Anamorphic Chaetosphaeriaceous Fungi from China

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Abstract

Chaetosphaeriaceae is one of the largest families in Sordariomycetes that commonly found on decaying leaf, fruit, branch, bark and wood in both terrestrial and submerged environment in nature. This paper reports our research result of diversity, taxonomy and phylogeny of anamorphic Chaetosphaeriaceae in China, which is based on a systematic study with an integrated approach of morphological observation and phylogenetic analysis for a large collection (>1300 herbarium specimens and 1100 living strains). The family Chaetosphaeriaceae is further expanded to accommodate 89 accepted genera, including 22 new genera and 10 newly assigned genera. Most of these genera (except for *Chaetosphaeria* and several other relatively large genera) are delimited as monophyletic genera with well-defined diagnostic characters in morphology. The phylogenetic connection of non-phialidic *Sporidesmium*-like fungi with the family is further confirmed and expanded to 10 different genera. The polyphyletic *Codinaea*/*Dictyochaeta*/*Tainosphaeria* complex is further resolved with a taxonomic framework of 28 monophyletic genera by redelimitation of *Codinaea* and *Dictyochaeta* with narrow concept, acceptance of the 16 established genera, and finally introduction of 10 new genera. *Chloridium* is phylogenetically redefined as monophyletic genus with narrow concept as typified by the type species, a systematic review in both generic and species level is still needed. For biodiversity of chaetosphaeriaceous fungi, a total of 372 species in 76 genera, including 126 new species, 48 new combinations, and 1 new name, are documented. The identification keys are provided for most genera, especially the large genera such as *Codinaea*, *Codinaeella*, *Stiblochaeta*, *Cryptophiale*, *Thozetella*, *Dinemasporium* and *Pseudolachnella*. In addition, ten known species were excluded from the family and reclassified. One of the future research area for this family should be the systematic revision of several relatively large polyphyletic genera, including *Bahusutrabeja*, *Ellisembia*, *Stanjehughesia*, *Cacumisporium*, *Chaetosphaeria*, *Chloridium*, *Craspedodidymum*, *Cryptophiale*, *Cryptophialoidea*, *Dictyochaetopsis*, *Minimidochium*, and many published species of *Codinaea* and *Dictyochaeta*.

Key words Chaetosphaeriaceae, anamorphs, diversity, taxonomy, phylogeny, China

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Table of contents

Introduction

Materials and methods

Result and discussion

Molecular phylogeny

Morphology

Taxonomy

Hyphomycetes genera with non phialidic anamorphs

Key to genera

Aunstrupia W.P. Wu & Y.Z. Diao

Ellisembia Subram.

Linkosia A. Hern. Gut. & B. Sutton

Lomaantha Subram.

Morrisiella Saikia & A.K. Sarbhoy

Riisgaardia W.P. Wu & Y.Z. Diao

Stanjehughesia Subram.

Falholtia W.P. Wu & Y.Z. Diao

Hyphomycetes with phialidic anamorph

Key to genera

Codinaea, *Dictyochaeta* and related genera

Dictyochaeta and related genera with asexual conidia

Aciculadictyochaeta W.P. Wu & Y.Z. Diao

Anacraspedodidymum C.R. Silva, R.F. Castañeda & Gusmão

Brachydictyochaeta W.P. Wu & Y.Z. Diao

Curvichaeta W.P. Wu & Y.Z. Diao

Dictyochaeta Speg.

Kylindrochaeta W.P. Wu & Y.Z. Diao

Lunatochaeta W.P. Wu & Y.Z. Diao

Phialogeniculata Matsush.

Phialoturbella Réblová & Hern.-Restr.

Codinaea and related genera with sexual conidia

Calceisporiella W.P. Wu & Y.Z. Diao

Codinaea Maire

Codinaeella Réblová & Hern.-Restr.

Menispora Pers.

Multiguttulispora C.G. Lin & J.K. Liu

Neotainosphaeria W.P. Wu & Y.Z. Diao

Nimesporella Réblová & Hern.-Restr.

Oxenbollia W.P. Wu & Y.Z. Diao

Paracodinaea W.P. Wu & Y.Z. Diao

Parabahusutrabeja W.P. Wu & Y.Z. Diao

Stilbochaeta Réblová & Hern.-Restr.

Tainosphaeria F.A. Fernández & Huhndorf

Xyladelphia Réblová A.N. Mill. & Hern.-Restr.

Doubtful and excluded species of *Codinaea* and *Dictyochaeta*

Chloridium, *Catenularia* and related genera

Chloridium Link

Catenularia Grove

Chaetosphaeria Tul. & C. Tul.

Craspedodidymum Hol.-Jech.

Ejnerjensenia W.P. Wu & Y.Z. Diao

Fusichloridium W.P. Wu & Y.Z. Diao

Fuscocatenula Réblová & A.N. Mill.

Nawawia Marvanová

Paragaeumannomyces Matsush.

Cryptophiale and related genera

Cryptophiale Piroz.

Cryptophialoidea Kuthub. & Nawawi

Paracryptophiale Kuthub. & Nawawi

Paraceratocladium R.F. Castañeda

Paraceratocладиella W.P. Wu & Y.Z. Diao

Zanclospora S. Hughes & W.B. Kendr.

Zanclosporiella W.P. Wu & Y.Z. Diao

Kionochaeta P.M. Kirk & B. Sutton

Kionochaetiella W.P. Wu & Y.Z. Diao

Phaeostalagmus W. Gams

Sporendocladia Arnaud ex Nag Raj & W.B. Kendr.

Sporoschisma and related genera

Anacacumisporium Y.R. Ma & X.G. Zhang

Cacumisporium Preuss

Exserticlava S. Hughes

Monosporoschisma W.P. Wu & Y.Z. Diao

Phaeodischloridium W.P. Wu & Y.Z. Diao

Sporoschisma Berk. & Broome

Stephembruneria R.F. Castañeda

Genera with synnematos conidiomata

Arcuatospora Réblová & Hern.-Restr.

Menisporopsis S. Hughes

Phialoarthrobotryum Matsush.

Phialosporostilbe Mercado & J. Mena

Genera with sporodochial conidiomata

Eucalyptostroma Crous & M.J. Wingf.

Eucalyptostromiella W.P. Wu & Y.Z. Diao

Minimidochium B. Sutton

Pseudothozetella W.P. Wu & Y.Z. Diao

Rattania Prabhu. & Bhat

Thozetella Kuntze

Verhulstia Hern.-Restr.

Phialidic coelomycetous genera

Key to genera

Dinemasporium Lév.

Brunneodinemasporium Crous & R.F. Castañeda

Pseudodinemasporium A. Hashim. & Kaz. Tanaka

Neopseudolachnella A. Hashim. & Kaz. Tanaka

Pseudolachnea Ranoj.

Pseudolachnella Teng

Conicomycetes R.C. Sinclair, Eicker & Morgan-Jones

Hoehneliella Bress. & Sacc.

Doubtful and excluded species

Parasporendocladia W.P. Wu & Y.Z. Diao

Phaeochloridium W.P. Wu & Y.Z. Diao

Sinochloridium W.P. Wu & Y.Z. Diao

Tubulicolla Réblová

Xyladictyochaeta Hern.-Restr., R.F. Castañeda & Gené

Xylolentia Réblová

Pseudofuscophialis Sivan. & H.S. Chang

Stratiphoromyces Goh & K.D. Hyde

Discussion

A list of new fungal names

References

Introduction

The family Chaetosphaeriaceae was originally introduced by Locquin (1984) for *Chaetosphaeria* Tul. & C. Tul., *Loramycetes* W. Weson, *Niesslia* Auersw., *Rhagadostoma* Körb., and *Zignoëlla* Sacc. It was validated by Réblová et al. (1999) to accommodate several wood-inhabiting ascomycetous genera including *Ascocodinaea* Samuels, Cand. & Magni, *Chaetosphaeria* Tul. & C. Tul., *Melanochaeta* E. Müll., Harr & Sulmont, *Melanopsammella* Höhn., *Porosphaerella* E. Müll. & Samuels, *Porosphaerellopsis* Samuels & E. Müll. and *Striatosphaeria* Samuels & E. Müll. Based on LSU sequence data, Huhndorf et al. (2004) placed the family in *Chaetosphaeriales*. Apart from their sexual morphology, members of these genera often reproduce by asexual stages or anamorphic stages, which are some well-known non-phialidic *Sporidesmium*-like fungi, phialidic coelomycetous genera such as *Dinemasporium* Lév. and *Pseudolachnella* Teng, and many phialidic hyphomycetous genera such as *Chloridium* Link, *Cryptophiale* Piroz., *Codinaea* Maire, *Dictyochaeta* Speg., *Kionochaeta* P.M. Kirk & B. Sutton *Sporidesmium*-like, and *Sporoschisma* Berk. & Broome (Borowska 1986; Dennis 1986; Costantinescu et al 1995; Heredia-Abarca et al 1995, 1997a, b; Okada et al. 1997; Réblová et al. 1999; Réblová 1998a, b, 1999a, b, 2000; Réblová and Gams 2000; Réblová and Winka 2000; Grunig et al. 2002; Réblová and Seifert 2003; Réblová 2004; Réblová et al. 2011a, b; Seifert et al. 2011; Hyde et al. 2016, b; Lin et al. 2019; Luo et al. 2019; Dayarathne et al., 2020; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, d).

Recent molecular phylogenetic analysis has allowed a better taxonomic and phylogenetic understanding of both sexual and asexual morphological genera, which resulted in continuously adjustment in the concept and number of asexual genera under the family Chaetosphaeriaceae (Réblová et al. 1999; Shenoy et al. 2006, 2007; Hyde et al. 2011; Crous et al. 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020; Ma et al. 2016; Wijayawardene et al. 2012, 2017, 2018; Jayasiri et al. 2015; Maharachchikumbura et al. 2016; Yang et al. 2018a, b; Hyde et al. 2019; Lin et al., 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, d). For example, under the family Chaetosphaeriaceae, Réblová et al. (1999) accepted 7 sexual genera with asexual stages in 13 asexual genera; Maharachchikumbura et al. (2016) and Wijayawardene et al. (2018) included 38 genera with both sexual and/or asexual stage; Lin et al. (2019) further expanded it to accommodate 49 genera, including 5 sexual genera, 35 hyphomycetous asexual genera and 9 coelomycetous asexual genera; Hyde et al. (2020) listed 39 genera, including both anamorphic and teleomorphic genera. Réblová et al. (2020, 2021a, b, c, d) in their systematic review of some polyphyletic genera established several new genera under the family. It is expected that, with more effort on molecular phylogenetic analysis and exploration of fungal biodiversity in tropical and subtropical area, more anamorphic genera and species will be discovered and assigned to the family in future (Ma and Zhang 2015; Crous et al. 2016, 2017, 2018, 2019, 2020; Li et al. 2016; Hsieh et al. 2021; Réblová et al. 2021).

In recent years, a major change effecting the nomenclature of anamorphic fungi is the new ruling in Article 59.1 of International Code of Nomenclature for Algae, Fungi, and Plants (ICN; Melbourne Code) (Hawksworth, 2011; Hawksworth et al. 2017). The change, known as “one fungus, one name”, has resulted in the implementation of a single name for one fungus, where formerly separate names were allowed for both asexual and sexual states. Based on this ruling, several papers have been published with recommendations for use or protection of competing generic names in *Sordariomycetes* (Rossman et al. 2013, 2015; Réblová et al. 2016). Molecular phylogeny has been a main enabler for implementation of “one fungus, one name” in both generic and species level under Chaetosphaeriaceae. This has led to several changes in taxonomy of chaetosphaeriaceous fungi: a). accommodation of many anamorphic genera in the family, such as *Codinaea*, *Craspedodidymum* Hol.-Jech., *Cryptophiale*, *Dictyochaeta* Speg., *Dinemasporium* Lév., *Menisporopsis* S. Hughes, *Nawawia* Marvanová, *Pseudolachnella* Teng; b). connection of anamorphic and teleomorphs in both generic and species level; c). inclusion of species with only anamorphs known under the teleomorphic genera such as *Chaetosphaeria* and *Tainosphaeria* F.A. Fernández & Huhndorf (Booth 1957; Gams and Holubová-Jechová 1976; Constantinescu et al. 1995; Fernández et al. 1998, 1999a, b; Réblová 1998a, b, 1999, 2000, 2004; Réblová and Winka 2000; Sivichai et al. 2000; Huhndorf and Fernández 2005a, b; Réblová et al. 2006; Shenoy et al. 2006; Fernández et al. 2006; Atkinson et al. 2007; Réblová and Seifert 2003, 2008; Liu et al. 2016; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021). However, classification of several phylogenetically closely related polyphyletic genera in the family Chaetosphaeriaceae has not been solved, these genera include *Codinaea*, *Dictyochaeta*, *Chloridium*, *Chaetosphaeria*, *Cryptophiale* and *Kionochaeta*. Systematic study with inclusion of the type species for all genera is a prerequisite to build a nature classification and nomenclature system for the Chaetosphaeriaceous fungi.

In nature the chaetosphaeriaceous fungi are ascomycetes seen with superficial ascomata, or conidiomata of coelomycetes or hairy-like effuse colony as their anamorphic state on decaying plant material including leaf, stem, bark, rotten wood, and fruits. They have a cosmopolitan distribution and are known in both temperate and tropical climates, from herbaceous to woody plants, and in both terrestrial and freshwater (Gams and Holubová-Jechová 1976; McKenzie 1982, 1991, 1992, 1993a, b, 2008; McKenzie et al. 1992, 2000, 2000a; McKenzie and Hyde, 1996; McKenzie and Kuthubutheen 1993; Goh and Hyde 1996a; Goh 1997; Hyde and Goh 1997, 1998, 1999; Marvanova 1997; Réblová et al. 1999; McKenzie et al 2000, 2004; Ho et al. 2002; Réblová 2004; Fernández

and Huhndorf 2005; Fernández et al. 2006; Maharachchikumbura et al. 2015, 2016; Xia 2017; Lin et al. 2019; Luo et al. 2016, 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, d).

The family Chaetosphaeriaceae have not been systematically studied in China. Only few genera and species were reported in various publications (Teng 1963; Tai 1978; Tseng and Chen 1987; Guo 1989, 1992, 1997; Zhuang 2001; Xu and Zhang 2012; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020). In our study of microfungi from China during last 25 years, more than 1300 specimens bearing asexual fungi belonging to *Chaetosphaeriaceae* were collected from different localities in China. From these specimens, more than 1100 living strains were obtained and preserved for further study. The herbarium specimens, together with the obtained strains, were studied systematically for their biodiversity, taxonomy, and phylogeny, which forms the foundation for the current publication. Based on morphological study and phylogenetic analysis of fresh specimens and strains obtained from China, Japan and UK, we further expand the Chaetosphaeriaceae to accommodate 89 genera with 22 new genera and 10 already known anamorphic genera. For the species diversity, we record the anamorphic Chaetosphaeriaceous fungi with 372 species in 760 genera mainly from China, including 126 new species. All new species are fully described and illustrated, and the identification keys for most of the genera are provided. DNA barcodes (ITS and LSU) were generated for all studied genera and species with pure cultures successfully obtained from the fresh specimens. In a revision of these fungi, we proposed 55 new combinations based on the revision of some genera of Chaetosphaeriaceae.

Materials and Methods

Collection of Chaetosphaeriaceous fungi

Fresh specimens of dead plant material including leaf litter, dead branches, bark, rotten wood, and fruits from a variety of plants in various environments including forest, botanical garden and agriculture field were collected in many localities in different part of China (Figs. 1 and 2). Samples were taken to the laboratory in Zip-lock plastic or paper bags for examination; some of these specimens were also incubated in sterile moist chambers in the laboratory to induce more diversity of chaetosphaeriaceous fungi. Type specimens were preserved in the Mycological Herbarium, Institute of Microbiology, Chinese Academy of Science, Beijing (HMAS).

Morphological study and description

Morphological study is based on examinations of microscopic preparations made from both fresh specimens collected by the author and living cultures isolated from some of these specimens. For microscopic preparation and identification, the fresh material was mounted in distilled water. This is extremely important for proper identification of those species with appendages, especially the apical mucilaginous sheath, since this character might disappear quickly in preparations made in lactophenol or cotton blue. However, semi-permanent slide preparations were also made by mounting the specimens in cotton blue or lactophenol and sealing with nail varnish, for observation of conidiogenous cells and conidia (Sutton 1980b; Nag Raj 1993). Micro-morphological characters (conidiomata, conidiophores, conidiogenous cells, conidia) were examined using a Nikon ECLIPSE 80i and 90i compound microscope and photographed with a Canon 550 D and 600 D digital camera fitted to the microscope. Measurements of morphological structures were made with the Tarosoft (R) v.0.9.7 Image Frame Work program. Photographic plates were edited and combined using Adobe Photoshop CS6 Extended version 13.0.1 software (Adobe Systems, USA).

For description of genera and species, the terms used were based on *Dictionary of the Fungi* (Kirk et al. 2001). The citation of authors for fungal names follows *Authors of Fungal Names: A list of authors of scientific names of fungi* by Kirk and Ansell (1992). For description of new fungal genera and species, we followed the recommendation in “*How to publish a new fungal species, or name, version 3.0*” (IMA Fungus 12:11, 2021). *Mycobank* was used for registering all new fungal taxon.

Fungal strains, growth, and preservation

Pure cultures were obtained from freshly collected specimens by single spore isolation method. Germinated spores were observed with a stereomicroscope and transferred to potato dextrose agar (PDA) for examination of culture characteristics, sporulation, extraction of DNA and preservation. Colony color was determined according to the color charts of Rayner (1970). The cultures were grown on potato-dextrose agar for morphological study and preservation. All 1176 living strains were preserved in 15% glycerin under minus 80°C. All presentation data including ex-type strains are listed in Table 1 and Supplementary Table 1.

Genomic DNA extraction from the fungal strains

DNA extraction was performed from fresh fungal mycelia. Isolates were grown on PDA at 25°C under dark condition for 7-14 days, or until the colony with enough mycelium for DNA extraction. The mycelium was scraped off and collected in a 1.5 ml micro-centrifuge tube. Mycelium was ground to a fine powder in liquid nitrogen and genomic DNA was extracted using the Fungal gDNA Kit (BioMIGA, USA) according to the manufacturer's instructions. The DNA products were kept at 4 °C for use in regular work and duplicated at -20°C for long-term storage. For ITS sequence amplification, total genomic DNA was successfully extracted for all strains from fresh mycelia following a modified protocol of Doyle and Doyle (1987).

DNA amplification and sequencing

DNA amplification was performed by polymerase chain reaction (PCR). Primers pairs NS1 (5'-GTA GTC ATA TGC TTG TCT C-3') & NS4 (5'-CTT CCG TCA ATT CCT TTA AG-3') as defined by White et al. (1990) were used to amplify a region spanning approximately 1100 nucleotides from the small subunit of the rDNA (18S rDNA). LROR (5'-ACCCGCTGAACCTTAAGC-3') and LR5 (5'-TCCTGAGGGAACT TCG-3') primer pairs as defined by Vilgalys and Hester (1990) were used to amplify a segment of the large subunit 28S rDNA (approx. 850 nucleotides). ITS1 (5'-TCCGTAGGTGAACCTGCGG-3') or ITS5 (5'-GGAAGTAAAAGTCGTAACAAGG-3') and ITS4 (5'-TCCTCCGCTTATTGATATGC-3') primer pairs as defined by White et al. (1990) were used to amplify a segment of the ITS1, 5.8s and ITS2 regions. The amplification was performed in a 50 µl reaction volume as follows: 1X PCR buffer, 0.2 mM dNTP, 0.3 µM of each primer; 1.5 mM MgCl₂, 0.8 units Taq Polymerase and 5-10 ng DNA. The PCR products were checked on 1% agarose electrophoresis gels stained GelRed® Nucleic Acid Gel Stain (41003).

PCR products were then purified using minicolumns, purification resin and buffer according to the manufacturer's protocols (Amersham product code: 27-9602-01). DNA sequencing was performed using the primers mentioned above in an Applied Biosystem 3730 DNA Analyzer by SinoGenoMax Company Limited. For each fungal strain, sequences obtained for the respective primers (LROR & LR5, NS1 & NS4, ITS1, ITS5 and ITS2) were manually aligned to obtain an assembled sequence using one of the following programs, VectorNTI, Bioedit (Hall 1999) or SnapGene.

Sequence alignment and phylogenetic analysis

Original sequences were checked using various bioinformatics program including Vector NTIO, BioEdit, SnapGene, along with reference sequences originated from previous publications. The relevant homogenous sequences were obtained by BLAST searches from GenBank. All sequences generated in this study are listed in Table 1. All public sequences used in this study are listed in Supplementary Table 2. Alignments for each locus were done in MAFFT v7.307 online version (Katoh and Standley 2016) and manually verified in MEGA v.7 (Tamura et al. 2013; Kumar et al. 2016) to allow maximum alignment and minimize gaps. The files for Bayesian inference analyses and maximum likelihood analyses were formatted with Mesquite v3.04. Phylogenetic analyses were performed using Bayesian Inference (BI) and Maximum-Likelihood (ML) approaches with MrBayes v. 3.2.6 (Ronquist et al. 2012), and PhyML v. 3.0 (Thompson et al 1997; Guindon et al. 2010), respectively. For Bayesian inference analysis, the best evolutionary model for each locus was determined using MrModelTest v. 2.3 (Nylander, 2004). Posterior probabilities (PP) (Rannala and Yang 1996; Zhaxybayeva and Gogarten 2002) were calculated by Markov Chain Monte Carlo sampling (MCMC), using the estimated evolutionary models. Two analyses of four MCMC chains were run from random trees for 12000000 generations and sampled every 1000 generations. The first 25 % of trees were discarded as the burn-in phase of each analysis and posterior probabilities determined from the remaining trees. For the ML analysis, the general time reversible model was applied with an invariable gamma-distributed rate variation (GTR+I+G). Phylogenetic trees were drawn with Figtree v1.4.3. All the sequences generated were deposited in GenBank (Table 1), typification in Index Fungorum (<http://www.indexfungorum.org>), novel taxonomic descriptions in MycoBank (<https://www.mycobank.org>), and the multi-locus alignments and trees in TreeBASE (submission number: 29086).

Result and Discussion

Molecular phylogeny

Both ITS and LSU sequences were successfully obtained from 259 living strains of chaetosphaeriaceous fungi (hyphomycetes and coelomycetes) collected from China, Japan, and UK, and the final concatenated alignment

consisting of 1734 characters. Based on the phylogenetic analysis by using the integrated data set of ITS and LSU sequences, these strains were assigned to the monophyletic groups. One to several representative ITS and LSU sequences from each species were used in the phylogenetic analysis. The ML and BI analyses based on combined LSU and ITS sequence data provided similar tree topologies. The ML tree is shown in Fig. 3.

In the phylogenetic tree, the 508 strains (including 270 fresh isolates) of Chaetosphaeriaceae included in the analysis distributed in 21 clades with more than 100 lineages representing genera or natural groups of species with strong support (95/1.0).

Clade 1 includes all known species of *Calvolachnella*, *Rattania*, and several species known as *Codinaea*/*Dictyochaeta* and now as *Codinaeella*. The *Codinaea*/*Dictyochaeta* species in this clade are *Codinaea lambertiae*, *C. pini*, *C. simplex*, *C. sinensis*, *C. yunnanensis*, *Dictyochaeta coryli*, *D. mimusopis* and several new species. They are distantly related to other two linkages in the clade and also to other species (including the type species) of the two genera, the recently established new genus *Codinaeella* is adapted to accommodate them. Morphologically these species also share some similarity on morphology, such as absence of setae or if present not clustered with conidiophores, solitary conidiophores, terminal conidiogenous cells with funnel-shaped collarettes, and aseptate conidia bearing one setulae at each end, which are different from the type species of these two genera, *Codinaea* and *Dictyochaeta*. None of these species has been known with teleomorph.

Clade 2 includes species of *Anacacumisporium*, *Phialoturbella*, *Phialogeniculata*, *Flectospora*, *Tainosphaeria*, *Tainosphaeriella* and several unknown species (Lin et al. 2019; Réblová et al. 2021b). These unknown species are distantly related to other linkages in the clade, several new genera, including *Calceisporiella*, *Oxenbolliia*, *Parabahusutrabeeja*, and *Paracodinaea*. Morphologically the species in this clades are very variable on conidiophores, conidiogenous cells, conidia and conidial setulae. However, none of them produces setae among the conidiophores. Combining with morphological and phylogenetic analysis, these genera can be well defined as monophyletic genera with reasonable diagnosis characters.

Clade 3 includes species in three different genera, *Anacraspedodidymum*, *Phialoarthrobotryum* and *Thozetella*. *Phialoarthrobotryum* is a newly assigned genus to Chaetosphaeriaceae, based on the ex-type material of the type species. *Thozetella* is resolved as a monophyletic clade with strong support value in all analysis. Morphologically, *Thozetella* is also unique in forming sporodochial and/or synnematal conidiomata, microawns and setose conidia (Seifert et al. 2011). *Chaetosphaeria rivularia*, originally described with both teleomorph and *Thozetella* anamorph on wood submerged in freshwater in southern France, is phylogenetically closely related to other species of the genus, while distinct from other *Chaetosphaeria* species (Ariyawansa et al. 2015). *Phialoarthrobotryum submersum* is included in this clade, but it is not the type species of the genus. Morphologically all these three genera produce phialidic conidiogenous cells, but diverse on types of conidiomata (sporodochia in *Thozetella*, synnemata in *Phialoarthrobotryum*, solitary conidiophores in *Phialoarthrobotryum*), shape of conidia, and with or without conidial setulae.

Clade 4 includes species in three genera, *Infundibulomyces*, *Menisporopsis*, *Minimidochium* and *Phialosporostilbe*. All included species of *Menisporopsis*, including *M. breviseta*, *M. anisospora*, *M. dushanensis*, *M. pandanicola*, *M. pirozynskii*, *M. theobromae* (the type species of the genus), and several undescribed species, are resolved as a monophyletic clade with strong support value in all analysis. These species are distantly related to other three linkages in the clade and also the type species of *Arcuatosporea*, a recently established genus segregated from *Menisporopsis* (Réblová et al. 2021b). Morphologically all these four genera form complex conidiomata (vs. solitary conidiophores), phialidic conidiogenous cells, setose conidia in wet spore mass, but diverse on types of conidiomata (sporodochia in *Minimidochium*, synnemata in *Phialosporostilbe* and *Menisporopsis*, and cupulate to infundibuliform in *Infundibulomyces*) and shape of conidia.

Clade 5 represents the single genus *Dinemasporium*. A total of 23 species, including 18 known *Dinemasporium* species with DNA sequences available and 5 new species are included in this clade and formed a monophyletic group with strong support value. New ITS and LSU sequences were also generated from fresh material for two species, *D. ligongense* and *D. sinensis*, previously published by us but without DNA bar code.

Clade 6 represents two different monophyletic genera, *Arcuatosporea* and *Menispora*. All species of *Arcuatosporea*, *A. novae-zelandiae*, *A. seorsa*, and several undescribed species, cluster together with strong support, this further supports the segregation of *Arcuatosporea* from *Menisporopsis* (Réblová et al. 2021b). Morphologically the 1-septate conidia and synnemata surrounding the seta becoming unilateral towards their apices are the characteristics of these species, and differs from the closely related genus *Menisporopsis* (aseptate conidia, setae centrally located in synnemata).

Clade 7 represents one non-phialidic species *Stanjehughesia kaohsiungensis* and several phialidic *Codinaea/Dictyochaeta* species which are now known as *Stilbochaeta*, including *Codinaea aquatica*, *Dictyochaeta canshangensis*, *D. septata*, *D. submersa* and 4 undescribed species. These *Codinaea/Dictyochaeta* species are distantly related to other linkages where other *Codinaea* and *Dictyochaeta* species are included, the recently established new genus *Stilbochaeta* is adapted to accommodate them. Morphologically these species also share some similarity on morphology, such as presence of sterile or fertile setae or with long conidiophores if not, several conidiophores cluster together with one setae at the base, terminal conidiogenous cells with funnel-shaped collarettes, and septate conidia bearing one setulae at each end, which are also different from the type species of the two genera, *Codinaea* and *Dictyochaeta*. *Stanjehughesia kaohsiungensis* is distantly related to *Stanjehughesia hormiscioides*, the type species of *Stanjehughesia*, and also other *Sporidesmium*-like fungi with affinity to Chaetosphaeriaceae, the new genus *Falholtia* is created for this fungus.

Clade 8 includes nineteen species of *Bahusutrabeja*, *Codinaeopsis*, *Phialolunulospora*, and *Codinaea/Dictyochaeta*. Morphologically all these species produce solitary or grouped conidiophores, terminal phialidic conidiogenous cells, and hyaline and aseptate conidia with setulae. *Nimesporella capillacea* and two undescribed *Codinaea/Dictyochaeta* species with no setae, polyphialidic conidiogenous cells, and hyaline, aseptate, ellipsoid conidia form a distantly related linkage with strong support, the recently established new genus *Nimesporella* is adapted for them. The rest *Codinaea/Dictyochaeta/Codinaeopsis* species included in this clade are distantly related to other linkages in this clade and also other clades where *Dictyochaeta* and other known *Codinaea* species are included in the analysis. Majority of these species also share some similarity on morphology, such as presence of sterile or fertile setae or if not then with long conidiophores, several conidiophores cluster together with one setae at the base, terminal conidiogenous cells with funnel-shaped collarettes, and aseptate conidia bearing one setulae at each end, which are aligned with the type species of *Codinaea*, *Codinaea aristata*. Two species without setae and solitary conidiophores, *Codinaea ellipsoidea* and *C. puerensis*, are also included in this clade and both are with long conidiophores.

Clade 9 represents species of nine different well-defined monophyletic genera, *Brunneodinemasporium*, *Dendrophoma*, *Hoehnliella*, *Neopseudolachnella*, *Polynema*, *Pseudodinemasporium*, *Pseudolachnea*, *Pseudolachnella* and *Striatosphaeria*. Among them, *Striatosphaeria* is the only genus with solitary conidiophores and dark colored conidia, while all other genera produce synnemata (*Polynema*, *Hoehnliella*) or cupulate to acervuloid conidiomata. This clade is unrelated to the linkage containing *Dinemasporium* species, which shares most similarity on morphology with several genera included in this clade. *Hoehnliella* with synnemata and cupulate conidiogenous region is a newly assigned genus to the family Chaetosphaeriaceae.

Clade 10 represents a single genus *Multiguttulispora*. This is a recently established genus (Lin et al., 2019). In this genus, the solitary or grouped conidiophores are with terminal polyphialidic conidiogenous cells bearing funnel-shaped collarettes, and hyaline, ellipsoid, multiguttulate and 3-septate conidia with one setulae at each end.

Clade 11 includes all known species of *Adautomilanezia*, *Gonytrichum*, *Sporoschisma*, and some species of *Chloridium*. *Adautomilanezia* with sporodochia, setae and ellipsoid, brown and 3-septate conidia forms a distant linkage. All *Sporoschisma* species are grouped together as a strongly supported clade unrelated to other linkages in this clade. In this clade, *Chaetosphaeria inaequalis*, all known *Gonytrichum* species, and some *Chloridium* species, including the type species of both anamorphic genera, are grouped into two unrelated linkages, but is not strongly supported. However, in several research papers, some of these species are grouped together as a strongly supported linkage (Lin et al. 2019; Luo et al. 2019; Réblová et al. 2021a, b, c, d). These species are characterized by simple or branched conidiophores, terminal or lateral monophialidic conidiogenous cells bearing funnel-shaped collarettes with multisporeulating loci, and hyaline or very pale brown, aseptate, globose, ellipsoid to cylindrical conidia in cirrhi or slimy heads. *Chloridium* in narrow concept, as typified by the type species *C. virescens*, is adapted for these fungi. The percurrently proliferating conidiophores, multiple sporulating loci within the collarette, and hyaline to very pale brown, globose, ellipsoid, cylindrical, and aseptate conidia in cirrhi or slimy heads are the main diagnostic characteristics of *Chloridium* s. str.

Clade 12 represents seven non phialidic *Sporidesmium*-like fungal species, including the type species of *Lecythothecium* (*L. aurantiaca*), *Lomaantha* (*L. pooga*), *Pyrigemmula* (*P. duriligni*), and 3 *Ellisembia* species. The type species of *Lecythothecium* and *Pyrigemmula* are grouped together other *Ellisembia* as a strongly supported linkage. Morphologically all these species are *Sporidesmium*-like fungi with well-developed conidiophores (except for *P. duriligni*) with or without percurrent proliferations, terminal conidiogenous cells, and cylindrical to fusiform, brown to dark brown, distoseptate conidia with or without apical filamentous extension (Réblová and Winka 2001; Wu and Zhuang 2005; Magyar et al. 2011). The teleomorphs are also

reported for two of these species, *E. aurea* and *L. duriligni*, both with fusiform to ellipsoid, multiseptate and versicolored ascospores (Réblová and Winka 2001; Magyar et al. 2011).

Clade 13 includes species of *Fuscocatenula*, *Lunatochaeta*, *Sporendocladia*, *Phaeostalagmus*, *Verhulstia*, 7 species of *Chaetosphaeria* (*C. innumera*), some species of *Chloridium*. The 23 species in this clade form 12 strongly supported linkages, each represents a distinct monophyletic genus including well solved genera *Chaetosphaeria* s. str., *Fuscocatenula*, *Lunatochaeta*, *Phaeostalagmus*, *Sporendocladia* and *Verhulstia*. The 12 species of *Chaetosphaeria* and *Chloridium* are grouped into 6 unrelated linkages, the anamorph of these species are *Chloridium*-like with solitary conidiophores with only percurrent or sympodial proliferations, terminal monophialidic conidiogenous cells with funnel-shaped collarete bearing single sporulating, and hyaline, globose, ellipsoidal to subcylindrical conidia, and belong to *Chloridium* section *Gongromeriza* (proliferation of the conidiophores only percurrent) and *Psilobotrys* (proliferation of the conidiophores mainly sympodial) (Gams & Holubová-Jechová, 1976). *Chaetosphaeria innumera*, the type species of the genus *Chaetosphaeria*, is clustered together with its *Chloridium botryoideum* anamorph and two other species. *Chaetosphaeria lentomita* W. Gams. & Hol.-Jech. (anamorph: *Chloridium pachytrachelum* W. Gams. & Hol.-Jech.), *Chloridium lignicola* and *Chloridium pini* are grouped together as a linkage with strong support. *Chaetosphaeria myriocarpa* (anamorph: *Chloridium claviforme*) and *Chaetosphaeria pygmaea* (anamorph: *Phialophora phaeophora*) are grouped into one strongly supported linkage. Each of the rest 4 species, *Chaetosphaeria guttulata*, *C. mangrovei* (no anamorph known), *Chaetosphaeria preussii* (anamorph: *Chloridium preussii*) and one unidentified *Chloridium* species forms their own linkage. *Chaetosphaeria guttulata* is unique in non-phialidic conidiogenous cells bearing many tiny protuberant conidiogenous loci and hyaline septate conidia (Luo et al., 2019). Two strains (78259 and 78345), with *Dictyochaeta* s. str. morphology, forms a strongly supported linkage unrelated to others in the clade and also *Dictyochaeta* s. str., the new genus *Lunatochaeta* is created for them.

Clade 14 includes thirteen species of *Achrochaeta*, *Craspedodidymum*, *Chaetosphaeria*, *Kionochaeta*, and two new genera in 7 unrelated linkages. The ITS and LSU sequences were for the first time generated for the type species of *Craspedodidymum*, *C. elatum*, and is assigned to the family Chaetosphaeriaceae. New genera are established for two strongly supported linkages, *Brachydictyochaeta* for two species with *Dictyochaeta*-like morphology but differs in setae with sterile and swollen apex, and phialides directly formed from setae or superficial hyphae; *Neotainosphaeria* for an unnamed fungus with solitary conidiophores, terminal monophialidic conidiogenous cells bearing cylindrical collarete, and hyaline, globose, aseptate conidia without 1 short setulae. Two *Chaetosphaeria* species, *C. dilabens* and *C. hebetiseta*, both with *Chloridium*-like anamorph and hyaline, fusiform and septate ascospores, are included in unrelated linkages, they probably represent different genera (Réblová and Gams 2000).

Clade 15 represents seven species of the recently emended *Dictyochaeta* in narrow concept. This genus was recently well documented by Réblová et al. (2021c). Morphologically the genus is characterized by presence of sterile or fertile setae, short but well-developed conidiophores in small group and associated with setae at the base, terminal phialidic conidiogenous cells with funnel- or cylindrical-collarettes, and hyaline, falcate, clavate to fusiform, usually asymmetrical conidia bearing no setulae.

Clade 16 represents species of *Eucalyptostroma* and *Paliphora*. These two genera are morphologically very different, ie. sporodochial conidiomata, phialidic conidiogenous cells, and hyaline, aseptate, fusiform-shaped conidia in *Eucalyptostroma*, and solitary setiform conidiophores, intercalary conidiogenous cells with sporulating pore, and hyaline, septate, cylindrical to fusiform conidia in *Paliphora*.

Clade 17 includes two sporodochial species in two unrelated linkages with strong support and they are distantly related to all other genera in Chaetosphaeriaceae. Two new genera are established for them: *Eucalyptostromiella* characterized by is characterized by fresh-yellow colored sporodochial conidiomata, flask-shaped phialidic conidiogenous cells, and hyaline, aseptate, falcate or lunate conidia; and *Pseudothozetella* characterized by sporodochial conidiomata, cylindrical phialidic conidiogenous cells, and hyaline, aseptate, falcate or lunate conidia.

Clade 18 represents *Chaetosphaeria longiseta*, *Dictyochaeta brevis*, and several unnamed species. They are grouped into a strongly supported clade unrelated to others, the recently established new genus *Xyladelphia* is adapted for them. The diagnosis characters for the genus are presence of sterile setae with darker ultimate or penultimate cells, grouped short conidiophores associated with setae at base, terminal mono- or poly-phialidic conidiogenous cells bearing funnel-shaped collarettes, and hyaline, aseptate, falcate, multiguttulate, asymmetrical or symmetrical conidia with or without setulae. *Dictyochaeta brevis* is an exception in lacking versicolored setae (Lin. et al. 2019).

Clade 19 represents non phialidic *Sporidesmium*-like fungi (*Aunstrupia*, *Linkosia*, *Morrisiella*, *Riisgaardia*), several phialidic hyphomycetous genera with lateral phialides (*Cryptophiale*, *Cryptophialoidea*, *Paracryptophiale*, *Paraceratocladium*, *Kionochaeta ivoriensis*) and one synnematus genus (*Conicomycetes*). For the non phialidic species, four unrelated linkages with strong supports represent different genera including two known genera, *Linkosia* and *Morrisiella*, and two new genera, *Aunstrupia* and *Riisgaardia*. These four genera can also be easily deaferented by morphology. Interestingly *Kionochaeta ivoriensis* is grouped together as a subclade with a separate linkage, a new genus *Kionochaetiella* is established for this fungus. Morphologically it is similar to other *Kionochaeta* species, but differs in fertile region only in apical part of the conidiophores. All species with lateral phialides are grouped into 4 subclades representing *Cryptophiale*, *Cryptophialoidea*, *Paracryptophiale* and *Paraceratocladium*. However, separation of *Cryptophiale* and *Cryptophialoidea* seems to be not strongly supported. *Paraceratocladium polisetosum* is an independent linkage unrelated to the type species *P. silvestre* of the genus and other genera with lateral phialides, the new genus *Paraceratocladia* is created for this fungus and morphologically it differs from *Paraceratocladium* by branched setae, and cylindrical conidia.

Clade 20 represents species of *Zanclospora*, *Nawawia* and *Chaetosphaeria minuta*. The monophyletic genus *Zanclospora* was recently emended and revised by Réblová et al. (2021a). *Chaetosphaeria minuta* is an independent linkage unrelated to *Zanclospora* and other *Chaetosphaeria* species. Morphologically it is similar to *Zanclospora* in setiform conidiophores, lateral phialides, and hyaline, aseptate, cylindrical to fusiform conidia, but differs from *Zanclospora* in unilateral phialides produced along the midsection and aseptate ascospores. The new genus *Zanclosporiella* is created for this fungus.

Two unique fungi, *Paraceratocladium polisetosum* and *Chaetosphaeria luquillensis*, are grouped together with clade 13 to 20, but as unrelated linkages. Combined their unique morphology and phylogeny, two new genera *Paraceratocladia* and *Aciculadictyochaeta* are created. The diagnosis characters for *Aciculadictyochaeta* are presence of sterile setae, grouped conidiophores with association of setae at the base, terminal monophialidic, conidiogenous cells with funnel-shaped collarettes, and hyaline, cylindrical to obclavate, septate conidia (Fernández and Huhndorf, 2005).

Clade 21 includes all species of *Catenularia*, *Ericiosphaeria*, *Exserticlava*, *Paragaeumannomyces*, *Obeliospora minima*, *Stanjehughesia*, *Stephembruneria*, and some diversified *Chaetosphaeria* species. Several strongly supported subclades and linkages are formed within this clade, each probably represents a different genus.

One of the strongly supported subclade include all known species of *Paragaeumannomyces*, *Obeliospora minima*, *Chaetosphaeria chalaroides*, and the recently established monotypic *Ericiosphaeria*. The monophyletic genus *Paragaeumannomyces* was recently emended and revised with 12 species, most are for the known *Chaetosphaeria* species (Huhndorf and Fernández, 2005; Réblová et al., 2020, 2021a). The genus is characterized by scolecospore ascospore, and unique anamorph if present with reduced conidiophores, bulb-shaped conidiogenous cells with broad collarettes, and hyaline, aseptate, cuneiform-shaped conidia with 3-4 corners from top view, and sometime each corner bearing one simple setulae. One isolate of *Obeliospora minima* is included in the analysis and it is clearly grouped together with all other species of *Paragaeumannomyces* in the same clade, thus it is transferred to the genus *Paragaeumannomyces*.

Another strongly supported sub-clade includes 5 species of *Exserticlava*, *Stephembruneria* and *Stanjehughesia*. The anamorphs of these fungi are with colored and septate conidia from terminal phialidic conidiogenous cells of the conidiophores (Réblová and Seifert 2003; Fernández and Hannaford, 2005). Except for *Stephembruneria*, the teleomorph and anamorph connections were established for all included species in *Exserticlava* and *Stanjehughesia hormiscioides*, and the ascospore are fusiform, versicolored and septate for all of these connected species. The type species of *Stanjehughesia*, *S. hormiscioides* (= *Chaetosphaeria caesariata*), is in this clade and unrelated to other *Sporidesmium*-like fungi.

Chaetosphaeria fusiformis with hyaline and 3-septate ascospores and unique anamorph known as *Chloridium cylindrosporum* is an independent linkage. Combined on molecular phylogeny and unique morphology, the new genus *Fusichloridium* is created for this fungus, its diagnosis characters are hyaline and 3-septate ascospore, *Chloridium*-like anamorph with fertile setae, grouped conidiophores in association with setae at the base, terminal polyphialidic conidiogenous cells with sympodial proliferations and funnel-shaped collarette, and hyaline, aseptate, cylindrical conidia (Gams and Holubová-Jechová 1976; Réblová and Gams, 1999).

Chaetosphaeria aquatica also forms a separate linkage in this clade. This fungus, with only anamorph known, is morphologically unique in producing solitary conidiophores, terminal mono-phialidic and percurrently proliferating conidiogenous cells with inconspicuous collarettes and broad sporulating loci, and ellipsoid, 3-septate, versicolored conidia. The new genus *Phaeodischloridium* is established for this fungus.

Two *Chaetosphaeria* species, *C. catenulata* and *C. cubensis*, both with colored, aseptate and cuneiform conidia with 3-5 corners from top view, are grouped together as a strongly supported subclade unrelated to the type species

of *Chaetosphaeria*. The anamorphic name *Catenularia* was adapted as generic name, and emending and revision of the genus was provided by Réblová et al. (2021d).

The other *Chaetosphaeria* species in this clade, including *C. fennica*, *C. lignomollis*, *C. metallicans*, *C. curvispora*, *C. cylindrospora* and *C. conirostris*, also form different leakages unrelated to the type species of *Chaetosphaeria*. Morphologically they are diverse, and revision is needed to determine their taxonomic position. Here two new genera, *Curvichaeta* and *Kylindrochaeta* are created for *Chaetosphaeria curvispora* and *C. lignomollis* respectively.

Finally, *Neonawawia malaysiana* seems to be unique in Chaetosphaeriaceae and forms an independent linkage unrelated to any other clades in the family Chaetosphaeriaceae. Morphologically it is similar with *Nawawia*, with reduced conidiophores, monophialidic conidiogenous cells with broad collarettes, and hyaline, aseptate, cuneiform-shaped conidia bearing one setulae at each of corner on top of the conidia.

Morphology of non-phialidic chaetosphaeriaceous fungi

Among the known anamorphs of chaetosphaeriaceous fungi, only a few genera and species are known with non-phialidic conidiogenous cell and holoblastic conidia. All these anamorphs are *Sporidesmium*-like fungi, except for *Paliphora* Sivan. & B. Sutton, and their teleomorphs, if known, are with multiseptate and versicolor ascospores (Shoemaker and White 1985, Subramanian 1992, 1995, Réblová 1999a, Réblová and Winka 2001, Magyar et al. 2011, Seifert et al. 2011, Hyde et al. 2019, Luo et al. 2018, 2019, Hsieh et al. 2021, Réblová et al. 2021b).

For the *Sporidesmium*-like anamorph, they are diverse in conidiomata, conidiophores and conidia, and the detailed description and discussion can be found in previous publications (Ellis 1971, 1976, Wu and Zhuang 2005, Seifert et al. 2011, Réblová et al. 2021b). The synnematus conidiomata are only found from *Morrisiella* and *Falholtia*, while the conidiophores in most other genera are solitary or in groups. The conidiophores can be well-developed, or reduced to conidiogenous cells only (Fig. 4). The pigmented conidia are various in shape, being cylindrical, sub-cylindrical, fusiform, ellipsoidal, obclavate, rostrate; their septation can be euseptate or distoseptate (Fig. 5). In some species, the conidia are with germinating pore. The morphology of conidiophores and conidia are used for distinguishing different species.

Paliphora is very special among the chaetosphaeriaceous anamorphs in producing solitary, unbranched setiform conidiophores with sterile apex and intercalary conidiogenous cells bearing sporulating pores, from which the cylindrical to fusiform conidia are produced (Sivanesan and Sutton 1985, Kuthubutheen 1987c, Alcorn 1996, Gusmão et al. 2008, Goh et al. 2014b, Malosso et al. 2017).

Morphology of phialidic chaetosphaeriaceous fungi

Most of the anamorphic chaetosphaeriaceous fungi with phialidic conidiogenous cells are hyphomycetes, however 8 coelomycetous genera are also assigned to the family (Lin et al. 2019; Luo et al. 2019). Morphological characters of conidiomata, conidiophores, conidiogenous cells, and conidia are important in identification of these fungi (Sutton 1980; Nag Raj 1993; Réblová et al. 1999; Réblová and Winka, 2000; Fernández et al. 2006; Seifert et al. 2011; Hashimoto et al. 2015a, b; Liu et al. 2016; Wijayawardene et al. 2016; Lin et al. 2019; Luo et al. 2019).

Conidiomata

The conidiomata of anamorphic chaetosphaeriaceous fungi are diverse and vary in form from acervuloid to cupulate, sporodochial and synnematus, and solitary or grouped conidiophores (Kendrick 1980; Sutton 1980; Nag Raj 1993; Seifert et al. 2011; Hashimoto et al. 2015a, b; Lin et al. 2019; Luo et al., 2019).

Acervuloid to cupulate conidiomata (Fig. 6), usually superficial, globose to navicular, unilocular, with variable excipular development and adorned with sterile hyphae or setae, are formed from most known coelomycetous genera of chaetosphaeriaceous fungi, including *Brunnepdinemasporium* Crous & R.F. Castañeda, *Calvolachnella* Marinc., T.A. Duong & M.J. Wingf., *Dendrophoma* Sacc., *Dinemasporium* Lév., *Infundibulomyces* Plaingam, Somrith. & E.B.G. Jones, *Neopseudolachnella* A. Hashim. & Kaz. Tanaka, *Pseudodinemasporium* A. Hashim. & Kaz. Tanaka, *Pseudolachnea* Ranoj. and *Pseudolachnella* Teng (Sutton 1980; Nag Raj 1993; Plaingam et al. 2003; Somrithipol et al. 2008; Crous et al. 2012; Hashimoto et al. 2015a, b; Hernández-Restrepo et al. 2016). Basal stroma of these cupulate conidiomata are usually well-developed, of textura angularis or epidermoidea, cells thick-walled, brown, pale brown or subhyaline, cells bordering the lateral wall becoming darker and thicker; lateral excipulum hardly exist or well-developed and usually consisting of cells of textura porrecta, cells thin- or thick-walled, pale brown to brown, marginal cells becoming darker (Sutton, 1980, Nag Raj 1993, Hashimoto et al. 2015a, b). In *Infundibulomyces*, the basal stroma is poorly developed and lateral excipulum consisting of textura prismatica with a single cell layer, appearing nidulariaceous (Plaingam et al. 2003; Somrithipol et al. 2008). In *Brunnepdinemasporium*, *Dendrophoma*, *Dinemasporium*, *Neopseudolachnella*, *Pseudolachnea* and

Pseudolachnella, the conidiomata are usually associated with setae, which are dark brown, septate, with acute or obtuse tips, and restricted to the basal part of the lateral walls. While in *Calvolachnella* and *Infundibulomyces*, no setae are formed in conidiomata.

Sporodochial conidiomata (Fig. 7), with superficial pulvinate stroma supporting conidiophores or conidiogenous cells on its upper surface and not covered by the substrate, usually with a basal stroma, were found from several genera, including *Adautomilanezia* Guesmão, S.S. Silva, Fiuza, L.A. Costa & T.A.B. Santos, *Eucalyptostroma* Crous & M.J. Wingf., *Minimidochium* B. Sutton, *Rattania* Prabhub. & Bhat, *Pseudothozetella* W.P. Wu & Y.Z. Diao, *Thozetella* Kuntze and *Verhulstia* Hern.-Restr. (Sutton 1980a, b; Nag Raj 1993; Seifert et al. 2011; Crous et al. 2016; Hernández-Restrepo et al. 2016). In *Minimidochium*, *Rattania* and *Verhulstia*, the sporodochia are usually associated with setae, which are dark brown, septate, with acute or obtuse tips, and arising from basal stroma (Sutton, 1969; Prabhugaonkar and Bhat 2009). In *Thozetella*, the sterile element microawns in various shapes is produced from conidiogenous cells in most species (Pirozynski and Hodges 1973; Sutton and Cole 1983; Monteiro et al. 2016, 2019). In all these genera, the conidia are embedded in wet spore mass covering the upper part of sporodochia.

Synnematus conidiomata (Fig. 7), consisting of a compacted group of erect and fused hyphae, the apices, and occasionally intercalary cells of which function as conidiophores and conidiogenous cells, is the characteristics of several genera, including *Conicomycetes* R.C. Sinclair, Eicker & Morgan-Jones, *Hoehneliella* Bress. & Sacc., *Hyphopolynema* Nag Raj, *Menisporopsis* S. Hughes, *Phialoarthrobotryum* Matsush., *Phialosporostilbe* Mercado & J. Mena, and some species of *Codinaea* Maire, *Dictyochaeta* Speg., and *Thozetella* (Hughes and Kendrick 1968; Kuthubutheen 1987a; Mercado Sierra and Mena Portales 1995; Kuthubutheen and Nawawi 1991a, b; Shirouzu and Harada 2004; Seifert et al. 2011; Granados et al. 2014; Lin et al. 2019). Among these genera, *Conicomycetes*, *Hyphopolynema*, *Menisporopsis*, *Arcuatospira* and *Phialosporostilbe* produce synnemata with setae, which are formed from out layers or basal stroma of the synnemata, same as the conidiophores. The synnematus conidiomata in *Conicomycetes* and *Hoehneliella* are cupulate, and for this reason, these two genera have also been treated as coelomycetes (Illman and White 1985a, b; Okada and Tubaki 1986; Nag Raj 1993).

Setae and microawns

The sterile or fertile setae are commonly found in some genera and species among the anamorphic chaetosphaeriaceous fungi (Seifert et al. 2011). These setae are pale to dark brown in color, septate, and thin- or thick-walled, simple, or branched, and formed from hyphae or stroma. In most cases, the conidiophores and/or conidiogenous cells are associated with setae in different approaches, including in cluster, as branches, or directly from setae. The setae can be used for delimitation of genera and species (Figs. 7-9). In *Catenularia*, *Conicomycetes*, *Dinemasporium*, *Hoehneliella*, *Menisporopsis*, *Minimidochium*, *Neopseudolachnea*, *Obeliospora*, *Paraceratocladium*, *Pseudodinemasporium*, *Pseudolachnea*, *Pseudolachnella*, *Rattania*, *Sporoschisma*, and some species of *Chloridium* and *Dictyochaeta*, the setae are always sterile; while in *Cryptophiale*, *Cryptophialoidea*, *Dictyochaetopsis*, *Gonytrichum*, *Kionochaeta*, *Menispora*, *Paracryptophiale*, *Phialosporostilbe*, *Zanclospora*, and some species of *Chloridium*, *Codinaea* and *Dictyochaeta*, the setae are fertile as setiform conidiophores (Seifert et al., 2011; Luo et al., 2016).

Morphology of setae, including color, septation, location of fertile region, appearance of apex, varies a lot and in some cases, they can be used as one of the characters to define genus or species. For example, all species of *Sporoschisma* produce sterile setae usually called capitate hyphae with rounded apex covered by a mucilaginous sheath; the very characteristic structures of fertile region, including how the conidiophores and conidiogenous cells produced and arranged, can be used to distinguish *Kionochaeta*, *Cryptophiale*, *Cryptophialoidea*, *Paracryptophiale* and *Zanclospora* from other genera. This was further confirmed by our phylogenetic analysis and redelimitation of *Codinaea/Dictyochaeta*.

Microawns, another type of sterile element, are the characteristics for the genus *Thozetella* (Agnihotrudu 1958; Pirozynski and Hodges 1973; Sutton and Cole 1983). The term microawn was proposed by Pirozynski and Hodges (1973) while reviewing *Thozetella* species, because these cells were described as awn-shaped cells in the descriptions of *T. cristata*, *T. nivea*, *T. radicata* and *T. Tocklaiensis* (Pirozynski and Hodges 1973). They are cells produced by the conidiogenous cells, mixed and immersed in the conidial mass, hyaline, aseptate or septate, thin- or thick-walled, smooth or verruculose, and with different shapes, which are important for distinguishing the genus from others and also delimiting species within the genus (Sutton and Cole 1983, Silva and Graudi 2013, Monteiro, Castañeda-Ruiz and Gusmão, 2016). New species described afterward were found to have many other forms of microawns including vermiform, clavate with coronate projections, Y-shaped, L-shaped, sigmoid-shaped (Barbosa et al., 2011; Silva and Graudi, 2013; Monteiro et al. 2016) (Fig. 10). The origin of microawns from the conidiogenous cells was confirmed in *T. effusa* and *T. canadensis* by Sutton and Cole (1983). They did not consider microawns to be reproductive structures and described these cells as arising from phialides. Speculations of microawn function include carrying the conidia for dispersal and acting as an obstacle for the animals that feed on conidia (Pirozynski and Hodges 1973; Waipara et al. 1996; Paulus et al. 2004).

Conidiophores

In all coelomycetous genera and some sporodochial hyphomycetous genera (Fig. 8), the conidiophores are pale brown to brown, branched or unbranched, arising from inner layer cells of cavity, terminated with 1 to several hyaline to very pale brown conidiogenous cells (Sutton 1980, Nag Raj 1993; Luo et al. 2020).

In hyphomycetous genera with synnemata (Figs. 8-9), the conidiophores are closely compacted group of erect and fused hyphae, the apices, and occasionally intercalary cells of which function as conidiophores and conidiogenous cells. In some genera and species such as *Phialosporostilbe*, *Menisporopsis*, and some species of *Dictyochaeta* Speg. and *Codinaea* Maire the upper part of the conidiophores is separated from each other; while in other species or genera such as some species of *Menisporopsis*, *Arcuatospora* and *Hyphopolynema*, they are always closely packed together.

In most other hyphomycetous genera (Figs. 8-9), the conidiophores are macronematous or mononematous, brown, septate, straight, or slightly flexuous, solitary, or formed in clusters and arising directly from hyphae or basal stroma composed of dark brown and thick-walled cell. In many genera including *Anacacumisporium* Y.R. Ma & X.G. Zhang, *Bahusutrabeeja* Subram. & Bhat, *Cacumisporium* Preuss, *Catenularia* Grove, *Chloridium* Link, *Codinaea* Marine, *Craspedodidymum* Hol.-Jech., *Dictyochaeta* Speg., *Exserticlava* S. Hughes, *Multiguttulispora* C.G. Lin & J.K. Liu, *Nawawia* Marvanová and *Stephembruneria* R.F. Castañeda, the conidiophore are simple, unbranched, septate, cylindrical, brown and becoming paler towards the apex and terminated with an apical conidiogenous cells (Figs. 11-12). In *Dictyochaetopsis* Aramb. & Cabello, *Menispora* Pers. and *Phaeostalagmus* W. Gams, the setiform conidiophores are with lateral conidiogenous cells forming directly from cell of conidiophores or lateral branches from which the terminal conidiogenous cells are formed (Réblová et al. 2006, Réblová and Seifert 2008). In some other genera, including *Cryptophiale* Piroz., *Cryptophialoidea* Kuthub. & Nawawi, *Kionochaeta* P.M. Kirk & B. Sutton, *Paracryptophiale* Kuthub. & Nawawi and *Zanclospora* S. Hughes & W.B. Kendr., the setiform conidiophores are simple or branched, and the closely packed conidiogenous cells forming the fertile regions in special part of the setiform conidiophores. In *Sporoschisma* Berk. & Broome, the conidiophores are solitary, each composed of a bulbous base, a cylindrical stipe, and a swollen venter, like those found in *Chalara*-like fungi. In *Paraceratocladium* and *Paraceratocладиella* the conidiophores are hyphae-like, the simple or branched setae are covered by anastomosing superficial hyphae functioned as conidiophores, which are smooth, septate, thin-walled, and bearing intercalary conidiogenous cells.

Conidiogenous cells and conidiogenesis

The conidiogenous cells are phialidic in majority of known anamorphic chaetosphaeriaceous fungi (Cole 1986; Sutton 1986; Magyar et al. 2011; Seifert et al. 2011; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020). Only a few genera are with other types, the conidiogenous cell with a solitary terminal pore in *Pyrigemmula* D. Magyar & R. Shoemaker (Magyar et al. 2011), intercalary conidiogenous cells with pore in *Paliphora* Sivan. & B. Sutton (Sivanesan and Sutton 1985; Kuthubutheen 1987c; Alcorn 1996; Gusmão et al. 2008; Goh et al. 2014b; Malosso et al. 2018); and terminal holoblastic in *Ellisembia* and *Lecythothecium* Réblová & Winka (Hughes 1953, 1958; Réblová and Winka 2000; Seifert et al. 2011; Lin et al. 2019).

Same as in other fungi with phialidic conidiogenous cells (for examples *Colletotrichum*, *Aspergillus*, *Fusarium*, *Penicillium*, *Trichoderma*), the phialidic anamorphic chaetosphaeriaceous fungi produce conidia by inside wall building and in rapid basipetal succession from the open end of special conidiogenous cells called phialides (Fig. 12). The phialidic conidiogenous cells can be terminal (*Anacacumisporium*, *Cacumisporium*, *Chloridium*, *Dictyochaeta*, *Sporoschisma* and many other genera), intercalary (*Paraceratocladium*, *Paliphora*) or lateral (*Cryptophiale*, *Cryptophialoidea*, *Dictyochaetopsis*, *Zanclospora*) (Fig. 12).

Shapes of phialides are ampulliform, cylindrical, lageniform or ellipsoidal. They are straight, except for some species of *Menispora* and *Menisporopsis*, where the apex of phialide curved strongly downwards towards the main stipe (Huhndorf and Fernández 2005; Réblová et al 2006). They can be hyaline, pale brown to dark brown, thin- or thick-walled, smooth- or rough-walled with different decoration on the cell wall. These characters together with others are also used for distinguishing taxa in genera and species.

The phialide can be monophialidic with a single apical collarette or polyphialidic with several collarettes. The open end of the phialides can be rather simple, seen as a narrow or wide opening without collarette, or being well-developed collarette in funnel shapes. The funnel-shaped collarettes in some species, especially those with several collarettes in the same phialide, easily break out and are carried away by conidia, this left the conidiogenous cells as non-phialidic and sympodial appearance as seen in *Multiguttulispora*, and some *Dictyochaeta* species with big spore. The phialides in *Sporoschisma* and *Sporendocladia* are somewhat special, where they are subcylindrical to urceolate, composed of a subcylindrical to ellipsoidal venter and a narrower, cylindrical or more or less tubular, open ended collarette, and the conidia are endogenous inside the tubular collarettes and extruded in phase chain (Nag Raj and Kendrick 1975; Minter et al. 1983; Huhndorf and Fernández 2005; Fernández, et al, 2006).

In most genera and species, the phialides don't change in length while producing many successive conidia, though many wall layers build up inside the open end of the cell. However, in some species of *Anacacumisporium*, *Bahusutrabeeja*, *Cacumisporium*, *Chloridium* and *Exserticlava*, significant elongation of the sporulating region happens during the sporulating process to form thin-walled extraction structures (Goos 1969a, b; Bhat 1994; Réblová 2000; Tsui et al. 2001b; Fernández et al. 2006). In most of these cases, multisporulating loci is connected. Anellidic extension was also observed in some species of *Chloridium*.

Sympodial extension of conidiogenous cells also happens in many species of the chaetosphaeriaceous fungi, this is because the accumulation of wall layers after rapid basipetal succession may eventually plug the opening, and in phialides to which this happens there is a tendency to produce sympodial extensions that develop new fertile apertures. Such phialides are called polyphialides since they have more than one conidiogenous locus.

In all coelomycetous genera and some sporodochial hyphomycetous genera, the conidiophores are mainly hyaline to pale brown, branched or unbranched, arising from inner layer cells of cavity, terminated with 1 to several hyaline to very pale brown conidiogenous cells (Sutton 1980; Minter et al. 1983; Nag Raj 1993; Li et al. 2020).

Ultrastructural studies on conidial anatomy and conidiogenesis were studied for a few phialidic chaetosphaeriaceous fungi by electron microscopy, and these species, including *Chloridium chlamydosporium*, *Cacumisporium capitulatum*, *Codinaea setosa*, *Gonytrichum macrocladum*, *Phialocephala humicola* and *Sporoschisma nigroseptatum*, represented different conidium ontogenies (Hammill 1972; Gams and Holubová-Jechová 1976; Fersiani and Maggi 1990; Onofri et al. 1994; Ho et al. 1998). Conidium ontogeny has been used for phylogenetic analysis among genera of the family and also used for delimitation of genera, subgenera and species within the family (Gams and Holubová-Jechová 1976; Réblová and Winka 2000; Fernández et al. 2006).

In *Chloridium chlamydosporium*, a collarete is formed by rupture of an electron-dense, outer wall layer of tip of phialides. An electron-transparent inner wall layer blow out into a conidium initial which after expansion is delimited by a septum. Then a new conidium develops to one side of the previously delimited conidium. Conidia are therefore not produced concurrently from within the collarete, but are produced sequentially and sympodially (Hammill 1972). Scanning electron and interference contrast microscopy of conidiogenesis in *Phialocephala humicola* (now transferred into *Chloridium* in this work) revealed a replacement wall building development type with a peculiar disposition of conidia at the apex of the conidiogenous cell, a pattern of conidiogenesis similar to the one described for *Chloridium chlamydosporium*, was proposed by Onofri et al (1994). In *Sporoschisma nigroseptatum* (Ho et al. 1998), the development of the conidial chain involves endogenous conidial ontogeny, apical wall-building, and retrogressive conidial delimitation followed by cessation of apical wall-building, then replacement ring wall-building of additional retrogressively delimited conidia, and extrusion of the true conidial chain through the terminal aperture of the conidiogenous cell. Maturation of conidia involves deposition of two inner wall layers and formation of five distosepta. Conidial chains secede schizolytically. No proliferation of the conidiogenous cell occurs and the conidium is delimited by a cross wall that is discontinuous with the periclinal wall. Each conidium has polar plug-and-socket-like structures that are interlocked between adjacent conidia along the conidial chain. Similar plug-and-socket-like structures are also seen in other *Sporoschisma* species.

Conidia

Conidia of anamorphic chaetosphaeriaceous fungi display the greatest variation in shape, color, septation and appendage, and are useful characters for identification of genera and species. The different types of conidia encountered in these fungi are illustrated in Figs. 13 and 14.

In conidial shape and septation, large variation, from amerosporous, didymosporous, phragmosporous, dictyosporous (only in *Paracryptophiale*) or scolecosporous, can be found from different genera and even among species within same genus (Sutton 1980; Kuthubutheen and Nawawi 1991a, b, c, d, e; Nag Raj 1993; Whitton et al 2000, 2001; Seifert et al. 2011). The distoseptate conidia is only found in *Exserclavata*, while all other genera are aseptate or euseptate conidia (Seifert et al. 2011). Many different conidial shapes can be found among the chaetosphaeriaceous fungi, including globose, ellipsoid, cuneiform, pyramidal, fusiform, falcate, cylindrical, filamentous, star-shaped. For some genera, especially most monotypic genera, the conidial shape and septation are used as one of diagnosis characters of the genus. For example, all species of *Catenularia* have aseptate and cuneiform-shaped conidia; all species of *Phialosporostilbe* have aseptate and round-tetrahedral to pyramidal conidia with 3 protuberant corners each corner furnished with one setula and base slightly truncate to rounded with one setula. On the other hand, in most of other genera including *Codinaea*, *Dictyochaeta*, *Chloridium*, *Craspedodidymum*, *Cryptophiale*, and *Pseudolachnella*, the conidial shapes and septation vary a lot among different species in the same genus. For example, the conidial shapes in *Dictyochaeta* can be falcate, fusiform, globose, and ellipsoidal; the conidial septation can be aseptate, uniseptate, to multiseptate. In conidial septation, euseptate conidia are found from almost all species with septate conidia, except for *Exserticlava* with distoseptate conidia (Hughes 1978; Seifert et al. 2011).

Majority of the known genera in the family produces hyaline spores in various shape and septation, including *Bahusutrabeeja*, *Brunneodinemasporium*, *Chloridium*, *Codinaea*, *Conicomycetes*, *Cryptophiale*, *Cryptophialoidea*, *Dendrophoma*, *Dictyochaeta* (except for a few species), *Dictyochaetopsis*, *Dinemasporium*, *Eucalyptostroma*, *Hyphopolynema*, *Infundibulomyces*, *Kinochaeta*, *Menispora*, *Menisporopsis*, *Multiguttulispora*, *Nawawia*, *Neopseudolachnella*, *Paraceratocladium*, *Paracryptophiale*, *Phaeostalagmus*, *Pseudodinemasporium*, *Pseudolachnea*, *Pseudolachnella*, *Rattania*, and *Zanclospora*. While the rest genera, including *Adautomilanezia*, *Anacacumisporium*, *Calvolachnella*, *Catenularia*, *Craspedodidymum*, *Exserticlava*, *Phialoarthrobotryum* and *Sporoschisma*, are with pigmented conidia which can be subhyaline, pale brown to dark brown.

Many species among these fungi produce conidia with tubular appendage, which can be single to multiple, branched, or unbranched, bipolar and/or lateral. These genera include *Anacacumisporium*, *Bahusutrabeeja*, *Brunneodinemasporium*, *Calvolachnella*, *Codinaea*, *Dendrophoma*, *Dictyochaeta*, *Dictyochaetopsis*, *Dinemasporium*, *Hyphopolynema*, *Infundibulomyces*, *Menispora*, *Menisporopsis*, *Multiguttulispora*, *Nawawia*, *Neopseudolachnella*, *Phialosporostilbe*, *Pseudodinemasporium*, *Pseudolachnea*, *Pseudolachnella*, *Rattania* and *Thozetella*. Other type of appendages is rarely found in these fungi, except for *Brunneodinemasporium jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde with mucilaginous balls at the conidial ends to connect the conidia in short false chains (Lu et al. 2016). These appendages are very often used as useful character to delimit genera and species.

In all the coelomycetous genera of the anamorphic chaetosphaeriaceous fungi, the conidia are produced in slime within the conidiomata, and adhering material can be seen when making slide preparation. This is also true for all sporodochial and synnematus genera such as *Conicomycetes*, *Eucalyptostroma*, *Hoehneliella*, *Minimidochium*, *Phialosporostilbe*, *Rattania*, and *Thozetella*. In hyphomycetous genera, it is also very common that the conidia are produced in slime and adhering to the fertile region, as seen in *Chloridium*, *Codinaea*, *Cacumisporium*, *Dictyochaetopsis*, *Gonytrichum*, *Kionochaeta*, *Menispora*, *Menisporopsis*, *Nawawia* and *Paraceratocladium*. In some species, the conidia are produced in false chains as seen in *Sporoschisma*, *Sporendocladia*, some species of *Chloridium*, *Catenularia*. For those species with dark spore or hyaline spore in big size, such as *Anacacumisporium*, *Catenularia*, *Craspedodidymum*, *Stephembruneria*, the conidia are usually not produced in slime.

Production of microconidia were reported in several genera and species, especially in pure culture (Fernández and Huhndorf 2005; Fernández et al. 2006; Crous et al. 2011; Hashimoto et al. 2015b). For example, Fernández and Huhndorf (2005) described both macroconidia and microconidia in *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf and *Tainosphaeria crassiparis* F.A. Fernández & Huhndorf; Hashimoto et al. (2015b) reported the production of microconidia on natural substrate in *Neopseudolachnella unseptata* A. Hashim., Sat. Hatak. & Kaz. Tanaka, *Pseudolachnea fraxini* Crous, *Pseudolachnella asymmetrica* A. Hashim., Y. Harada & Kaz. Tanaka and *Pseudolachnella longiciliata* (I. Hino & Katum.) Nag Raj. In our study, we also observed the microconidia production in *Menisporopsis* sp., *Phialosporostilbe setosa* Bhat & W.B. Kendr. and *Pseudolachnella minima* on natural substrates.

Pure culture

Conidia or ascospores of many chaetosphaeriaceous fungi are usually easy to germinate and pure culture can be obtained. Those with hyaline spore such as *Codinaea*, *Dictyochaeta*, *Chloridium*, *Menisporopsis*, *Dinemasporium* and *Pseudolachnea* are usually easy to be cultivated and grow relatively fast on PDA. We also observed that spores of some genera and species were difficult to germinate or took long time to germinate under current condition. For example, we failed to obtain living strains from many specimens of *Catenularia*, pure cultures were obtained only from small portions of studied specimens of *Obeliospora* and *Sporoschisma*. The growth rate of these fungi are very different, some grow fast (for example, most species of *Codinaea*, *Dinemasporium*), while other grow very slow (for example, most species in *Ellisembia*, *Stanjehughesia*, *Sporoschisma*).

Colony of these fungi on artificial media, including growth rate, superficial hyphae, pigmentation etc, varies a lot among different species within a genus and among different genera in the family (Figs 16-17). They have some value in distinguishing different species within a genus. Sporulation often occurs on laboratory media from freshly obtained strains, and much variations on conidiomata, conidiophores and conidia were seen within the species.

Anamorph and teleomorph connection in Chaetosphaeriaceae

Among the 89 accepted genera in Chaetosphaeriaceae, only 17 genera are with teleomorph and anamorph connection established for at least one species within the genus, while a large number of genera are known with only anamorph (Borowska 1986; Dennis 1986; Costantinescu et al 1995; Heredia-Abarca et al 1995, 1997a, b; Okada et al. 1997; Rébolvá 1998a, b, 1999a, b, 2000, 2004, 2014; Rébolvá et al. 1999, 2000, 2011a, b, 2020, 2021a, b, c; Rébolvá and Gams 2000; Rébolvá and Winka 2000; Grunig et al. 2002; Rébolvá and Seifert 2003; Hyde et al. 2016a, b; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020).

The genera with both anamorph and teleomorph connection established for at least one species include *Cacumisporium*, *Catenularia*, *Chaetosphaeria*, *Morrisiella*, *Chloridium*, *Dictyochaeta*, *Exserticlava*, *Lecythothecium*, *Menispora*, *Paragaeumannomyces*, *Pyrigemmula*, *Sporoschisma*, *Striatosphaeria*, *Tainosphaeria*, *Thozetella* and *Zanclospora*. These connections were confirmed by both pure culture study and phylogenetic analysis. The anamorphic stage within a specific genus is usually well defined and can be morphologically distinguished from others, which provides a useful character to define these genera (Costantinescu et al. 1995, Réblová 1998a, b, 1999a, b, 2000, 2004; Réblová and Gams 2000; Réblová and Winka 2000; Réblová and Seifert 2003; Fernández and Huhndorf 2005; Réblová et al. 2011a, b). However, the anamorphs for *Chaetosphaeria* and *Tainosphaeria* are diverse and morphologically very different on conidiophores, conidiogenous cells, conidiogenesis and conidia (Hyde et al. 2016a; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020).

Biodiversity of anamorphic chaetosphaeriaceous fungi

Anamorphic chaetosphaeriaceous fungi are geographically widespread and found in different habitats from temperate, subtropical to tropical regions, the diversity is richer in subtropical and tropical areas (Agnihotru 1963a, b; Ellis 1971, 1976; Holubová-Jechová 1972, 1973a, b, 1982, 1984, 1987a, b, 1988a, b; Kirk 1981a, b, 1982a, b, 1983a, b, 1985, 1986, 1992; Castañeda-Ruiz 1984, 1985a, b, c, 1986a, b, 1987, 1988; Castañeda-Ruiz and Arnold 1985a, b; Holubová-Jechová and Castañeda-Ruiz 1986; Holubová-Jechová and Mercado Sierra 1984, 1986; Holubová-Jechová and Revay 1987; Sutton 1980; Subramanian 1986; Bhat and Kendrick 1993; Nag Raj 1993; Ellis and Ellis 1997; Réblová et al. 1999, 2020, 2021a, b, c, d; Prabhugaonkar and Bhat 2009; Bhat 2010; Hashimata et al. 2015a, b; Castañeda-Ruiz et al. 2016; Hyde et al. 1999, 2016; Maharachchikumbura et al. 2016b; Lin et al. 2019; Luo et al. 2019). Most of them are found as saprobes in leaf litter, decaying branches and bark, decaying fruit and seeds, rotten wood etc., that recycle carbon and other nutrient elements. In nature they grow on broad plant species including monocotyledons (such as bamboo, palms, grasses, banana) and dicotyledonous plant in natural forest and gardens (Goh and Hyde 1996a; Whitton et al. 2012; Liu et al. 2016; Luo et al. 2016, 2019; Dai et al. 2017; Perera et al. 2020). Apart from commonly known on terrestrial occurrence, many species in the family Chaetosphaeriaceae are found from submerged woods in stream. So far, approximately 17 genera in this family have been reported from fresh water (Schoenlein-Crusius and Grandi 2003; Seifert et al. 2011; Liu et al. 2016; Lin et al. 2019; Luo et al. 2019; Zheng et al. 2020). Seeds and fruits of various tree, especially wild seeds and fruits also provided a good substrate for rich chaetosphaeriaceous fungi (Perera et al. 2018, 2020).

Among the many known genera under the Chaetosphaeriaceae, some of them are monotypic genus or with only few species; while several genera, such as *Dictyochaeta*, *Dinemasporium*, *Pseudolachnella*, *Chloridium* and *Thozetella* are with many known species and new species are constantly being described. For examples, more than 120 species names under *Dictyochaeta* have been registered in Mycobank. Number of new species described under Chaetosphaeriaceae are rapidly increasing during last 10 years (Fig. 18), partly contributed by sorting out the species complex with DNA sequencing and phylogenetic analysis, and also more dedicated researching effort from subtropical or tropical areas (Liu et al. 2016; Luo et al. 2016, 2019).

Although not so many species of *Chaetosphaeriaceae* have been reported in China, our researches demonstrated great diversity of these fungi and a total of with 304 species in 70 genera were recorded from China, including 129 new species, and 117 new recorded species.

Taxonomy

Chaetosphaeriaceae Réblová, M.E. Barr & Samuels, Sydowia 51: 56, 1999

Stroma absent or restricted to a thin sometimes subiculate crust. Ascomata perithecial, superficial, often aggregated, black, globose to conical, usually rather thin walled but often carbonaceous, glabrous or setose the ostiole papillate, periphysate. Interascal tissue of copious persistent true paraphyses. Asci cylindrical, persistent, thin-walled, not fissitunicate, with a well-developed refractive J-apical ring. Ascospores ellipsoidal to fusiform, transversely septate, sometimes fragmenting at the septa, hyaline to brown. Anamorphs hyphomycetous, coelomycetous, varied, with pigmented conidiophores and percurrently proliferating conidiogenous cells often with widely flared collarettes, conidia very varied in form but mostly small and hyaline.

Type genus: *Chaetosphaeria* Tul. & C. Tul.

Ecology/Substrate/host: Saprobes on decaying leaves, fruits, branches, stems, barks and wood of herbaceous or woody plants, terrestrial or submersed.

Distribution: Cosmopolitan, very frequent in temperate, subtropical, and tropical climates.

Notes: Based on phylogenetic analysis, the family Chaetosphaeriaceae is expanded with 89 accepted genera, including 22 new genera and 10 newly assigned genera (Table 2). All these genera (except for *Monosporoschisma*) are assigned with support from phylogenetic analysis by using integrated ITS and LSU data. Most of these

accepted genera (except for *Chaetosphaeria* and several others) are delimited as monophyletic generic concept with well-defined morphological diagnosis characters. Among these genera, only 12 genera (*Brunneodinasporium*, *Calvolachnella*, *Conicomycetes*, *Dendrophoma*, *Dinemasporium*, *Hoehneliella*, *Infundibulomyces*, *Neopseudolachnella*, *Polynema*, *Pseudodinemasporium*, *Pseudolachnea*, *Pseudolachnella*) are with coelomycetous anamorphs, while all other genera are with dematiaceous hyphomycetous anamorphs. In conidiogenesis, majority of these genera are with phialidic conidiogenous cells, and only 10 genera (*Aunstrupia*, *Ellisembia*, *Falholtia*, *Linkosia*, *Lomaantha*, *Morrisiella*, *Paliphora*, *Riisgaardia*, *Stanjehughesia* and *Zanclospora*) are with non-phialidic conidiogenous cells. The genus *Chaetosphaeria* is still a polyphyletic genus and revision is under way for monophyletic generic concept. The identification keys for both hyphomycetous and coelomycetous genera are provided as well under each session.

The 22 new genera are *Aciculadictyochaeta* W.P. Wu & Y.Z. Diao, *Aunstrupia* W.P. Wu & Y.Z. Diao, *Brachydictyochaeta* W.P. Wu & Y.Z. Diao, *Calceisporiella* W.P. Wu & Y.Z. Diao, *Curvichaeta* W.P. Wu & Y.Z. Diao, *Ejnerjensenia* W.P. Wu & Y.Z. Diao, *Eucalyptostromiella* W.P. Wu & Y.Z. Diao, *Falholtia* W.P. Wu & Y.Z. Diao, *Fusichloridium* W.P. Wu & Y.Z. Diao, *Kionochaetiella* W.P. Wu & Y.Z. Diao, *Lunatochaeta* W.P. Wu & Y.Z. Diao, *Kylindrochaeta* W.P. Wu & Y.Z. Diao, *Monosporoschisma* W.P. Wu & Y.Z. Diao, *Neotainosphaeria* W.P. Wu & Y.Z. Diao, *Oxenbollia* W.P. Wu & Y.Z. Diao, *Paracodinaea* W.P. Wu & Y.Z. Diao, *Parabahusutabeeja* W.P. Wu & Y.Z. Diao, *Paraceratocladia* W.P. Wu & Y.Z. Diao, *Phaeodischloridium* W.P. Wu & Y.Z. Diao, *Pseudothozetella* W.P. Wu & Y.Z. Diao, *Riisgaardia* W.P. Wu & Y.Z. Diao and *Zanclosporiella* W.P. Wu & Y.Z. Diao. The ten newly assigned anamorphic genera based on the ITS and LSU sequences generated from fresh specimens are *Hoehneliella* Bress. & Sacc., *Linkosia* A. Hern. Gut. & B. Sutton, *Lomaantha* Subram., *Minimidochium* B. Sutton, *Morrisiella* Saikia & A.K. Sarbhoy, *Paraceratocladium* R.F. Castañeda, *Paracryptophiale* Kuthub. & Nawawi, *Phialoarthrobotryum* Matsush., *Sporendocladia* Arnaud ex Nag Raj & W.B. Kendr. and *Stephembruneria* R.F. Castañeda. Concepts of some polyphyletic genera such as *Chloridium* Link, *Codinaea* Marie, *Dictyochaeta* Speg., *Ellisembia* Subram., *Menisporopsis* S. Hughes, *Paraceratocladium* R.F. Castañeda are future defined and emended.

It is expected that number of genera in family Chaetosphaeriaceae will be further expanded through revision of *Chaetosphaeria*, molecular phylogenetic analysis of relevant genera when DNA sequence data are available (for example: *Hyphopolynema* Nag Raj, *Morrisographium* M. Morelet, *Polybulbophiale* Goh & K.D. Hyde, *Stratiphoromyces* Goh & K.D. Hyde), and exploration of fungal biodiversity in tropical and subtropical area, more anamorphic genera and species will be discovered and assigned to the family in future (Morelet 1968; Subramanian 1971; Illman and White 1984, 1985b; McKenzie 1991a, b, c; Marvanová, 1997; Goh and Hyde 1998a, b; Eudardo et al 1999; Marincowitz et al. 2008; Seifert et al. 2011; Ma and Zhang 2015; Crous et al. 2016, 2017, 2018, 2019, 2020; Li et al. 2016; Luo et al., 2019; Hyde et al. 2020; Hsieh et al. 2021; Réblová et al. 2020, 2021a, b, c, d; Zheng et al. 2020, 2021).

For biodiversity of the chaetosphaeriaceous fungi, a total of 372 species in 76 genera, including 126 new species and 48 new combinations or new name, are documented in this paper. Among them, 304 species in 70 genera are reported from China, and majority of these genera and species are reported from our own studies of specimens and living strains. All these species are described and illustrated, and the identification keys for most of the genera are also provided. DNA barcodes (ITS and LSU) were generated for all studied genera and species with pure cultures successfully obtained from the fresh specimens. In revising the relevant genera and species, a total of 49 new combinations are made. A list of new genera, new species and new combination is found in the Appendix.

In addition, eight already described species are excluded from the Chaetosphaeriaceae and re-assigned to other fungal family, and subsequently 3 new genera, 3 new species, 1 new name and 6 new combinations are made. The three new genera are: *Parasporendocladia* W.P. Wu & Y.Z. Diao gen. nov., *Phaeochloridium* W.P. Wu & Y.Z. Diao gen. nov. and *Sinochloridium* W.P. Wu & Y.Z. Diao gen. nov.; the new species, new name and new combinations are: *Lareunionomyces foliicola* (P.M. Kirk) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Phialocephala foliicola* P.M. Kirk, ≡ *Sporendocladia foliicola* (P.M. Kirk) M.J. Wingf.), *Lareunionomyces kionochaetoides* (B. Sutton) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Sporendocladia kionochaetoides* B. Sutton), *Parasporendocladia bactrospora* (W.B. Kendr.) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Phialocephala bactrospora* W.B. Kendr., ≡ *Sporendocladia bactrospora* (W.B. Kendr.) M.J. Wingf.), *Phaeochloridium gamsii* W.P. Wu & Y.Z. Diao sp. nov., *Phaeochloridium geniculata* (Emden) W.P. Wu & Y.Z. Diao comb. nov., and *Phaeochloridium phaeosporum* (W. Gams & Hol.-Jech) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Chloridium phaeosporum* W. Gams & Hol.-Jech.), *Rhopalophora minima* W.P. Wu & Y.Z. Diao, *Sinochloridium bambusicola* W.P. Wu & Y.Z. Diao sp. nov., *Xyladictyochaeta eucalypti* (B. Sutton & Hodges) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Codinaea eucalypti* B. Sutton & Hodges), *Xylolentia matsushimae* W.P. Wu & Y.Z. Diao nom. nov. (≡ *Chloridium reniforme* Matsush.) and *X. palmicola* W.P. Wu & Y.Z. Diao sp. nov.

Table 2. A list of all accepted genera in the family Chaetosphaeriaceae (*genera not found from China; **genera tentatively assigned to the family, due to no DNA sequence available from the type specie; H = hyphomycetes, C = coelomycetes, S = sexual stage)

No	Generic name	No	Generic name
1	<i>Achrochaeta</i> Réblová & Hern.-Restr. (S & H)*	46	<i>Minimidochium</i> B. Sutton (H)**
2	<i>Aciculadictyochaeta</i> W.P. Wu & Y.Z. Diao (H)*	47	<i>Monosporoschisma</i> W.P. Wu & Y.Z. Diao (H)**
3	<i>Adautomilanezia</i> Gusmão, S.S. Silva, Fluza, L.A. Costa & T.A.B. Santos (H)*	48	<i>Morrisium</i> Saikia & A.K. Sarbhoy (H)
4	<i>Anacacumisporium</i> Y.R. Ma & X.G. Zhang (H)	49	<i>Multiguttulispora</i> C.G. Lin & J.K. Liu (H)
5	<i>Anacraspedodidymum</i> C.R. Silva, R.F. Castañeda & Gusmão (H)**	50	<i>Nawawia</i> Marvanová (H)
6	<i>Arcuatospora</i> Réblová & Hern.-Restr. (H)	51	<i>Neonawawia</i> J. Yang, K.D. Hyde & J.K. Liu (H)*
7	<i>Aunstrupia</i> W.P. Wu & Y.Z. Diao (H)	52	<i>Neopseudolachnella</i> A. Hashim. & Kaz. Tanaka (C)
8	<i>Brachydictyochaeta</i> W.P. Wu & Y.Z. Diao (H)	53	<i>Neotainosphaeria</i> W.P. Wu & Y.Z. Diao (H)
9	<i>Brunneodinemasporium</i> Crous & R.F. Castañeda (C)	54	<i>Nimesporella</i> Réblová & Hern.-Restr. (H)
10	<i>Cacumisporium</i> Preuss (S & H)	55	<i>Oxenbollia</i> W.P. Wu & Y.Z. Diao (H)
11	<i>Calceisporiella</i> W.P. Wu & Y.Z. Diao (H)	56	<i>Paliphora</i> Sivan. & B. Sutton (H)*
12	<i>Calvolachnella</i> Marinc., T.A. Duong & M.J. Wingf. (C) *	57	<i>Parabahusutrabeja</i> W.P. Wu & Y.Z. Diao (H)
13	<i>Catenularia</i> Grove (S & H)	58	<i>Paraceratocladium</i> R.F. Castañeda (H)
14	<i>Chaetosphaeria</i> Tul. & C. Tul. (S & H)	59	<i>Paraceratocleriella</i> W.P. Wu & Y.Z. Diao (H)
15	<i>Chalarodes</i> McKenzie (H)*	60	<i>Paracodinaea</i> W.P. Wu & Y.Z. Diao (H)
16	<i>Chloridium</i> Link (S & H)	61	<i>Paracryptophiale</i> Kubuth. & Nawawi 1994 (H)
17	<i>Codinaea</i> Maire (H)	62	<i>Paragaeumannomyces</i> Matsush. (S & H)
18	<i>Codinaeella</i> Réblová & Hern.-Restr. (H)	63	<i>Phaeodischloridium</i> W.P. Wu & Y.Z. Diao (H)
19	<i>Conicomycetes</i> R.C. Sinclair, Eicker & Morgan-Jones (H)	64	<i>Phaeonawawia</i> Goh (H)*
20	<i>Craspedodidymum</i> Hol.-Jech. (H)	65	<i>Phaeostalagmus</i> W. Gams (H)
21	<i>Cryptophiale</i> Piroz. (H)	66	<i>Phialoarthrobotryum</i> Matsush. (H)*
22	<i>Cryptophialoidea</i> Kuthub. & Nawawi (H)	67	<i>Phialogeniculata</i> Matsush. (H)
23	<i>Dendrophoma</i> Sacc. (C)*	68	<i>Phialosporostilbe</i> Mercado & J. Mena (H)
24	<i>Dictyochaeta</i> Speg. (S & H)	69	<i>Phialoturbella</i> Réblová & Hern.-Restr. (S & H)
25	<i>Dictyochaetopsis</i> Aramb. & Cabello (H)*, **	70	<i>Polynema</i> Lév. (C)*
26	<i>Dinemasporium</i> Lév. (C)	71	<i>Pseudodinemasporium</i> A. Hashim. & Kaz. Tanaka (C)
27	<i>Ejnerjensenia</i> W.P. Wu & Y.Z. Diao (H)	72	<i>Pseudolachnea</i> Ranoj. (C)
28	<i>Ellisembia</i> Subram. (H & S) **	73	<i>Pseudolachnella</i> Teng (C)
29	<i>Ericiosphaeria</i> Réblová & Hern.-Restr. (H)	74	<i>Pseudothozetella</i> W.P. Wu & Y.Z. Diao (H)
30	<i>Eucalyptostroma</i> Crous & M.J. Wingf. (H)	75	<i>Rattania</i> Prabhug. & Bhat (H)
31	<i>Eucalyptostromiella</i> W.P. Wu & Y.Z. Diao (H)	76	<i>Riisgaardia</i> W.P. Wu & Y.Z. Diao (H)
32	<i>Exserticlava</i> S. Hughes (S & H)	77	<i>Stilbochaeta</i> Réblová & Hern.-Restr. (H)
33	<i>Falholtia</i> W.P. Wu & Y.Z. Diao (H)	78	<i>Sporendocladia</i> Arnaud ex Nag Raj & W.B. Kendr. (H)

34	<i>Flectospora</i> Réblová & Hern.-Restr. (H)	79	<i>Sporoschisma</i> Berk. & Broome (S & H)
35	<i>Fusichloridium</i> W.P. Wu & Y.Z. Diao (H)	80	<i>Stanjehughesia</i> Subram. (S & H)
36	<i>Fuscocatenula</i> Réblová & A.N. Mill.	81	<i>Stephembruneria</i> R.F. Castañeda (H)
37	<i>Hoehneliella</i> Bress. & Sacc. (C)	82	<i>Striatosphaeria</i> Samuels & E. Müll. (S & H)*
38	<i>Infundibulomyces</i> Plaingam, Somrith. & E.B.G. Jones (C)*	83	<i>Tainosphaeria</i> F.A. Fernández & Huhndorf (S & H)
39	<i>Kionochaeta</i> P.M. Kirk & B. Sutton (H)	84	<i>Tainosphaeriella</i> Réblová & Hern.-Restr. (H)*
40	<i>Kionochaetiella</i> W.P. Wu & Y.Z. Diao (H)*	85	<i>Thozetella</i> Kuntze (S & H)
41	<i>Linkosia</i> A. Hern. Gut. & B. Sutton (H)	86	<i>Verhulstia</i> Hern.-Restr. (H)
42	<i>Lomaantha</i> Subram. (H)	87	<i>Xyladelphia</i> Réblová, A.N. Mill. & Hern.-Restr. (H)
43	<i>Lunatochaeta</i> W.P. Wu & Y.Z. Diao	88	<i>Zanclospora</i> S. Hughes & W.B. Kendr. (S & H)
44	<i>Menispora</i> Pers. (S & H)	89	<i>Zanclosporiella</i> W.P. Wu & Y.Z. Diao*
45	<i>Menisporopsis</i> S. Hughes (H)		

Hyphomycetous genera with non-phialidic anamorphs

Among the known anamorphs of chaetosphaeriaceous fungi, only a few genera and species were reported with non-phialidic conidiogenous cell and holoblastic conidia. All these anamorphs are *Sporidesmium*-like fungi, except for *Paliphora* Sivan. & B. Sutton, and their teleomorphs are with multiseptate and versicolor ascospores (Shoemaker and White 1985, Subramanian 1992, Réblová 1999a, Réblová and Winka 2001, Magyar et al. 2011, Seifert et al. 2011; Hyde et al. 2019; Luo et al. 2018; Luo et al. 2019; Hsieh et al. 2021; Réblová et al. 2021a). *Paliphora* is very special among the chaetosphaeriaceous anamorphs in producing solitary, unbranched setiform conidiophores with sterile apex and intercalary conidiogenous cells bearing sporulating pores from which the cylindrical to fusiform conidia are produced (Sivanesan and Sutton 1985, Kuthubutheen 1987c, Alcorn 1996, Gusmão et al. 2008; Goh et al. 2014b; Malosso et al. 2017).

Based on our phylogenetic analysis (Figs. 4 and 19), ten monophyletic genera including 3 new genera are accepted for *Sporidesmium*-like fungi under the Chaetosphaeriaceae. They are *Aunstrupia*, *Ellisembia*, *Falholtia*, *Linkosia*, *Lomaantha*, *Morrisiella*, *Riisgaardia*, *Stanjehughesia* and *Zanclospora*. Two generic names, *Lecythothecium* Réblová & Winka and *Pyrigemmula*, are treated as synonyms of *Ellisembia*.

Among these known species with non-phialidic conidiogenous cells, only three species have both anamorph and teleomorph found and also phylogenetically supported, including *Chaetosphaeria caesariata* (Clinton & Peck) Réblová with *Sporidesmium hormiscioides* as anamorph, *Lecythothecium duriligni* Réblová & Winka with *Sporidesmium folliculatum* (Corda) E. Mason & S. Hughes as anamorph, and *Ellisembia aurea* Réblová & J. Fourn with both anamorph and teleomorph in nature.

The living strains of many studied species were also studied on PDA (Figs. 20 and 63), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to hyphomycetous genera with non-phialidic anamorphs

1. Conidiogenous cells intercalary; conidia produced from sporulating pore *Paliphora*
1. Conidiogenous cell terminal; conidia not produced from sporulating pores 2
2. Conidia euseptate only 3
2. Conidia distoseptate or both eu- and disto-septate 7
3. Synanamorph of *Zanclospora* with phialides *Zanclospora*
3. Not synanamorph of *Zanclospora* 4
4. Conidiophores single, with doliiform-shaped proliferation *Aunstrupia*
4. Conidiophores in synnemata or in cluster, or absent, without proliferation 5
5. Conidiophores in synnemata or in cluster; conidia rostrate, verruculose *Falholtia*
5. Conidiophore absent; conidia smooth 6
6. Conidia obclavate, obclavate-rostrate, subcylindrical *Riisgaardia*
6. Conidia cylindrical, clavate, or obclavate *Stanjehughesia*
7. Conidiophores absent *Linkosia*
7. Conidiophores present or absent 8
8. Conidiomata synnematos; conidia without appendage *Morrisiella*

8. Conidiomata solitary; conidia with appendage 9
 9. Conidia obclavate, with branched appendage at the apex *Lomaanthes*
 9. Conidia fusiform to obclavate, rostrate, apical appendage not branched if present *Ellisembia*

Aunstrupia W.P. Wu & Y.Z. Diao, gen. nov.. MycoBank MB841515

Etymology: Named after Knud Aunstrup, the former vice president in Novozymes, who gave strong support for this study in early time.

Diagnosis: Similar to *Sporidesmium* on percurrently proliferated conidiophore and euseptate conidia, but phylogenetically belong to Chaetosphaeriaceae.

Type species: *Aunstrupia nodipes* (Penz. & Sacc.) W.P. Wu & Y.Z. Diao.

Saprobe on rotten leaves and petiole of palm. Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae, often forming network on the surface of the substrate. Teleomorph: unknown. Anamorph: Conidiophores macronematous, mononematous, solitary or in small group, simple, cylindrical, straight or slightly flexuous, smooth, septate, dark brown. Conidiogenous cells integrated, terminal, cylindrical, lageniform, ampulliform, smooth, dark brown, with up to 15 lageniform, ampulliform percurrent proliferations. Conidia acrogenous, solitary, dry, obclavate, rostrate, euseptate, sometimes constricted at the septa, brown to dark brown, become pale brown towards the apex, smooth, basal cell conic-truncate.

Ecology/Substrate/Host: Saprobe on decaying leaves and petioles of palm.

Geographical distribution: Tropical and subtropical areas, including China, Gabon, Indonesia, Java, Venezuela.

Notes: *Aunstrupia* W.P. Wu & Y.Z. Diao is characterized by solitary conidiophores, holoblastic conidiogenous cells with doliiform or lageniform percurrent proliferations, and dark brown and euseptate conidia. Morphologically it resembles *Sporidesmium* on conidiophores, conidiogenous cells and conidia, however, phylogenetically belongs to *Chaetosphaeriaceae*, while members of *Sporidesmium* belong to *Sporidesmiaceae* or *Distoseptosporaceae* (Ellis, 1948, 1958, 1971, 1976; Subramanian 1992; Ellis & Ellis 1997; Wu and Zhuang 2005; Luo et al. 2018). The genus is monotypic, with only the type species known. ITS sequences were obtained from several other similar *Sporidesmium* species producing conidiophores with doliiform or lageniform proliferations and dark brown, obclavate or subcylindrical conidia, but they phylogenetically belong to other family (unpublished).

Aunstrupia nodipes (Penz. & Sacc.) W.P. Wu & Y.Z. Diao, comb. nov., Figs. 17-18, MycoBank MB841676

≡ *Helminthosporium nodipes* Penz. & Sacc., Malpigia 15: 246, 1901.

≡ *Sporidesmium nodipes* (Penz. & Sacc.) S. Hughes, Can. J. Bot. 36: 809, 1958

≡ *Penzigomyces nodipes* (Penz. & Sacc.) Subram., Proc. Indian natn. Acad. Sci. B 58: 187, 1992.

Saprobe on decaying leaves and petiole of palm. Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae, 1-3 µm wide, often forming network on the surface of the substrate. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, solitary or in small group, simple, cylindrical, straight or slightly flexuous, smooth, 1-6-septate, dark brown, 20-250 x 3-5 µm, 7-10 µm at the base. Conidiogenous cells integrated, terminal, cylindrical, lageniform, ampulliform, smooth, dark brown, 10-22 x 4-6 µm, apex 2.5-4 µm wide and truncate, with up to 15 lageniform, ampulliform percurrent proliferations. Conidia acrogenous, solitary, dry, obclavate, rostrate, 11-14-euseptate, sometimes constricted at the septa, brown to dark brown, become pale brown towards the apex, smooth, 40-65 x 6.5-8 µm; apex acute and 1.5-4 µm wide; basal cell conic-truncate, 2.5-4 µm wide at the base.

Colonies on PDA effuse, colonies 2-3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, brown or dark brown, reverse of the same color or slightly darker, with yellow pigment diffused into agar.

Material examined: China: Guangdong Province, Dinghushan, on rotten leaves and petiole of palm, 9 Oct. 1998, W.P. Wu (Wu1881b, Wu1892a, Wu1898, Wu1918a); China: Guangdong Province, Luofushan, on rotten leaves and branches of palm, 9 Oct. 1998, W.P. Wu (WU2057c); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of palm, 2 Jan. 1997, W.P. Wu (Wu1311a). Living strain: 43149 (from Wu1311a) and 44694 (from Wu1881b).

Ecology/Substrate/Host: saprobe on rotten leaves and branches of palm.

Geographical distribution: China, Gabon, Indonesia, Java, Venezuela.

Descriptions and illustrations: Ellis (1963, 1976); Wu and Zhuang (2005).

Notes: *Aunstrupia nodipes* (Penz. & Sacc.) W.P. Wu & Y.Z. Diao can be easily recognized by its dark brown conidiophores, percurrently proliferated conidiogenous cells, and dark brown, 11-14-septate, obclavate conidia. This species is commonly found on dead petiole of various palm species. Ellis (1963) described the pale colored hyphae around the first formed conidiophores, but this character was not seen from any collections examined here. *S. nodipes* is probably a typical tropical species with wide distribution and specifically grows on various species

of palms. The ITS and LSU sequences were obtained from two strains and its affinity to Chaetosphaeriaceae is confirmed.

Ellisembia Subram., Proc. India Natn. Acad. Sci. B 58: 183, 1992.

= *Imicles* Shoemaker & Hambleton, Can. J. Bot. 79: 598, 2001.

= *Lecythothecium* Réblová, Mycologia 93: 481, 2001.

= *Lomaantha* Subram., J. Indian Bot. Soc. 33: 32, 1954.

= *Pyrigemmula* D. Magyar & R. Shoemaker, Mycol. Progress 10:309, 2011.

Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae. Teleomorph: Perithecia immersed, flask-shaped, glabrous. Perithecial wall leathery, consisting of distinct regions. Ostiolar canal periphysate. Paraphyses persistent. Asci unitunicate, 8-spored, cylindrical; ascus apex with nonamyloid (J-), refractive apical annulus. Ascospores ellipsoidal to fusiform, transversely septate, versicolorous, central cells brown, end-cells hyaline. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, cylindrical, straight or slightly flexuous, smooth, septate, brown to dark brown. Conidiogenous cells integrated, terminal, lageniform, doliform, cylindrical, smooth, medium brown to brown, proliferation none or proliferation enteroblastic percurrent and progressive. Conidial ontogeny holoblastic by apical wall building, delimitation by 1 septum, schizolytic session, maturation by diffuse wall-building, if with proliferation, then percurrent enteroblastic conidiogenous cell proliferation followed by conidial ontogeny by replacement apical wall-building, successive conidia seceding at progressively higher levels. Conidia acrogenous, solitary, dry, cylindrical, obclavate, rostrate, fusiform, or narrowly clavate, obovoid to broadly obovoid, truncate at the base, rounded or appendaged at the apex, smooth or verruculose, distoseptate, cell lumina reduced, pale brown to brown.

Type species: *Ellisembia coronata* (Fuckel) Subram.

Ecology/Substrate/Host: on wood, bamboo culm or plant remnants in terrestrial and freshwater habitats.

Geographical distribution: Broadly distributed and known from many countries.

Notes: *Ellisembia* Subram., based on *E. coronata*, is a segregated genus from *Sporidesmium* Link by Subramanian (1992) to accommodate those previously described *Sporidesmium* without or with percurrently proliferating conidiogenous cells, and distoseptate conidia (McKenzie 1995; Goh and Hyde 1999; Wu and Zhuang 2005). The criteria used for species identification in the genus are number of proliferation in conidiogenous cells and conidial morphology such as shape, size and septation. Teleomorphs of *Ellisembia* were found from 3 species, they are: *Ellisembia adscendens* (Berk.) Subram. (= *Sporidesmium adscendens* Berk.) with *Miyoshiella triseptata* (Shoemaker & White) Réblová as teleomorph; *Ellisembia bambusicola* (M.B. Ellis) Subram. with *Miyoshiella fusispora* Kawamura as teleomorph; *Ellisembia folliculata* (Corda) Subram. with *Lecythothecium duriligni* Réblová & Winka as teleomorph (Shoemaker and White 1985; Réblová 1999a; Réblová and Winka 2001).

Recent phylogenetic analysis shows that the genus *Ellisembia* is polyphyletic and problematic in delimitation from *Distoseptispora* and *Sporidesmium*. It comprises more than 65 species but only some of them could be positioned in the system based on DNA sequence data (Hyde et al. 2019). Members of *Ellisembia* with DNA sequences available are placed in four clades in Sordariomycetes, i.e. in Chaetosphaeriaceae under the name *Ellisembia*, Distoseptisporaceae as *Distoseptispora*, Sporidesmiaceae as *Sporidesmium* and Xylariales as *Ellisembia calyptrata* (Réblová and Winka 2001; Shenoy et al. 2006; Su et al. 2016; Hyde et al. 2019). Future revision needs to include both morphological and molecular analysis of the type species (Réblová 1999a; Réblová and Winka 2001; Shoemaker and Hambleton 2001; Wu and Zhuang 2005; Shenoy et al. 2006; Mena Portales et al. 2016; Su et al. 2016; Luo et al. 2018; Yang et al. 2018b; Hyde et al. 2019; Sun et al. 2020; Hsieh et al. 2021). Among the many known species under *Ellisembia*, only three species, *E. aurea* Réblová & J. Fourn., *E. brachypus* (Ellis & Everh.) Subram. and *Ellisembia folliculata* (Corda) Subram., are assigned to Chaetosphaeriaceae (Réblová and Winka, 2001; Shenoy et al., 2006; Magyar et al., 2011; Hyde et al., 2019). However, their phylogenetic relationship with the type species, *E. coronata*, is not known, thus placement of the genus *Ellisembia* in Chaetosphaeriaceae needs to be further confirmed when the DNA sequence data will be available from fresh collection of the type species. Until the systematic positions of the type species of *Ellisembia* and *Sporidesmium* are revealed, Réblová (2019) recommended using the name *Ellisembia* for species grouped in a strongly supported monophyletic clade in Chaetosphaeriaceae, experimentally linked with sexual morphs having multiseptate, versicolorous ascospores in asci with a non-amyloid apical annulus, persistent paraphyses and immersed ascomata.

Species of the genus occurs as saprobes on wood, bamboo culm or plant remnants in terrestrial and freshwater habitats. Many species under the genus *Ellisembia* have been reported from China (Wu and Zhuang 2005). However, only three species, *E. aurea* Réblová & J. Fourn., *Ellisembia brachypus* (Ellis & Everh.) Subram. and *E. folliculata*, are phylogenetically assigned to Chaetosphaeriaceae based on available DNA data, while most other species are to be studied. Here we add a new species, *E. reblovae* to the genus.

Key to species of *Ellisembia* (*E*) and *Lomaantha* (*L*) species with affinity to Chaetosphaeriaceae

1. Conidiophores absent; conidiogenous cells directly from hyphae; conidia ellipsoid, 0-5-septate, 22.5-24 x 6.5-8 µm *E. aurantiaca*
1. Conidiophores well-developed, septate; conidiogenous cells terminal 2
2. Conidia cylindrical to clavate or obclavate, 5-11-septate, 28-62 x 9-10.5 µm *E. folliculata*
2. Conidia obclavate, obclavate-rostrate, fusiform, more than 11-septate 3
3. Conidia without apical extension, 10-14-septate, 60-93 x 11-13 µm *E. reblovae*
3. Conidia with apical hyaline to subhyaline extension 4
4. Conidia 17-19 septate, 110-135 x 18-20 µm; appendage branched, 45-65 x 1-1.5 µm *L. pooga*
4. Conidia less than 15-septate, apical appendage unbranched 5
5. Conidia 5-8-septate, 50-90 x 10-14 µm, apical extension up to 70 µm long *E. brachypus*
5. Conidia 11-13-septate, 70-97 x 11-16 µm, apical extension up to 20 µm *E. aurea*

Ellisembia aurantiaca (D. Magyar & R. Shoemaker) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841983.
 ≡ *Pyrigemmula aurantiaca* D. Magyar & R. Shoemaker, Mycol. Prog. 10: 310, 2011.

Anamorph: Conidiophores 3-5 x 2-3 µm, later extending to 10x3 µm with a branch budding from the outside of the curvature, finally branching bifurcately to produce 4 or 5 cells. Conidiogenous cells (9.6-)11(-14.4) x (4.8-)5.7(-7.2) µm, with one solitary terminal pore 2 µm diam. Conidia (17.6-)22.5-24 (-27.2) x 6.5-8 µm, 0-5(-7) septate.

Ecology/Substrate/Host: Saprobies on the marginal surface of the bark of living *Acer saccharinum*, *Betula pendula*, *Elaeagnus angustifolia*, *Mespilus germanica*, *Quercus* sp., *Platanus hybrida*, *Pyrus communis*, *Vitis vinifera* and on litter.

Geographical distribution: Hungary.

Description and illustration: Magyar et al. (2011).

Notes: *Pyrigemmula aurantiaca*, the type species of *Pyrigemmula*, is similar to species of *Linkosia* in lacking well-developed conidiophores and pseudoseptate conidia. Our phylogenetic analysis shows that *P. aurantiaca* belongs to the same genus with other species of *Ellisembia* with Chaetosphaeriaceae affinity.

Ellisembia aurea Réblová & J. Fourn., Fung. Div. 96: 163, 2019. Fig. 19

Saprobic on decaying wood partly submerged in freshwater. Teleomorph: Ascomata immersed with protruding necks or becoming superficial, solitary or in small groups. Venter 550-700 µm diam., 300-380 µm high, subglobose, upright or decumbent. Neck central, 150-200 µm wide, 350-800 µm long, cylindrical, sometimes tapering towards the apex, with a distinct pore at the apex. Ostiole periphysate. Ascomatal wall leathery, 20-30 µm thick, two-layered; outer layer consisting of brown, thick-walled, polyhedral cells with opaque walls of textura angularis; towards the interior cells more flattened of textura prismatica. Inner layer consisting of several rows of thin-walled, hyaline, flattened cells. Paraphyses hyaline, branched, anastomosing, septate, 2.5-3 µm wide, tapering to 1.5-2.0 µm. Asci 160-220 x 20-27 µm, truncate at the apex, cylindrical to clavate, stipitate; with 8 obliquely uniseriate or biseriate ascospores; apical annulus 6.5-8 µm wide, 2.0-2.5 µm high. Ascospores 37-41.5 x 10-11 µm, ellipsoidal, sometimes inequilateral, 5-septate, not constricted at the septa, with a large globule in each cell obscuring the septa, versicollous prior to discharge, middle cells brown to olivaceous brown with hyaline polar cells, smooth-walled, without mucilaginous sheath or appendages. Anamorph: Not observed from Chinese material, but reported by Réblová in Hyde et al. (2019).

Colonies on PDA effuse, colonies 2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, brown to dark brown, reverse of the same color or slightly darker.

Material examined: China: Jilin Province, Changbaishan, on dead stem of unidentified tree, 5 Sept. 1998, Wenping Wu (Wu1786a). Strain: 44588 (from Wu1786a).

Ecology/substrate/host: Saprobies on dead stem of tree, including *Sambucus nigra*.

Geographical distribution: China, France.

Description and illustration: Hyde et al. (2019).

Notes: The fungus is only found with teleomorph in the Chinese material. The anamorph on nature substrate was fully described by Hyde et al. (2019): the conidiophores are 92-155 x 6.5-7.5 µm wide, and the conidia are obclavate to fusiform to lanceolate, (65-)70-97(-103) x 11-16(-17.5) µm, brown to reddish brown, with the darkest basal cell, paler at the apex, 11-13-distoseptate, smooth-walled, truncate at the base 4.5-5.0 µm wide, tapering apically with a terminal extension up to 26 µm long. In the ITS-LSU phylogeny, *E. aurea* is positioned in Chaetosphaeriaceae in a strongly supported clade together with *Ellisembia brachypus*, *E. foliiculata* and *Pyrigemmula aurantiaca*.

Besides *E. foliiculata* (Réblová and Winka 2001), *E. aurea* is another *Ellisembia* species experimentally linked with a sexual morph with versicollous ascospores. *Ellisembia aurea* resembles *E. foliiculata* in the morphology of ascomata, size of ascospores and morphology of brown, distoseptate conidia, but the latter species differs from *E. aurea* in having flask-shaped ascomata, regularly 7-septate ascospores, and cylindrical to clavate or obclavate, shorter conidia without a rostrum or appendage at the distal end (Hyde et al. 2019). *E. aurea* morphologically

resembles *E. brachypus* in having conidia with a distal rostrate end, which differs in having somewhat shorter conidia (45-90 µm) and fewer (5-8) septa (Ellis 1958; Hughes and Illman 1974b).

Ellisembia brachypus (Ellis & Everh.) Subram., Proc. Indian Natn. Acad. Sci. B 58: 183, 1992. Figs. 20

≡ *Helminthosporium brachypus* Ellis & Everh., Publications of the Field Columbian Museum Botanical Series Chicago 1: 92, 1896.

≡ *Sporidesmium brachypus* (Ellis & Evert.) S. Hughes, Can. J. Bot. 36: 807, 1958.

= *Sporidesmium deightonii* M.B. Ellis, Mycol. Pap. 70: 26, 1958.

= *Sporidesmium ceratophorum* Munja & Kulshr., Indian Phytopathol. 19: 269, 1962.

Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae, 2-3 µm wide. Teleomorph: not observed. Anamorph: Conidiophores macronematous, mononematous, solitary or aggregated at the base, simple, cylindrical, straight or slightly flexuous, smooth, 2-7-septate, brown to dark brown, almost black at the lower part and septa hardly seen, 30-250 x 5-9 µm, base sometimes swollen. Conidiogenous cells integrated, terminal, lageniform, smooth, brown to dark brown, 5-10 x 3-4.5 µm, constricted toward the truncate apex, 2-3 µm wide at the apex. Conidia acrogenous, solitary, dry, ellipsoidal, fusiform, rostrate, 5-8-distoseptate, dark brown, become pale brown toward the apex, 50-90 x 10-14 µm; apical cell extended into hyaline, aseptate, filiform appendage of 30-74 x 2-3 µm; basal cell conical-truncate, darker than other cells, 3-5 µm wide at the base.

Colonies on PDA effuse, colonies 1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium not well-developed, grey to yellow brown, reverse dark brown, with red brown pigment in the medium.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of *Bauhinia* sp., 9 Oct. 1998, W.P. Wu (Wu1875, Wu1997c); China: Guangdong Province, Luofushan, on dead branches, 12 Oct. 1998, W.P. Wu (Wu2264, Wu2253a); China: Guangxi Province, Shangsì, Shiwandashan, on dead branches of *Rhododendron* sp., 2 Jan. 1997, W.P. Wu (Wu1246b, Wu1259b, Wu1328a, W1598); China: Hunan Province, Zhangjiajie (Wu4549); China: Hubei Province, Shennongjia, on rotten wood, Sept 2004, W.P. Wu (Wu8080b); China: Jilin Province, Changbaishan, on rotten wood of *Salix* sp., 5 Sept 1998, W.P. Wu (Wu1769c); China: Ningxia Province, Liupanshan, Langtianxia, on rotten wood, 25 Aug. 1997, W.P. Wu (Wu1022e); China: Ningxia Province, Liupanshan, Liangtianxia, on rotten bark, 24 Aug. 1997, W.P. Wu (Wu1154i); China: Yunnan Province, Shilin, on dead branches, 24 Oct. 1999, W.P. Wu (Wu2573a); China: Yunnan Province, Jinghong, Xishuangbanna, on rotten bark, 20 Oct. 1999, W.P. Wu (Wu2643a); China: Yunnan Province, Simao, on rotten bark, 12 Oct. 1999, W.P. Wu (Wu2696b, Wu3102c); China: Zhejiang Province, Huaian County, Qiandaohe, on rotten wood, 18 Oct. 2018, W.P. Wu (Wu16078); Taiwan (Matsushima, 1980). Living strain: 50658 (from Wu8080b), 76460 (from Wu16078).

Ecology/Substrate/Host: saprobe on dead branches, rotten bark, rotten wood of many plants, including *Areca catechu*, *Averrhoa carambola*, *Bauhinia* sp., *Citrus aurantifolia*, *Citrus limetta*, *Dichrostachys glomerata*, *Freyinetia banksii*, *Ocotea leucoxylon*, *Ocotea usambarensis*, *Pandanus furcatus*, *Petrea volubilis*, *Rhododendron* sp., *Ripogonum scandens*, *Roystonea regia*, *Salix* sp. *Thevetia neriiifolia*.

Geographical distribution: China, Cuba, India, Japan, Kenya, New Zealand, Sierra Leone, USA.

Descriptions and illustrations: Ellis (1958, 1971); Hughes and Illman (1974a); McKenzie (1995); Matsushima (1975); Wu and Zhuang (2005).

Notes: *E. bambusae* (M.B. Ellis) W.P. Wu is similar to *Ellisembia brachypus* (Ellis & Everh.) Subram, but differs from it by producing proliferated conidiogenous cells and dark brown conidia with apical mucilaginous sheath (Ellis 1958, 1971; Hughes and Illman, 1974a). The conidia of this species have a wide range of variation in different collections examined by us, this was also shown by Ellis (1958, 1971) and Matsushima (1975). On PDA, the strain NN50658 produced abundant conidia which are morphologically similar to those found on natural substrate (Fig. 27e-k). *Ellisembia brachypus* has wide distribution and found through temperate to tropical areas. It has been recorded on rotten wood and dead branches of many plant species. Its occurrence in Taiwan was reported by Matsushima (1980).

Ellisembia reblovae W.P. Wu & Y.Z. Diao, sp. nov., Figs. 21, MycoBank MB841546

Etymology: Named after Prof. Martina Réblová who made significant contribution to biodiversity and taxonomy of the family Chaetosphaeriaceae.

Diagnosis: Similar to other Chaetosphaeriaceous *Ellisembia* species, especially *E. aurea* and *E. brachypus* in conidiophores without percurrent proliferation, and obclavate to obclavate-rostrate conidia, but differs from them by conidia without apical appendage.

Typification: China: Guangdong Province, Dinghushan, on dead culm of bamboo, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu1913b, holotype; ex-type strain CGMCC 3.20705 = NN44776).

Colonies on natural substrate effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae, 2-4 µm wide. Teleomorph: not observed. Anamorph: Conidiophores macronematous, mononematous, solitary or 1-2 aggregated

at the base, simple, cylindrical, straight or slightly flexuous, smooth, 1-3-septate, dark brown to almost black and septa hardly seen, 40-57 x 5.5-6.5 µm, base sometimes swollen, apex truncate, without percurrent proliferation. Conidiogenous cells integrated, terminal, cylindrical, smooth, brown to dark brown, 18-22 x 5-6 µm, constricted toward the truncate apex, 3.5-4 µm wide at the apex. Conidia acrogenous, solitary, dry, obclavate, obclavate-rostrate, 11-14-distoseptate, brown to dark brown, become pale brown toward the apex, 60-93 x 11-13 µm; apical cell pale brown, conical, cylindrical, rounded at the apex; basal cell truncate, significantly darker than other cells, 3.5-4 µm wide at the base.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, while to grey, reverse brown to dark brown.

Ecology/Substrate/Host: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Notes: *Ellisembia reblovae* is similar to *E. aurea* (conidia obclavate to fusiform to lanceolate, 11-13 (-15)-distoseptate, (65-)70-97 x 11-16 (-17.5) µm, tapering apically with a terminal extension up to 26 µm long) and *E. brachypus* (conidia ellipsoidal, fusiform, rostrate, 5-8-distoseptate, 50-90 x 10-14 µm; apical cell extended into hyaline, aseptate, filiform appendage of 30-74 x 2-3 µm), but differs from them by producing conidia without apical extension. In addition, the conidia in *E. aurea* are broader than those in *E. reblovii*. Several *Ellisembia* species have been reported on bamboo, but none of them belongs to *Chaetosphaeriaceae* (Wu and Zhuang 2005; Yang et al. 2018b; Hyde et al. 2019).

Linkosia A. Hern. Gut. & B. Sutton, Mycol. Res. 101: 202, 1997.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, lageniform, ampulliform, solitary, short, simple, truncate at the apex. Conidial ontogeny holoblastic, 1 locus per conidiogenous cell, solitary conidia, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic, no proliferation (Conidiogenous event #1, Kirk et al., 2001). Conidia holoblastic, straight or slightly curved, narrowly obclavate to obclavate-rostrate, conical-truncate at the base, distoseptate, pale brown to brown, smooth, subhyaline at the apex.

Type species: *Linkosia coccothrinacis* (A. Hern. & J. Mena) A. Hern. Gut. & B. Sutton.

Ecology/Substrate/Host: Saprobes on decaying plant material, and commonly found on dead culm of bamboo.

Known distribution: Broadly distribution, especially from subtropical and tropical areas.

Description and illustration: Hernández-Gutiérrez and Sutton (1997); Wu and Zhuang (2005); Seifert et al. (2011).

Notes: *Linkosia* A. Hern. Gut. & B. Sutton differs from *Sporidesmium* Link and the other segregated genera in that the conidiophores are absent, and the conidia are distoseptate (Subramanian 1992; Hernández-Gutiérrez and Sutton, 1997). *Stanjehughesia* Subram. and *Janetia* M.B. Ellis are the two related genera to *Linkosia* in many respects such as absence of conidiophores, lageniform conidiogenous cells directly formed from superficial mycelium and obclavate conidia. However, the conidia in these two genera are euseptate (only one species in *Janetia* is with distosepta, *J. longispora* P.M. Kirk). In addition, all members of the genus *Janetia* superficially grow on leaves of various plant species (Ellis 1976; Hughes 1983; Hernández-Gutiérrez and Mena Portales 1994; Goh and Hyde 1996). A total of 12 species are known in the genus *Linkosia* and they can be distinguished by shape, size and septation of conidia (Hernández-Gutiérrez and Sutton 1997; Castañeda-Ruiz et al. 2000; Wu and Zhuang 2005; Zhang et al. 2009; Ma et al. 2011b; Almeida et al. 2014; Delgado 2014; Conceição et al. 2016; Xu et al. 2017).

The ITS and LSU sequences were obtained from four species, *L. filiformia*, *Linkosia gelatinosa*, *L. multiseptum*, *L. obclavata*, and *L. rostrata*, the phylogenetic analysis showed that these four species with distoseptate conidia, *Linkosia gelatinosa*, *L. filiformia*, *L. multiseptum* and *L. rostrata*, were clustered together, while one species *L. obclavata*, with euseptate conidia, is phylogenetically closer to *Stanjehughesia*. No DNA sequence is available from the type species *L. coccothrinacis*, and assignment of the genus to *Chaetosphaeriaceae* needs to be further confirmed when the DNA sequence data will be available from fresh collection. Seven species of *Linkosia*, including one new species, are known from China and documented here (Wu and Zhuang, 2005; Zhang et al. 2009; Ma 2011; Xu et al. 2017).

Key to all known species of *Linkosia*

1. Conidia with an apical appendage, navicular, 5–6-distoseptate, 28–42 × 9–13 µm (appendage excluded), appendage 5–12 µm long *L. ponapensis*
1. Conidia without apical appendage 2
2. Conidia rostrate 3
2. Conidia not rostrate 10
3. Conidia 4–7-septate, narrowly obclavate to obclavate-rostrate, 43–71 × 7–11 µm *L. coccothrinacis*
3. Conidia not as above 4

4. Conidia less than 18 distoseptate	5
4. Conidia more than 18-distoseptate	7
5. Conidia 11-14-septate, 70-113 x 9-10 µm, apex with mucilaginous sheath	<i>L. gelatinosa</i>
5. Conidia without apical mucilaginous sheath	6
6. Conidia 9-18-septate, narrowly obclavate to long obclavate rostrate, 91-158 x 6.5-12 µm	<i>L. longirostrata</i>
6. Conidia not long and narrow rostrate, 11-15-distoseptate, 107-123 x 8.5-10.5 µm	<i>L. rostrata</i>
7. Conidia sometimes >20-distoseptate	8
7. Conidia 15-20-distoseptate, obclavate to obclavate-rostrate, 100-160 x 13-15 µm	<i>L. fusiformis</i>
8. Conidia <25-distoseptate	9
8. Conidia 27-30-distoseptate, obclavate to obclavate-rostrate, 300-380 x 12-14 µm	<i>L. multiseptata</i>
9. Conidia 15-21-distoseptate, obclavate to obclavate-rostrate, 122-177 x 12-16 µm	<i>L. mori</i>
9. Conidia 16-21-distoseptate, obclavate to obclavate-rostrate, 160-210 x 7.5-9.5 µm	<i>L. hibisci</i>
10. Conidia smooth	11
10. Conidia verruculose	12
11. Conidia bacilliform, attenuated at the ends, 5-9-distoseptate	<i>L. bacilliformis</i>
11. Conidia cylindrical, slightly clavate, sometimes filiform, 16-21 distoseptate	<i>L. aquatica</i>
12. Conidia 22-35-septate, filiform, long obclavate-rostrate, 260-377 x 7-9.5 µm	<i>L. filiformia</i>
12. Conidia with less than 20 septa, shorter than 200 µm long	13
13. Conidia pyriform or obpyriform to cylindrical, 1-7 distoseptate, 16-57 x 5.5-9 µm	<i>L. canescens</i>
13. Conidia pyriform or obpyriform, 4-6-distoseptate, 31-37 x 7-8 µm	<i>L. refugia</i>

Linkosia filiformis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 21-22, MycoBank MB841547

Etymology: refers to its long, multiseptate and filamentous conidia.

Diagnosis: Conidiophores absent. Conidiogenous cells lageniform, 11-13 x 6-7 µm, 8-11 µm at the swollen base; Conidia cylindrical, filamentous, narrowly obclavate-rostrate, 22-35-septate, 261-377 x 7-9.5 µm.

Type: China: Hubei Province, Shennongjia, on rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8277; ex-type strain CGMCC 3.20793 (= NN 50606)).

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, cylindrical, lageniform, ampulliform, solitary or in groups, short, simple, brown to dark brown, 14-19 x 5.5-6 µm, 9-12 µm at the swollen base, 4-5.5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate-rostrate, (11-) 15-23-euseptate, brown to dark brown, smooth, (125-) 230-273 x 10-11.5 µm; apical cells subhyaline, rounded, 2.5-3 µm; basal cell cylindrical, conical-truncate, 5-6.5 µm wide at the base.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, brown to dark brown, reverse of the same color or slightly darker, with yellow pigment diffused into agar.

Material examined: China: Hubei Province, Shennongjia, On rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8277); China: Hubei Province, Shennongjia, on rotten plant material, Sept 2004, W.P. Wu (Wu8169, Wu8204). Living strains: ex-type strain NN 50606, 50717 (from Wu8169), 50600 (from Wu8204).

Ecology/substrate/host: Saprobe on rotten wood.

Geographical distribution: China.

Notes: *Linkosia filiformis* differs from other species in *Linkosia* and related genera including *Riisgaardia* and *Stanjehughesia* by its longer conidia with more septa. It resembles *Riisgaardia longispora* and *R. vermiculata*, but differs by longer and narrower conidia with more septa (Wu and Zhuang 2005; Hsieh et al. 2021). Both ITS and LSU sequences were obtained from the two specimens examined and their phylogenetic relationship with other members of Chaetosphaeriaceae was confirmed.

Linkosia fusiformis W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 183, 2005. Fig. 24

Saprobe on dead culm of bamboo. Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2.5-3.5 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 13-15 x 7-9 µm, 4-5.5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate to obclavate-rostrate, 15-20-distoseptate, pale brown to brown, smooth, 100-160 x 13-15 µm; apical cells subhyaline, rounded and with a mucilaginous sheath; basal cell conical-truncate, 4-5.5 µm wide at the base.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culm of bamboo, 2 Jan. 1997, W.P. Wu (Wu1326a, holotype).

Ecology/substrate: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: *Linkosia fusiformis* superficially resembles *L. coccothrinacis* (A. Hern. Gut. & J. Mena) A. Hern. Gut. & B. Sutton, but can be distinguished by its much longer conidia with more septa (Hernández-Gutiérrez and Sutton 1997; Wu and Zhuang 2005). The ex-type living culture NN43150 preserved in NN is contaminated by another fungus, thus no DNA sequence is available for phylogenetic analysis. However, its affinity to *Linkosia* seems to be well-supported by morphology.

***Linkosia gelatinosa* W.P. Wu & Y.Z. Diao, sp. nov. Figs. 25-26. MycoBank MB841548**

Etymology: refers to its conidia with gelatinous apex.

Diagnosis: Conidiophores absent. Conidiogenous cells lageniform, 9-12 x 4-5 µm, 9-11 µm at the swollen base; Conidia obclavate-rostrate, 11-14-septate, 70-113 x 9-10 µm. apex cell with mucilaginous sheath.

Type: China: Hubei Province, Shennongjia, On rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8228c; ex-type culture CGMCC 3.20709 = NN 50607).

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, cylindrical, lageniform, ampulliform, solitary or few in groups, short, simple, brown to dark brown, 9-12 x 4-5 µm, 9-11 µm at the swollen base, 4-5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate-rostrate, 11-14-euseptate, brown to dark brown, smooth, 70-113 x 9-10 µm; apical cells subhyaline, rounded, 3-3.5 µm; basal cell subcylindrical, conical-truncate, 5-7 µm wide at the base.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey brown to dark brown, reverse of the same color or darker.

Material examined: China: Hubei Province, Shennongjia, on rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8228c; ex-type culture NN 50607).

Ecology/substrate/host: Saprobe on dead branches.

Geographical distribution: China.

Notes: *Linkosia gelatinosa* W.P. Wu & Y.Z. Diao is similar to *L. coccothrinacis* (conidia 4-7-septate, 43-71 x 7-11 µm), *L. fusiformis* (conidia 5-20-septate, 100-160 x 13-15 µm), *L. obclavata* (conidia 12-14-septate, 110-125 x 9-12 µm) and *L. rostrata* (conidia 11-15-septate, 107-123 x 8.5-10 µm) in producing obclavate to obclavate-rostrate conidia, but differs in a combination of shape, size and septation of conidia (Wu and Zhuang 2005; Conceição et al. 2016). Both ITS and LSU sequences were obtained from the two specimens examined and their phylogenetic relationship with other members of Chaetosphaeriaceae was confirmed.

***Linkosia hibisci* Jian Ma & X.G. Zhang, Mycotaxon 117: 249, 2011.**

Teleomorph: unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, solitary, simple, lageniform or ampulliform, brown to dark brown, smooth, 9-12 x 4-5 µm, 4-4.5 µm wide at the truncate apex. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate to obclavate-rostrate, dark brown to brown, smooth, 16-21-distoseptate, 160-210 µm long, 7.5-9.5 µm thick in the widest part, tapering to 1.5-2.5 µm near the apex; apical cells pale brown, rounded; basal cell cylindrical, truncate, 2-4.5 µm.

Typification: China: Hainan Province, tropical forest of Bawangling, on dead branches of *Hibiscus mutabilis*, 8 Dec 2010, J. Ma (HSAUP H5199-1, holotype; HMAS146142, isotype).

Ecology/substrate/host: Saprobe on dead branches of *Hibiscus mutabilis*.

Geographical distribution: China.

Description and illustration: Ma et al. (2011).

Notes: *Linkosia hibisci* resembles *L. obclavata* W.P. Wu and *L. mori* K. Zhang & X.G. Zhang on conidial shape, but differs on number of conidial septa and size of conidia (Wu and Zhuang 2005; Zhang et al. 2009; Ma et al. 2011b). No DNA sequence data are available for molecular phylogenetic analysis.

***Linkosia longirostrata* G. Delgado, Mycotaxon 129: 42, 2014.**

Teleomorph: unknown. Anamorph: Conidiophores absent or very reduced, erect, 1-septate, dark brown, 21-35 µm long, 6-12.5 µm wide at the swollen base. Conidiogenous cells monoblastic, integrated, terminal, lageniform or subcylindrical, smooth, brown to dark brown, determinate or occasionally percurrent, 15-27 x 5-6 µm, 3-4 µm wide at the truncate apex. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate to obclavate-rostrate, pale brown, smooth, 10-18-distoseptate, 82-126 µm long, 6.5-8.5 µm wide in the broadest part, 3-3.5 µm wide at the truncate base, apex extended into a pale brown to brown rostrum, 2-2.5 µm wide, and invested in 1-3 spherical or subspherical, hyaline or subhyaline mucous tunicae ca 6-15 µm diam.

Ecology/substrate/host: Saprobe on dead branch and rachides of dead leaves of *Acoelorrhaphe wrightii*.

Geographical distribution: China, USA.

Description and illustration: Delgado (2014); Xu et al. (2017).

Notes: No specimen was examined by us and the above description is based on the documentation provided by Xu et al. (2017). No DNA sequence data are available for molecular phylogenetic analysis.

Linkosia mori K. Zhang & X.G. Zhang, Mycotaxon 108: 123, 2009.

Teleomorph: Unknown. Anamorph: Conidiophores absent. Conidiogenous cells monoblastic, solitary, simple, lageniform or ampulliform, brown to dark brown, smooth, 13-17 x 7-9 µm, 4-5 µm wide at the truncate apex. Conidial secession schizolytic. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate to obclavate-rostrate, pale brown to brown, smooth, 15-21-distoseptate, 122-177 µm long, 12-16 µm thick in the widest part, apical cells subhyaline, basal cell cylindrical to conical-truncate, 3.5-5.5 µm wide.

Typification: China: Guangxi Province, Natural Reserve of Shiwandashan, on dead branches of *Morus alba*, 12 May 2007 (HSAUPvii, holotype; HMAS189369, isotype).

Ecology/substrate/host: Saprobies on dead branch.

Geographical distribution: China.

Description and illustration: Zhang et al. (2009).

Notes: *Linkosia mori* resembles *L. obclavata* W.P. Wu and *L. hibisci* Jian Ma & X.G. Zhang on conidial shape, but differs on number of conidial septa and size of conidia (Wu and Zhuang 2005; Zhang et al. 2009; Ma et al. 2011b). No DNA sequence data are available for molecular phylogenetic analysis.

Linkosia multiseptum W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 185, 2005. Fig. 27

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2.5-3.5 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 10-12.5 x 9-11 µm, 8-9 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate to obclavate-rostrate, 27-30-distoseptate, pale brown to brown, smooth, 300-380 x 12-14 µm; apical cells subhyaline, rounded; base truncate and 8-9.5 µm wide.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangxi Province, Damingshan, on rotten bamboo culm, 18 Dec. 1997, W.P. Wu (Wu1374b, holotype). Living strains: ex-type strain CGMCC 3.20786 (= NN 42961) and 43190 (also from the holotype).

Ecology/Substrate/Host: Saprobe on rotten culm of bamboo.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: *Linkosia multiseptum* differs from all other known species in the genus by its larger conidia with more septa (Hernández-Gutiérrez and Sutton 1997). The ITS and LSU sequences were obtained from the type specimen, and its affinity to Chaetosphaeriaceae was confirmed.

Linkosia rostrata W.P. Wu & Y.Z. Diao, sp. nov., Figs. 28-29, MycoBank MB841549.

Etymology: refers to its rostrate conidia.

Diagnosis: Conidiophores absent. Conidiogenous cells lageniform, 10-13 µm long, 7.5-10 µm wide in swollen base, 4.5-5.2 µm wide at the truncate apex; Conidia obclavate to obclavate-rostrate, 11-15-distoseptate, 107-123 x 8.5-10 µm.

Type: China: Hunan Province, Hengshan, on dead culm of bamboo, 10 April. 2002, W.P. Wu (Holotype WFH Wu6030b; ex-type culture CGMCC 3.20790 (= NN 47479).

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2.5-4 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 10-13 µm long, 7.5-10 µm wide in swollen base, 4.5-5.2 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate to obclavate-rostrate, 11-15-distoseptate, brown, smooth, 107-133 x 8.5-10.5 µm; basal cell dark brown, with truncate base; apical cells subhyaline, rounded.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Ecology/Substrate: saprobe on dead culm of bamboo.

Geographical distribution: China.

Notes: *Linkosia rostrata* W.P. Wu & Y.Z. Diao is similar to *L. coccothrinacis* (conidia 4-7-septate, 43-71 x 7-11 µm), *L. fusiformis* (conidia 5-20-septate, 100-160 x 13-15 µm) and *L. obclavata* (conidia 12-14-septate, 110-125 x 9-12 µm) but differs on a combination of shape, size and septation of conidia (Wu and Zhuang 2005; Conceição et al., 2016). The ITS and LSU sequences were obtained from the type specimen, and its affinity to Chaetosphaeriaceae was confirmed.

Linkosia sp.1

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2.5-3.5 μm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 8-10 μm long, 6-8 μm wide in swollen base, 4.5-5.2 μm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate to obclavate-rostrate, 8-14-distoseptate, brown, smooth, 110-135 x 10-11.5 μm ; basal cell dark brown, with truncate base; apical cells subhyaline, rounded.

Material examined: China: Sichuan Province, Qingchengshan, on rotten wood, 5 Aug. 2000, W.P. Wu (Wu5006).

Ecology/Substrate: saprobe on rotten wood.

Geographical distribution: China.

Notes: Morphologically this fungus most likely represents a new species, but no living strain was obtained for phylogenetic study.

Linkosia sp.2

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2.5-3.5 μm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 80-16 μm long, 10-14 μm wide in swollen base, 6-9 μm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, fusiform, 10-14-distoseptate, brown, smooth, 130-230 x 10-14.5 μm ; 2-3 basal cells dark brown, with broad and truncate base (8-10 μm wide); sharply tapering toward the acute apex.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of *Saccharum* sp., 2 Jan. 1997, W.P. Wu (Wu1315a).

Ecology/Substrate: saprobe on decaying culm of *Saccharum*.

Geographical distribution: China.

Notes: Morphologically this fungus most likely represents a new species, but no living strain was obtained. It suffers from other species in the genus by fusiform conidia with wider and truncated base, and acute apex.

Lomaantha Subram., J. Indian Bot. Soc. 33: 32, 1954.

Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, cylindrical, straight or slightly flexuous, smooth, septate, brown to dark brown. Conidiogenous cells integrated, terminal, lageniform, smooth, brown to dark brown, proliferation none. Conidial ontogeny holoblastic, 1 locus per conidiogenous cell, solitary conidia, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic, no proliferation (Conidiogenous event #1, Kirk et al., 2001). Conidia acrogenous, solitary, dry, cylindrical, obclavate, rostrate, smooth, pale brown to brown, distoseptate, cell lumina reduced, apex with benched appendages.

Type species: *Lomaantha pooga* Subram.

Ecology/Substrate/Host: Saprobes on decaying plant material.

Known distribution: China, India.

Description and illustration: Subramanian (1954).

Notes: *Lomaantha* Subram., typified by *L. pooga* Subram., is very similar to *Ellisembia* Subram. and the only difference between them is that the conidia in *Lomaantha* Subram. bear hyaline, aseptate and branched appendages (Subramanian, 1954, 1992). Some species of *Ellisembia* also produce appendaged conidia, but their appendages are simple and unbranched (Ellis 1958, 1971, 1976; Matsushima 1971, 1975, 1983, 1989, 1993). The ITS and LSU sequences of the type species were obtained from the two Chinese collections (Wu1518a and Wu1357a), and its affinity to Chaetosphaeriaceae was confirmed.

Lomaantha pooga Subram., J. Indian Bot. Soc. 33: 32, 1954. Figs. 30

Colonies effuse, brown, hairy, often inconspicuous. Mycelium partly superficial, partly immersed in the substratum, composed of pale brown to brown, septate, branched hyphae, 2-4.5 μm wide. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, solitary or aggregated at the base, simple, cylindrical, straight or slightly flexuous, smooth, 3-5-septate, brown to dark brown, 70-100 μm long, 7-9 μm wide, base sometimes slightly swollen up to 12 μm . Conidiogenous cells integrated, terminal, lageniform, smooth, brown, 25-30 x 7-10 μm , apex 4.5-5 μm wide. Conidia acrogenous, solitary, dry, obclavate, rostrate, 17-19-distoseptate, not constricted at the septa, dark brown, becoming pale brown toward the apex, the 2 basal cells

distinctly darker than the other cells, 110-135 x 18-20 µm; apical cell extended into hyaline, aseptate, branched appendage of 45-65 x 1-1.5 µm; basal cell conical-truncate, darker than other cells, 4-5 µm wide at the base.

Colonies on PDA effuse, colonies 0.3-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium not well-developed, yellow to yellow brown, reverse of the same color or slightly darker.

Material examined: China: Guangxi Province, Damingshan, on dead culm of *Arundo donax*, 18 Dec 1997, W.P. Wu (Wu1375a); China: Guangxi Province, Damingshan, on dead culm of *Arundo donax*, 20 Dec 1997, W.P. Wu (Wu1467b); China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 29 Dec 1997, W.P. Wu (Wu1518a). Living strain: 43946 (from Wu1518a); 42977 (from Wu1375a).

Ecology/Substrate/Host: Saprobe on decaying plant material, including dead culm of *Arundo donax*.

Geographical distribution: China, India.

Description and illustration: Subramanian (1954); Wu and Zhuang (2005).

Notes: *Lomaantha pooga* is probably a tropical species. Except for the slightly shorter conidia (48-62 x 12-14 µm), *Sporidesmium magnibrachypus* Matsush. is very similar to *Lomaantha pooga* Subram. (Matsushima 1975).

Morrisiella Saikia & A.K. Sarbhoy, Mycologia 77: 318, 1985.

= *Hemisynnema* Subram., Nova Hedwigia 58: 224, 1994.

Colonies effuse dark brown to black, hairy. Mycelium partly immersed, partly superficially, composed of subhyaline to brown, branched, septate hyphae. Teleomorph: unknown. Anamorph: Conidiomata synnematos, solitary or in group of 2-5, erect, cylindrical, dark brown to blackish, become narrower toward the apex, composed of closely compacted conidiophores, with a long fertile region. Conidiophores macronematous, synnematos, brown to dark brown, septate, smooth, and cylindrical. Conidiogenous cells integrated, denticulate, terminal, intercalary and lateral, monoblastic, determinate, straight, dark brown to black. Conidial ontogeny holoblastic, 1 locus ex conidiogenous cell, solitary conidia, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic, no proliferation (Conidiogenous event #1, Kirk et al., 2001). Conidia holoblastic, solitary, dry, obclavate rostrate, straight or curved, pale brown to brown, distoseptate, often with reduced cell lumen, smooth-walled.

Type species: *Morrisiella indica* Saikia & A.K. Sarbhoy.

Ecology/Substrate/Host: Saprobes on decaying plant material.

Known distribution: Broadly distribution, especially from subtropical and tropical areas.

Description and illustration: Saikia and Sarbhoy (1985); Wu and Zhuang (2005).

Notes: Saikia & Sarbhoy (1985) erected the genus *Morrisiella* Saikia & Sarbhoy based on the type species *M. indica* Saikia & A.K. Sarbhoy on bamboo. The most distinctive feature of the genus is its characteristic synnematos conidiomata, lateral or terminal, ampulliform conidiogenous cells coupled with the production of distoseptate conidia. The genus is similar to *Podosporium* Schwein., but differs from the members of that genus in the production of discrete conidiogenous cells arranged laterally on the conidiophores in synnemata and in bearing distoseptate conidia (Ellis, 1971, 1976). This type of conidiogenesis and conidial morphology notably the distoseptate conidia are also characteristic of *Linkosia* A. Hern. Gut. & B. Sutton, but the later genus does not form conidiophores, where the conidiogenous cells directly arising from superficial mycelium (Hernández-Gutiérrez and Sutton 1997; Wu and Zhuang 2005). The second species, *Morrisiella malayasiana* (Subram.) W.P. Wu & W.Y. Zhuang (≡ *Hemisynnema malayasianum* Subram., Kavaka 20/21(1-2): 58, 1995 (1992/1993) was added into the genus by Wu and Zhuang (2005).

The ITS and LSU sequences of *Morrisiella indica* were obtained from two strains and its affinity to Chaetosphaeriaceae was confirmed by the phylogenetic analysis. A new species without DNA sequence is added into the genus

Morrisiella indica Saikia & A.K. Sarbhoy, Mycologia 77: 319, 1985. Figs. 32-33

= *Janetia synnematos* Sivan. & W.H. Hsieh, Mycol. Res. 94: 567, 1990.

Colonies effuse, dark brown to black, hairy. Mycelium partly immersed, partly superficially, composed of subhyaline to brown, branched, septate hyphae, 2-5 µm wide, forming networks on the surface of substrate. Teleomorph: unknown. Anamorph: Conidiomata synnematos, solitary or in group of 2-5, erect, cylindrical, dark brown to blackish, up to 2.5 mm high, 100-500 µm wide, become narrower toward the apex, composed of closely compacted conidiophores, with a long fertile region. Conidiophores macronematous, synnematos, brown to dark brown, multiseptate, smooth, cylindrical, 2.5-4 µm wide. Conidiogenous cells integrated, denticulate, ampulliform, terminal, intercalary and lateral, monoblastic, determinate, straight, dark brown to black, 10-15 µm long, 4-8 µm wide at the base, 2-3 µm wide at the apex, truncate. Conidia holoblastic, solitary, dry, obclavate rostrate, straight or curved, pale brown to brown, 9-22-distoseptate, often with reduced cell lumen, smooth, 80-120 x 10-12.5 µm, basal cell conical, truncate, darker than other cells, dark brown to black, apex obtuse, pale brown.

Colonies on PDA effuse, colonies 1 cm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangdong Province, Dinghushan, on dead culm of bamboo, 9 Oct. 1998, W.P. Wu (1913a); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of *Arundo donax*, 2 Jan. 1997, W.P. Wu (Wu1258a); China: Guangxi Province, Shiwandashan, on dead culm of bamboo, 29 Dec 1997, W.P. Wu (1527a). Living strain: 42908 (from Wu1258a), 44710 (from Wu1913a).

Ecology/substrate/host: Saprobies on decaying plant material, including *Arundo donax* and bamboo.

Geographical distribution: China, India.

Descriptions and illustrations: Saikia and Sarbhoy (1985); Sivanesan and Hsien (1990); Wu and Zhuang (2005).

Notes: *Morriasiella indica* has been known on dead stem of grasses including *Bambusa tulda*, *Miscanthus floridulus*, *Schizostachyum dumetorum* and *Thysanolaena macima* from tropical areas and probably it has much wider distribution. Its occurrence in China including Taiwan and Hoog Kong has been reported (Sivanesan & Hsien, 1990). There is absolutely no doubt that *Janetia synnemata* Sivan. & W.H. Hsien described by Sivanesan & Hsien (1990) from Taiwan is the same species as *M. indica*. This fungus is better to be classified as *Morriasiella* rather than *Janetia* M.B. Ellis. Since the latter genus have no differentiated conidiophores, the conidiogenous cells directly arise from superficial hyphae, euseptate conidia, and at last but not at least foliicolous habitat (Ellis, 1976; Hughes, 1983). Both ITS and LSU sequences were obtained from the strain 42908 and 44710, and its affinity to *Chaetosphaeriaceae* was confirmed from the phylogenetic analysis.

Morriasiella malayasiana (Subram.) W.P. Wu & W.Y. Zhuang, *Sporidesmium*, *Endophragmiella* and related genera from China: 189, 2005.

≡ *Hemisynnema malaysianum* Subram., Kavaka 20/21(1-2): 58, 1995 (1992/1993)

Ecology/substrate/host: Saprobies on decaying plant material.

Geographical distribution: India.

Descriptions and illustrations: Subramanian (1994).

Notes: The new combination was made by Wu and Zhuang (2005).

Morriasiella reblovae W.P. Wu & Y.Z. Diao, sp. nov., Figs. 34-35, MycoBank MB841550

Etymology: Named after the mycologist Martina Réblová, who made significant contribution for taxonomy of *Chaetosphaeriaceae*.

Diagnosis: Similar to *Morriasiella indica* in producing synnematos conidiomata with conidiogenous cells directly formed from out layer of hyphae and distoseptate conidia, but differs in fusiform-shaped conidia in smaller size (50-79 x 8.5-10 µm) and with a narrower base (1.8-2 µm wide).

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead branches of unidentified broad leaf tree, March 2000, W.P. Wu (Holotype WFH Wu9002).

Colonies effuse, dark brown to black, hairy. Mycelium partly immersed, partly superficially, composed of subhyaline to brown, and branched, septate hyphae, 2-4 µm wide, forming networks on the surface of substrate. Teleomorph: unknown. Anamorph: Conidiomata synnematos, solitary or in group from superficial mycelium network, erect, cylindrical, dark brown to blackish, 500-753 µm high, 10-17 µm wide, basal part up to 30 µm wide, becoming slightly narrower toward the apex, composed of one central setae and closely compacted conidiophores, with a long fertile region from base to apex; central setae cylindrical, dark brown, multi-septate, completely covered by conidiophores and hyphae, 6-8 µm wide, apex rounded. Conidiophores macronematous, synnematos, brown to dark brown, multiseptate, smooth, cylindrical, 1-1.5 µm wide, completely cover the setae. Conidiogenous cells integrated, denticulate, ampulliform, intercalary and lateral, monoblastic, determinate, straight, brown to dark brown; basal part pale brown, thin-walled, 13-16 µm wide; upper part cylindrical, becoming darker towards the apex, smooth, 5-6 µm wide, with truncate apex up to 2 µm wide. Conidia holoblastic, solitary, dry, fusiform, obclavate rostrate, straight or slightly curved, brown to dark brown, 8-9-distoseptate, often with reduced cell lumen, smooth, 50-79 x 8.5-10 µm; basal cell conical, truncate, darker than other cells; apical cell conical with obtuse apex, pale brown, sometime with short extension.

Ecology/Substrate/Host: Saprobe on dead branches of unidentified broad leaf tree.

Geographical distribution: China.

Notes: *Morriasiella reblovae* resembles *M. indica*, the type species of the genus, in synnematos conidiomata with conidiogenous cells directly formed from the out-layer hyphae or conidiophores, intercalary and lateral conidiogenous cells without percurrent proliferation, and brown, distoseptate conidia. It differs from *M. indica* in shorter and narrower synnemata, pale brown conidiogenous cells, and fusiform, fewer septate conidia in smaller size (Wu and Zhuang 2005; Seifert et al. 2011). Unfortunately, no living culture was obtained, its affinity to the genus is still in doubtful.

Stanjehughesia Subram., Proc. India Natn. Acad. Sci. B 58: 184, 1992.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, lageniform, ampulliform,

solitary, short, simple, truncate at the apex. Conidial ontogeny holoblastic, 1 locus or conidiogenous cell, solitary conidia, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic, no proliferation. Conidia holoblastic, straight or slightly curved, narrowly obclavate to obclavate-rostrate, conical-truncate at the base, euseptate, pale brown to brown, smooth, subhyaline at the apex.

Type species: *Stanjehughesia hormiscioides* (Corda) Subram.

Ecology/Substrate/Host: Saprobes on decaying plant material.

Known distribution: Broadly distribution, especially from subtropical and tropical areas.

Description and illustration: Subramanian (1991); Wu and Zhuang (2005).

Notes: *Stanjehughesia* Subram. is a relatively small genus segregated from *Sporidesmium* Link (Subramanian, 1992). It is characteristic of absence of conidiophores, and euseptate, obclavate conidia. Morphologically *Stanjehughesia* resembles *Linkosia* A. Hern. Gut. & B. Sutton and *Janetia* M.B. Ellis, but can be distinguished from *Linkosia* by its euseptate conidia, from *Janetia* by its monoblastic conidiogenous cells and lignicolous habitat (Ellis 1976; Hughes 1983; Swart 1985; Subramanian 1992; Hernández-Gutiérrez and Mena Portales 1994; Goh and Hyde 1996c; Hernández-Gutiérrez and Sutton 1997; Wu and Zhuang 2005; Hsieh et al. 2021). *Pseudostanjehughesia* J. Yang & K.D. Hyde, typified by *P. aquitropica* J. Yang & K.D. Hyde, is also similar to *Stanjehughesia* on absence of conidiophores and euseptate conidia, but phylogenetically distinct and belongs to different family (Yang et al. 2018b).

Twenty species names are known under the genus and they can be distinguished by conidial size and septation (Subramanian 1992; McKenzie 1995; Wu and Zhuang 2005; Delgado 2008; Maromcpwotz et al 2008; Ma et al. 2011b; Almeida et al 2014; Ma 2016; Mena-Portales et al. 2016; Heuchert et al. 2018; Hsieh et al. 2021). Teleomorph of *Stanjehughesia* was found from 2 species: *Stanjehughesia hormiscioides* (as *Sporidesmium hormiscioides* Corda) has *Umbrinosphaeria caesariata* (Clinton & Peck) Réblová (= *Lasiosphaeria caesariata* (Clinton & Peck) Sacc.) as the teleomorph, which was confirmed by single spore isolation method (Réblová and Winka 2001); *Stanjehughesia larvata* (Cooke) Subram. (as *Sporidesmium larvata* Cooke & Ellis) has *Miyoshiella larvata* Kawamura as the teleomorph (Réblová 1999a; Réblová and Winka 2001).

Our phylogenetic analysis shows that the genus *Stanjehughesia* is polyphyletic, and species with available ITS/LSU sequences are grouped into 5 different clades in the phylogenetic tree. Among them, 3 species belong to Chaetosphaeriaceae: the type species of the genus *Stanjehughesia*, *S. hormiscioides* (= *Chaetosphaeria caesariata*; = *Umbrinosphaeria caesariata*), is clustered together with *Exserticlava* and represents a separate genus in Chaetosphaeriaceae; *S. vermiculata* is clustered together with several other *Sporidesmium*-like fungi; and *S. kaohsiungensis* is clustered together with *Codinaea*-like fungi with septate conidia, and belongs to an independent genus; two species should be excluded from the family, *S. polypora* belongs to *Xylariales*. Further phylogenetic analysis is needed with more DNA sequences available to clarify their phylogenetic relationship and establish monophyletic generic concept and revision of the genus (Réblová 1999a; Réblová and Winka 2001; Shenoy et al. 2006; Hyde et al. 2019; Réblová et al. 2020, 2021a; Hsieh et al. 2021).

Despite the immature phylogeny-based taxonomy at this stage, Hsieh et al. (2021) recognized 18 species of *Stanjehughesia* based on morphology and a detailed morphological comparison of these species, with a taxonomic key to ease species identification. Some of the taxonomic issues were also discussed. A total of ten species of *Stanjehughesia* have been reported from China (Wu and Zhuang 2005; Ma et al. 2011; Ma 2016; Hsieh et al. 2021).

Key to all species of *Riisgaardia* (R.), *Stanjehughesia* (S.) and *Falholtia* (F.) (revised after Hsieh et al. 2021)

1. Conidia with both eusepta and distosepta 2
1. Conidia with eusepta only 3
2. Conidia obclavate, apex rostrate, curved or coiled, 65–140 × 5.5–7.5 µm *S. curviapicis*
2. Conidia cylindrical to clavate, apex broadly rounded, 60–97 × 8–12 µm *S. clavata*
3. Conidia obclavate, apex conical or rostrate 4
3. Conidia cylindrical, cylindro-clavate, vermiform, fusiform, ellipsoidal, apex obtuse or rounded 14
4. Conidial wall verrucose 5
4. Conidial wall smooth 7
5. Conidia 90–170(–200) × 12–17 µm, apex rostrate and with a mucilaginous sheath *S. decorosa*
5. Conidia apex lacking a mucilaginous 6
6. Conidia obclavate or fusiform, 60–118 × 7–11 µm, 9–15-septate, apex subhyaline and with a broken outer wall *S. fasciculata*
6. Conidia obclavate or ventricose, 100–140 × 10.5–14.5 µm, 19–27-septate, apex not as above *F. kaohsiungensis*
7. Conidia 7–9 µm wide 8
7. Conidia 10–20 µm wide 9
8. Conidia 130–190 × 7–9 µm, 13–19-septate, with 0–2 lateral branches at upper part *S. micheliae*
8. Conidia 65–85 × 7–8 µm, 6–8-septate, apical regions lacking lateral branches *S. fusiformis*

9. Conidiogenous cells 3.5–4.5 µm wide at the truncated apex; conidia typically obclavate.....	10
9. Conidiogenous cells 4–7 µm wide at the truncated apex; conidia ventricose, cylindro-obclavate, elongate-fusiform or vermiform.....	11
10. Conidia 12–14-septate, 110–125 x 9–12 µm	<i>R. obclavata</i>
10. Conidia 11–14-septate, 80–120 x 10–12 µm	<i>S. jiangxiensis</i>
11. Conidia ventricose, 15–20 µm wide.....	<i>S. ventricosa</i>
11. Conidia cylindro-obclavate, elongate-fusiform to vermiform, 10–15 µm wide.....	12
12. Conidia 52.5–145 µm long, 7–16-septate.....	<i>S. obclavorostrata</i>
12. Conidia with more than 16 septa, and longer than 150 µm	13
13. Conidia 120–270 x 12–15 µm, 12–26-septate	<i>R. vermiculata</i>
13. Conidia 230–273 x 10–11.5 µm, 15–23-septate	<i>R. longispora</i>
14. Conidia 32–50(–79) µm long, 5–15-septate.....	15
14. Conidia 65–214 µm long, 8–36-septate.....	17
15. Conidiophores absent or short, 1–2 septate; conidia 40–79 x 9–12 µm, 10–15-septate.....	<i>S. larvata</i>
15. Conidiophores absent; conidia 34–48 x 6–10 µm, 5–9-septate.....	16
16. Conidia cylindro-obclavate, 6–7 µm wide.....	<i>S. floridensis</i>
16. Conidia fusiform or ellipsoidal, 8.5–10 µm wide.....	<i>S. minima</i>
17. Conidia vermiform, broader and distinctly darker at the middle portion, 130–214 x 10–12 µm, 23–36-septate.....	<i>S. nigroaca</i>
17. Conidia cylindrical to cylindro-fusoid, apex broadly rounded, uniform in color, 9–17 µm wide, 8–20-septate.....	18
18. Conidiogenous cells in fascicles; conidia 65–150 x 13–17 µm, 8–20-septate	<i>S. caespitulosa</i>
18. Conidiogenous cells solitary; conidia 90–205 x 9–14.5 µm, 8–20-septate	<i>S. hormiscioides</i>

Stanjehughesia curviapicis (Goh & K.D. Hyde) D.A.C. Almeida & Gusmão, Nova Hedwigia 98: 438, 2014.

≡ *Janetia curviapicis* Goh & K.D. Hyde, Mycologia 88: 1015, 1997.

= *Stanjehughesia hamatiella* W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 94, 2005.

Material examined: China: Guangdong Province, Dinghushan, on dead culm of bamboo, 9 Oct. 1998, W.P. Wu (Wu1911b, holotype of *Stanjehughesia hamatiella*).

Ecology/substrate/host: Saprobies on decaying plant material.

Geographical distribution: Australia, China.

Description and illustration: Goh and Hyde (1997), Wu and Zhuang (2005).

Notes: The hamate conidia in *Stanjehughesia curviapicis* is characteristic and make it easily being distinguished from all other known species in the genus (Ellis 1958, 1959, 1961, 1976; Subramanian 1992; Wu and Zhuang 2005). No living strain was obtained for molecular phylogenetic study, its affinity to *Chaetosphaeriaceae* remains to be confirmed when pure culture and DNA sequences are available.

Stanjehughesia fasciculata J. Mena, Delgado & Guarro, Mycologia 93: 754, 2001.

Material examined: China: Hainan Province, on dead petiole of palm, 20 Dec. 2000, W.P. Wu and Yan Huang (Wu5502); China: Hainan Province, on dead petiole of palm, 20 Dec. 2000, W.P. Wu and Yan Huang (Wu5508, Wu5519a).

Ecology/substrate/host: Saprobies on rotten petiole of palm.

Geographical distributions: China, Cuba.

Descriptions and illustrations: Mena Portales et al. (2001); Wu and Zhuang (2005).

Notes: *Stanjehughesia fasciculata* differs from other species in the genus by its verruculose, dark brown to black conidia with apical mucilaginous appendage (Subramanian 1992; Mena Portales et al. 2001). No living strain was obtained for molecular phylogenetic study, its affinity to *Chaetosphaeriaceae* remains to be confirmed when pure culture and DNA sequences are available.

Stanjehughesia fusiformis W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 92, 2005.

Material examined: China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on decaying culm of bamboo, 2 Jan. 1997, W.P. Wu (Wu2095, holotype).

Ecology/substrate/host: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: Among the known species in the genus, *Stanjehughesia caespitulosa* (Ellis & Everh.) Subram., *S. hormiscioides* (Corda) Subram., *S. larvata* (Cooke & Ellis) Subram. and *S. nigroaca* (B. Sutton) Subram. produce cylindrical to subcylindrical conidia, thus can be easily distinguished from *S. fusiformis* W.P. Wu which has obclavate to fusiform conidia (Ellis 1958, 1971, 1976). The conidia in *S. decorosa* (R.F. Castañeda and W.B.

Kendr.) McKenzie and *S. vermiculata* (Cooke) Subram. are also obclavate to fusiform but are much longer and with more septa than *S. obclavata* (Conidia 16-26-septate and 120-270 x 10-15 µm in *S. vermiculata*; 10-14-septate and 170-200 x 12-17 µm in *S. decorosa*).

Stanjehughesia hormiscioides (Corda) Subram., Proc. Indian natn Sci. Acad., Part B. Biol. Sci. 58(4): 184, 1992. Fig. 36

≡ *Sporidesmium hormiscioides* Corda, Icon. fung. (Prague) 2: 6, 1838.
≡ *Helminthosporium hormiscioides* (Corda) Sacc. [as 'Helmisporium'], Michelia 1 (no. 1): 85, 1877.
≡ *Clasterosporium hormiscioides* (Corda) Sacc., Syll. fung. (Abellini) 4: 383, 1886.
= *Lasiosphaeria caesariata* (Clinton & Peck) Sacc., Syll. fung. (Abellini) 2: 192, 1883.
= *Phaeotrichosphaeria caesariata* (Clinton & Peck) M.E. Barr, in Barr, Rogerson, Smith & Haines, Bull. N.Y. St. Mus. 459: 12, 1986.

= *Umbrinosphaeria caesariata* (Clinton & Peck) Réblová, Mycotaxon 71: 18, 1999.
= *Chaetosphaeria caesariata* (Clinton & Peck) F.A. Fernández & Huhndorf, Fungal Diversity 18: 49, 2005.
= *Sphaeria caesariata* Clinton & Peck, in Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 29: 60, 1878 [1876]

Mycelium superficial. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells single or in dense clusters on the substrate surface, short, dark brown, smooth and thick-walled, ampulliform, mostly 14-16 x 5-5.5 µm, with a bulbous base 13-15 µm wide, rounded at the distal end, apical cell subhyaline, truncate at the proximal end and 4.7-5 µm wide at the base. Conidia holoblastic, terminal and single at the conidiophore apex, dark brown, with basal cell, or cells, darker, smooth, thick-walled, obclavate, cylindrical, straight with rounded apex and slight tapering toward a narrower truncated base, 10-12-septate, 85-100 x 14-16 µm.

Material examined: China: Hubei Province, Shengnongjia, on rotten wood, Sept 2004, W.P. Wu (Wu8263).

Ecology/substrate/host: Saprobies on dead branch and rotten wood of many trees.

Geographical distribution: China, Italy, New Zealand, USA.

Description and illustration: Ellis (1958, 1971); Hughes and Illman (1974); Shoemaker and White (1985); Réblová (1999); Hsieh et al. (2021).

Notes: Among the known species of *Stanjehughesia*, *S. caespitulosus*, *S. hormiscioides*, *S. clavata*, and *S. nigroaca* produce clavate to cylindrical conidia with rounded apex and they can be distinguished by size and septation of conidia (Ellis 1958, 1971, 1976; Shoemaker and White 1985; Sutton 1989; Almeida et al. 2014; Hsieh et al. 2021). *Stanjehughesia hormiscioides* was fully described and illustrated in several publications. The fungus from the single Chinese specimen has shorter conidia with fewer septa, otherwise it is very similar to those described in literatures. Attempt to get the pure culture was failed due to no germination of spore.

Stanjehughesia jiangxiensis Jian Ma, Mycotaxon 131: 585, 2016.

Teleomorph: Not observed. Anamorph: Conidiophores reduced to conidiogenous cells. Conidiogenous cells monoblastic, determinate, solitary or grouped, cylindrical or ampulliform, brown to dark brown, smooth, 9.5-22 x 3.5-4 µm. Conidial secession schizolytic. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate to obclavate-rostrate, brown, smooth, 11-14-euseptate, 82-120 µm long, 10-12 µm thick in the broadest part, tapering to 2.5-3 µm near the apex, 3.5-4 µm wide at the truncate base.

Ecology/substrate/host: Saprobies on dead branches.

Geographical distribution: China.

Description and illustration: Ma (2016).

Notes: *S. jiangxiensis* is characterized by absence of conidiophores, aggregated conidiogenous cells, and 11-14-septate, obclavate-rostrate conidia of 82-120 x 10-12 µm conidia (Ma 2016). No living strain is available for molecular phylogenetic study and the above description is based on the original publication, its affinity to the genus and *Chaetosphaeriaceae* is doubtful.

Stanjehughesia larvata (Cooke & Ellis) Subram., Proc. Indian Natn. Acad. Sci. B 58: 184, 1992.

≡ *Sporidesmium larvatum* Cooke & Ellis, Grevillea 6: 86, 1878.

≡ *Clasterosporium larvatum* (Cooke & Ellis) Sacc., Syll. Fung. 4: 385, 1886.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of *Eucalyptus* sp., 10 Oct. 1998, W.P. Wu (Wu1958); China: Yunnan, Kunming Botanical Garden, on dead bark, 22 Oct 1999, W.P. Wu and Yan Huang (Wu2528).

Ecology/substrate/host: Saprobies on dead branches of tree, including *Eucalyptus* sp.

Geographical distributions: Canada, China, Japan, Pakistan, UK, USA, USSR.

Descriptions and illustrations: Ellis (1958); Matsushima (1975).

Notes: The cylindrical conidia and short but distinct conidiophores are characteristic of *Stanjehughesia larvata* (Cooke & Ellis) Subram. The very short but distinctly differentiated conidiophores, as described and illustrated by Ellis (1958) and Matsushima (1975), were seen from both collections examined here, which might mean that

this species probably should be remained in its original genus *Sporidesmium* Link (Castañeda-Ruiz and Kendrick, 1990b; McKenzie 1995). No living strain was obtained for molecular phylogenetic study, its affinity to Chaetosphaeriaceae remains to be confirmed when DNA sequence is available.

Stanjehughesia micheliae Jian Ma & X.G. Zhang, Mycotaxon 117: 251, 2011

Typification: On dead branches of *Michelia skinneriana*, China: Guangdong Province, Chebaling National Park Reserve, 16 Oct 2010, J. Ma (HSAUP H5414, holotype; HMAS146143, isotype).

Ecology/substrate/host: Saprobes on dead branch of *Michelia skinneriana*.

Geographical distribution: China.

Description and illustration: Ma et al. (2011).

Notes: *S. micheliae* is unique in producing obclavate to obclavate-rostrate conidia with 0-2 branches at the upper part. No DNA sequence is available for phylogenetic study, its phylogenetic relationship with other known *Stanjehughesia* species is remained to be studied.

Stanjehughesia minima W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 97, 2005.

Material examined: China: Hainan Province, on dead culm of bamboo, 20 Dec. 2000, W.P. Wu and Yan Huang (WU5558, holotype).

Ecology/substrate/host: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: *Stanjehughesia minima* differs from all other known species in the genus by small-sized, fusiform to ellipsoidal conidia. Morphologically it resembles *S. larvata* (Cooke & Ellis) Subram., but differs by its absence of conidiophores, small-sized conidia with less septa (Ellis 1958; Subramanian 1992, Wu and Zhuang 2005). No living strain was obtained for molecular phylogenetic study, its affinity to Chaetosphaeriaceae remains to be confirmed when DNA sequence is available.

Stanjehughesia polypora W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 99, 2005.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3.5 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, cylindrical to ampulliform, solitary, short, simple, brown to dark brown, 13-18 x 3.5-5 µm, 3.5-4.5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, fusiform, obclavate to obclavate-rostrate, 15-20-euseptate, pale brown to brown, become pale brown to subhyaline at the apex, smooth, constricted at the septation, each cell with a germination pore, 110-165 x 10-12 µm; apical cells subhyaline, rounded; basal cell cylindrical, conical-truncate, 3.5-4.5 µm wide at the base.

Material examined: China: Jilin Province, Changbaishan, on dead branch, 5 Sept. 1998, W.P. Wu (Wu1774b1, holotype); China: Guangxi province, Shangsi County, on rotten wood, 31 Dec. 1997, W.P. Wu (Wu1690); China: Yunnan Province, Gaoligongshan, on rotten wood, Oct. 2003, W.P. Wu (Wu7308). Living strain: 47796 (from Wu7308).

Ecology/substrate/host: Saprobes on dead branch and rotten wood.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: *Stanjehughesia polypora* differs from all known species in the genus by obclavate and multiseptate conidia with a germination pore in each cell (Ellis 1958, 1971, 1976; Subramanian 1992; Wu and Zhuang 2005). The ITS and LSU sequences were obtained from the single isolate 47796 and they clearly showed affinity to Chaetosphaeriaceae.

Stanjehughesia nigroaca (B. Sutton) Subram., Proc. Indian Natn. Sci. Acad. B 58: 184, 1992.

≡ *Sporidesmium nigroaca* B. Sutton, Sydowia 41: 341, 1989.

Description and illustration: Sutton (1989).

Substrate: On rotten wood.

Geographical distribution: Australia, China (Lu et al., 2000).

Notes: Lu et al. (2000) reported this species on submerged wood from Hong Kong.

Falholtia W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841517

Etymology: named after the former senior R&D leader, Per Falholtia, from Novozymes.

Diagnosis: Similar to *Stanjehughesia* on conidiophore and conidia, but differs from it by producing short but distinct 1-2-septate conidiophores. Phylogenetically they are also different.

Type species: *Falholtia kaohsiungensis* (S.Y. Hsieh, Goh & C.H. Kuo) W.P. Wu & Y.Z. Diao.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae. Teleomorph: unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, lageniform, ampulliform, solitary, short, simple, truncate at the apex. Conidial ontogeny holoblastic, 1 locus or conidiogenous cell, solitary conidia, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic, no proliferation. Conidia holoblastic, straight or slightly curved, narrowly obclavate to obclavate-rostrate, conical-truncate at the base, euseptate, pale brown to brown, smooth, subhyaline at the apex.

Ecology/Substrate/Host: Saprobe on decaying branches.

Geographical distribution: China.

Notes: *Falholtia* W.P. Wu & Y.Z. Diao is characterized by conidiophores in clusters or synnemata, short conidiophores with 1-2-septate, holoblastic conidiogenous cells with doliiform or lageniform proliferations, and dark brown, euseptate conidia. Morphologically it resembles *Stanjehughesia* on reduced conidiophores, conidiogenous cells and conidia, however, phylogenetically belongs to different clades in *Chaetosphaeriaceae*. The genus is monotypic, with only the type species known.

Falholtia kaohsiungensis (S.Y. Hsieh, Goh & C.H. Kuo) W.P. Wu & Y.Z. Diao, comb. nov., Figs. 37-38, MycoBank MB841677

≡ *Stanjehughesia kaohsiungensis* S.Y. Hsieh, Goh & C.H. Kuo, Phytotaxa 484: 267, 2021.

Colonies on natural substratum scattered, brown. Mycelium partly immersed and partly superficial, composed of branched, septate, pale brown to brown, smooth-walled hyphae. Teleomorph: unknown. Anamorph: Conidiomata synnematus, solitary or in group of 2-5, erect, cylindrical, dark brown to blackish, up to 2.5 mm high, 100-500 µm wide, become narrower toward the apex, composed of closely compacted conidiophores, with a long fertile region. Conidiophores short, 0-1-septate, mostly in groups of 4-10, cylindrical, dark brown to black, smooth-walled, 13-30(-34) x 4-5 µm. Conidiogenous cells monoblastic, terminal, determinate, cylindrical or lageniform. Conidia acrogenous, holoblastic, solitary, straight to flexuous or slightly sigmoid, obclavate to obclavate-rostrate, lower portion ventricose, thick-walled and somewhat verrucose at the ventricose region, brown to dark olivaceous brown, smooth and slightly paler toward the rostrate apex, (9-)19-27-euseptate, slightly constricted at the septa, (60-)100-140 µm long, 10.5-14.5 µm wide at the broadest part, tapering to 4.5-5.5 µm near the apex, 3.5-4 µm wide at the truncated base.

Colonies on PDA effuse, colonies 0.5-1.2 cm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, yellow brown, reverse of the same color or slightly dark brown, with yellow pigment in the medium.

Material examined: China: Hubei Province, Shengnongjia, on dead stem of unidentified plant, Sept 2004, W.P. Wu (Wu8321). Living strain: 50711 (from 8321).

Ecology/substrate/host: Saprobe on decaying branch and wood.

Geographical distribution: China.

Description and illustration: Hsieh et al. (2021).

Note: *Stanjehughesia kaohsiungensis* is a recently described species and its affinity to *Chaetosphaeriaceae* was confirmed by molecular phylogenetic analysis (Hsieh et al. 2021). The ITS sequence from the living strain derived from the specimen Wu8321 is almost identical to the one from the type specimen. However, the fungus from our specimen forms synnemata on natural substrate, which is different from the clustered conidiogenous cells from the type specimen.

Riisgaardia W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841516

Etymology: Named after the former CEO of Novozymes, Steen Riisgaardia, who made great contribution in promoting industrial biotechnology for sustainability.

Diagnosis: Similar to *Stanjehughesia* in euseptate conidia, but differs phylogenetically; also similar to *Linkosia* in absence of conidiophores, but differs in producing distoseptate conidia.

Type species: *Riisgaardia filiformia* W.P. Wu & Y.Z. Diao.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae. Teleomorph: Not observed. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, lageniform, ampulliform, short, , solitary in groups on basal stroma, simple, brown to black, truncate at the apex. Conidial ontogeny holoblastic, 1 locus or conidiogenous cell, solitary, delimited by 1 septum, maturation by diffuse wall-building, secession schizolytic. Conidia holoblastic, straight or slightly curved, narrowly obclavate to obclavate-rostrate, filiform, conical-truncate at the base, euseptate, pale brown to brown, smooth, subhyaline at the apex.

Ecology/Substrate/Host: Saprobes on rotten plant material.

Geographical distribution: China, Europe.

Notes: *Riisgaardia* is similar to *Stanjehughesia* and *Stanjehughesia* synanamorph of *Zanclospora* in absence of conidiophores, dark brown to black conidiogenous cells with truncate apex, and cylindrical, obclavate to

obclavate-rostrate, multiseptate conidia, and in fact they can hardly be distinguished from each other on morphology (Subramanian 1991; Wu and Zhuang 2005; Seifert et al. 2011; Hsieh et al. 2021; Réblová et al. 2021a). However, in the phylogenetic tree generated from the integrated ITS and LSU data, they are clearly distinguished: *Riisgaardia*, together with several other *Sporidesmium*-like species, is clustered together with several genera producing lateral phialides and hyaline conidia; while the type species of *Stanjehughesia*, *S. hormiscioides*, is clustered together with *Exserticlava* and *Stephemberneria*, both with brown and septate conidia.

***Riisgaardia longispora* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 39-40, MycoBank MB841551**

Etymology: refers to its long conidia.

Diagnosis: Conidiophores absent. Conidiogenous cells lageniform, 14-19 x 5.5-6 µm, 9-12 µm at the swollen base; Conidia obclavate-rostrate, (11-) 15-23-septate, (125-) 230-273 x 10-11.5 µm.

Type: China: Hubei Province, Shennongjia, On rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8333; ex-type culture CGMCC3.20794 = NN 50731).

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3 µm wide. Teleomorph: unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, cylindrical, lageniform, ampulliform, solitary or in groups, short, simple, brown to dark brown, 14-19 x 5.5-6 µm, 9-12 µm at the swollen base, 4-5.5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate-rostrate, (11-) 15-23-euseptate, brown to dark brown, smooth, (125-) 230-273 x 10-11.5 µm; apical cells subhyaline, rounded, 2.5-3 µm; basal cell cylindrical, conical-truncate, 5-6.5 µm wide at the base.

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey, grey brown to dark brown, reverse of the same color or slightly darker.

Material examined: China: Hubei Province, Shennongjia, on rotten plant material, 20 Sept 2004, W.P. Wu (Holotype WFH Wu8333; ex-type culture 50731); China: Hubei Province, Shennongjia, on rotten plant material, Sept. 2004, W.P. Wu (Wu8314). Living strains: 50687 (from Wu8314), ex-type strain 50731 (from Wu8333).

Ecology/substrate/host: Saprobe on dead branches.

Geographical distribution: China.

Notes: *Riisgaardia longispora* resembles *R. vermiculata*, but differs by longer conidia with more septa (Wu and Zhuang 2005; Hsieh et al. 2021). Both ITS and LSU sequences were obtained from the two specimens examined and their phylogenetic relationship with other members of Chaetosphaeriaceae was confirmed.

***Riisgaardia obclavata* (W.P. Wu) W.P. Wu & Y.Z. Diao, comb. nov., Fig. 41 MycoBank MB 841678**

≡ *Linkosia obclavata* W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 186, 2005.

Typification: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of bamboo, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1266a; ex-type strain CGMCC3.20787 = NN 43163).

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 14-16 x 8-10 µm, 4-5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate to obclavate-rostrate, 12-14-distoseptate, pale brown to brown, smooth, 110-125 x 9-12 µm; apical cells subhyaline, rounded; basal cell cylindrical, with truncate base of 4-5.5 µm wide.

Colonies on PDA effuse, colonies 0.3-1.2 cm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, pale brown to brown, reverse of the same color or slightly lighter.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of bamboo; 2 Jan. 1997, W.P. Wu (Wu1266a, holotype). Living strain: ex-type strain 43163.

Ecology/Substrate/Host: Saprobe on rotten culm of bamboo.

Geographical distribution: China.

Description and illustration: Wu and Zhuang (2005).

Notes: Re-examination of the type specimen shows that *Linkosia obclavata* W.P. Wu produces euseptate conidia. Phylogenetic analysis also shows it is grouped together with other *Riisgaardia* species. It differs from the other similar species, including *Stanjehughesia fusiformis*, *S. jiangxiensis*, and *S. polypore*, by the combination of conidial size and number of septa. The phylogenetic analysis based on the ITS and LSU sequences obtained from the type specimen shows it belongs to Chaetosphaeriaceae.

***Riisgaardia vermiculata* (Cooke) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841679**

≡ *Clasterosporium vermiculatum* Cooke, Grevillea 4: 69, 1875.

≡ *Sporidesmium vermiculatum* (Cooke) M.B. Ellis, Mycol. Pap. 70: 41, 1958.

≡ *Stanjehughesia vermiculata* (Cooke) Subram., Proc. Indian Natn. Acad. Sci. B 58: 184, 1992.

Colonies effuse, hypophyllous, brown. Mycelium superficial, composed of septate, brown to dark brown hyphae, 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores absent. Conidiogenous cells discrete, determinate, monoblastic, cylindrical, lageniform, ampulliform, solitary, short, simple, brown to dark brown, 11-15 x 5-7 µm, 4-5 µm wide at the truncate apex. Conidia holoblastic, straight or slightly curved, obclavate-rostrate, 12-19-septate, brown to dark brown, become pale brown to subhyaline at the apex, smooth, up to 250 µm long, 12.5-15 µm wide at the broadest part; apical cells subhyaline, rounded; basal cell cylindrical, conical-truncate, 7.5-9 µm wide at the base.

Colonies on PDA effuse, colonies 1 cm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, pale brown to brown, reverse of the same color.

Material examined: China: Guangxi Province, Damingshan, on dead culm of bamboo, 18 Dec 1997, W.P. Wu (Wu1354g). Living strain: 42952 (from Wu1354g).

Ecology/substrate/host: Saprobies on rotten wood and bark of woody plants including *Fagus sylvatica*, *Quercus* sp. and bamboo.

Geographical distributions: Canada, China, UK.

Description and illustration: Ellis (1958); Wu and Zhuang (2005).

Notes: *Riisgaardia vermiculata* resembles *S. longispora* in producing longer conidia with many septa, but differs from it by longer conidia with more septa (Ellis 1958; Wu and Zhuang 2005). The phylogenetic analysis based on the ITS and LSU sequences obtained from the specimen 42952 shows it belongs to Chaetosphaeriaceae.

Hyphomycetous genera with phialidic anamorphs

Among the 91 accepted genera of chaetosphaeriaceous fungi, majority of them are known as dematiaceous hyphomycetes with phialidic conidiogenous cells in their anamorphic states (Réblová and Winka 2000, 2001; Fernández et al. 2006; Magyar et al. 2011; Hyde et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021a, b, c, d; Zheng et al. 2021). Some of these phialidic genera have both anamorph and teleomorph found and their phylogenetical connection are established for at least one species within the genus, including *Cacumisporium*, *Catenularia*, *Chaetosphaeria*, *Chloridium*, *Dictyoachaeta*, *Exserticlava*, *Menispora*, *Paragaeumannomyces*, *Sporoschisma*, *Striatosphaeria*, *Tainosphaeria*, *Thozetella* and *Zanclospora*. While large number of these genera are known with only anamorph (Borowska 1986; Dennis 1986; Costantinescu et al. 1995; Heredia-Abarca et al. 1995, 1997a, b; Okada et al. 1997; Réblová 1998a, b, 1999a, b, 2000, 2004; Réblová et al. 1999, 2011; Réblová and Gams 2000; Réblová and Winka 2000; Grunig et al. 2002; Réblová and Seifert 2003; Hyde et al. 2016a, b; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, d).

Key to phialidic anamorphic genera in Chaetosphaeriaceae

1. Conidiomata sporodochia or synnemata	2
1. Conidiophore not formed from sporodochia or synnemata	15
2. Sporodochia or synnemata with sterile setae or microawn	3
2. Sporodochia without sterile setae or microawn	13
3. Sporodochia or synnemata with microawn	<i>Thozetella</i>
3. Sporodochia or synnemata with sterile setae	4
4. Conidiomata synnemata with 1 central setae and conidiophores	5
4. Conidiomata sporodochia	9
5. Conidiomata sporodochial or synnematus; sterile setae absent; microawn present	<i>Thozetella</i>
5. Conidiomata synnematus; sterile setae present; microawns absent	6
6. Synnemata diverge from setae towards apices and become unilateral; conidia septate	<i>Arcuatospira</i>
6. Sterile setae in the middle of synnemata	7
7. Conidia brown, septate, without appendage	<i>Phialoarthrobotryum</i>
7. Conidia hyaline, aseptate, with appendage	8
8. Conidia round-tetrahedral to pyramidal, with 3 protuberant corners each corner furnished with one setula, base slightly truncate to rounded with one setula	<i>Phialosporostilbe</i>
8. Conidia falcate, fusiform, with 1 setulae at end	<i>Menisporopsis</i>
9. Conidia dark brown, 3-septate, ellipsoid	<i>Adautilanezia</i>
9. Conidia hyaline, 0-1 septate	10
10. Conidia without appendages	<i>Verhulstia</i>
10. Conidia bearing appendages	11
11. Conidia star-shaped, 5-lobed, bearing 4-6 filiform appendages	<i>Neonawawia</i>
11. Conidia fusiform, falcate, with 1 filiform appendage at each end	12
12. Conidia 1-septate	<i>Rattania</i>
12. Conidia aseptate	<i>Minimidochium</i>

13. Conidia ellipsoidal, fusiform	<i>Eucalyptostroma</i>
13. Conidia lunate or falcate	14
14. Conidiogenous cells cylindrical, lageniform; conidia falcate	<i>Pseudothozetella</i>
14. Conidiogenous cells with bulbous base and cylindrical upper part; conidia lunate	<i>Eucalyptostromiella</i>
15. Phialides always borne laterally on conidiophores, in whorls, singly or on short branches, sometimes incorporated in the conidiophores, apical or intercalary	16
15. Phialides always integrated in the conidiophores, apical	26
16. Conidia forming at multiple conidiogenous loci with the collarette, hyaline or pale brown, short ellipsoid, aseptate; phialides in whorls or single	<i>Chloridium</i>
16. Conidia forming at a single conidiogenous locus without the collarette	17
18. Phialides borne singly, on 1-3 supporting cells or on short branches of the conidiophores, collarette inconspicuous or strongly recurved toward the conidiophore axis; conidia hyaline, oblong, fusiform, with or without setulae, 0-3-septate	<i>Menispora</i>
18. Apex of the phialide not strongly recurved toward the conidiophore axis	19
19. Phialides in palisade along the main axis of the conidiophores	20
19. Phialides not in a palisade	22
20. Collarettes inconspicuous; phialides arising around the whole conidiophore, surrounded by a shield-like aggregation of sterile cells	21
20. Collarettes distinct; phialides formed in a palisade or small bundles on one side of the conidiophores, no shield-like structure present	<i>Cryptophialoidea</i>
21. Conidia dictyospores with both transversely and longitudinal septa, ellipsoid, apical cell with a single apical appendage	<i>Paracryptophiale</i>
21. Conidia aseptate or with transversely septa only, various in shape from falcate, fusiform, cylindrical, to globose, without or with appendage	<i>Cryptophiale</i>
22. Phialides exclusively borne singly or in whorls along the main axis of conidiophore or its branches; conidiophore branched or unbranched; conidia hyaline, various in shape	23
22. Phialides borne on branches or rarely singly	24
23. Phialides exclusively borne singly or in whorls along the main axis of conidiophore or its branches; conidiophore branched or unbranched; conidia hyaline, various in shape	<i>Zanclospora</i>
23. Phialides borne singly along the main axis of conidiophores or directly from superficial hyphae; setiform conidiophores with swollen apex; conidia falcate	<i>Brachydietyochaeta</i>
24. Conidiophores not setiform, branched; Conidia short ellipsoidal, aseptate; phialides arising in whorls along the conidiophore or on its verticillate branches	<i>Phaeostalagmus</i>
24. Conidiophores setiform, branched, fertile or sterile at apex	25
25. Phialides born on single or poorly branched conidiophores; Conidia falcate or fusiform, symmetrical, or asymmetrical, +/- setulae	<i>Dictyochaetopsis</i>
25. Phialides on closely packed branches along the main axis of conidiophores	<i>Kionochaeta</i>
26. Conidiophores adhering and twining around the setae; conidiogenous cells mostly intercalary	27
26. Conidiophores not adhering and twining around the setae; conidiogenous cells terminal	28
27. Setae branched, conidia obclavate	<i>Paraceratocladium</i>
27. Setae unbranched, conidia cylindrical with rounded apex	<i>Paraceratocladia</i>
28. Conidiophores with branched apex, with several phialides	29
28. Conidiophores unbranched, with one terminal phialide only	30
29. Conidia cylindrical, formed in chain	<i>Sporendocladia</i>
29. Conidia ellipsoid, subglobose, formed in wet spore mass	<i>Chloridium</i>
30. Conidia forming at multiple conidiogenous loci within a collarette, sometimes extending beyond the collarette	31
30. Conidia forming at a single conidiogenous locus within the collarette	34
31. Conidia pigmented, distoseptate; collarette shallow, with a torn margin resulting from the rupture of the original outer wall	<i>Exserticlava</i>
31. Conidia hyaline, lightly pigmented or bicolorous, no distoseptate present; collarette cylindrical or flared, well-defined; phialides sometimes with percurrently extending conidiogenous zone above the collarette	32
32. Conidiophores and conidiogenous cells extending percurrently; conidia oblong, ellipsoidal to fusiform, bicolorous, 3-septate	<i>Cacumisporium</i>
32. Conidia aseptate	33
33. Conidia brown, asymmetrical, with setulae	<i>Stratiphoromyces</i>
33. Percurrent extension occurring or not; conidia hyaline or pale brown, aseptate	<i>Chloridium</i>
34. Collarettes long, tubular, conidiogenous locus deep-seated; conidia septate	35
34. Collarettes narrow, short, or broadly flared, campanulate, vase- or funnel-shaped	36

35. Sterile capitate hyphae present among conidiophores; conidia cylindrical, septate, darkly pigmented; collarettes deep, cylindrical	<i>Sporoschisma</i>
35. Sterile capitate hyphae absent; conidia fusiform, septate, bicolorous; collarette cupulate	<i>Pseudofuscophiales</i>
36. Sterile or fertile setae present	37
36. Sterile or fertile setae absent	46
37. Setae sterile, capitate, with swollen and mucilaginous apex; conidia brown to dark brown	38
37. Setae sterile or fertile, not capitate; conidia hyaline	39
38. Sterile capitate hyphae present or absent; conidia rounded-obconical and aseptate	<i>Catenularia</i>
38. Sterile capitate always present; conidia cylindrical to oblong and 3-septate	<i>Monosporoschisma</i>
39. Conidia lacking setulae	40
39. Conidia with setulae	43
40. Conidia obclavate, aciculate, septate	<i>Aciculadictyochaeta</i>
40. Conidia aseptate, not obclavate or aciculate	41
41. Conidia fusiform, tapering towards both end, centrally constricted	<i>Fusichloridi.um</i>
41. Conidia not centrally constricted	42
42. Conidia falcate, fusiform, subcylindrical	<i>Dictyochaeta and Lunatochaeta*</i>
42. Conidia globose, ellipsoidal, cylindrical	<i>Anacraspedodidymum</i>
43. Setae sterile, unbranched; conidiophores did not surround the setae; conidiophores of one kind around the central sterile setae; conidiogenous cells terminal; collarettes wide, funnel-shaped; conidia conical to pyramidal with rounded base, aseptate	<i>Paragaeumannomyces (Obeliospora)</i>
43. Setae sterile or fertile, unbranched; conidiophores surrounded the setae; conidiogenous cells terminal	44
44. Conidia septate	<i>Stilbochaeta</i>
44. Conidia aseptate	45
45. Setae uniformly brown and without darker apical 1-2 cells	<i>Codinaea</i>
45. Setae with apical 1-2 cells darker than other cells; conidia multiguttulate	<i>Xyladelphia</i>
46. Conidia with appendage	47
46. Conidia lacking appendage	59
47. Conidia formed in chains, obconical, bearing two setulae at the distal end..	<i>Chalarodes</i>
47. Conidia formed singly or in slime	48
48. Conidia dark brown, septate	49
48. Conidia hyaline	51
49. Conidia star-shaped, with 3 arms and septate	<i>Phaeonawawia</i>
49. Conidia not star-shaped	50
50. Conidia ellipsoidal, 3-septate, with 1-appendage at each end	<i>Anacacumisporium</i>
50. Conidia reniform to ellipsoidal, straight or slightly curved, 1-septate	<i>Striatosphaeria</i>
51. Conidia triangular to quadrangular, with >2 setulae	<i>Nawawia</i>
51. Conidia not triangular to quadrangular	52
52. Conidia 3-septate, ellipsoidal	<i>Multiguttulispora</i>
52. Conidia aseptate or 1-septate	53
53. Conidia formed single, rounded-cubical to globose, with >2 setulae	<i>Codinaea</i>
53. Conidia not rounded-cubical, with 1-2 setulae	54
54. Conidia falcate, fusiform, obclavate, straight or curved, aseptate or septate	55
54. Conidia ellipsoid, globose, straight, aseptate	56
55. Conidia falcate, fusiform, curved, with setulae at both ends	<i>Codinaeella & Tainosphaeria</i>
55. Conidia falcate, tapering toward apex, bearing appendage at base only	<i>Codinaea</i>
56. Conidia globose	57
56. Conidia ellipsoid	58
57. Conidia in chain or dry mass, with 1 setula only	<i>Parabahusutrabeeja</i>
57. Conidia in wet spore mass, with 1-3 setulae	<i>Neotainosphaeria</i>
58. Conidiogenous cells polyphialidic; conidia ellipsoid, aseptate	<i>Nimesporella</i>
58. Conidiogenous cells monophialidic; conidia ellipsoid, aseptate	<i>Calceisporiella</i>
59. Conidia hyaline	60
59. Conidia light to dark brown, aseptate or septate	61
60. Conidiogenous cells mono- or polyphialidic; conidia falcate to lunate	<i>Phialoturbella</i>
60. Conidiogenous cells monophialidic; conidia not falcate or lunate	62
61. Collarettes narrowly funnel-shaped and do not become apically incurved; conidia cylindrical-clavate, more gradually tapering toward the basal	<i>Achrochaeta</i>
61. Collarettes funnel-shaped, usually become apically incurved; conidia various shaped	62

62. Conidia ellipsoidal to obovoid, slightly curved, in slimy heads	<i>Flectospora</i>
62. Conidia ellipsoidal, clavate or reniform, straight, formed in slimy head or chain	<i>Chloridium</i>
63. Conidia formed in chain	64
63. Conidia not formed in chain	65
64. Sterile capitate present or absent; conidia rounded-obconical, with 3-4 corners	<i>Catenularia</i>
64. Sterile capitate absent; conidia rounded-obconical, apex rounded.....	<i>Fuscocatenula</i>
65. Conidia different, sterile capitate absent or present.....	66
66. Conidiogenous cells with very narrow sporulating loci	<i>Stephensbrunneria</i>
66. Conidiogenous cells with wide sporulating loci	67
67. Phialides with collarette inconspicuous; conidia 3-septate	<i>Phaeodischloridium</i>
67. Phialides inflated with large, funnel-shaped collarettes; conidia ellipsoidal to globose, rarely septate, formed singly, aggregating in slide heads	<i>Craspedodidymum</i>

Codinaea, Dictyochaeta and related fungi

Among dematiaceous hyphomycetes growing saprophytically on decaying plant materials including leaf litter, dead twigs and bark, rotten wood etc, *Codinaea* Maine and *Dictyochaeta* Speg. are two of the large genera, presently comprising about over 115 known species name (currently 63 species of *Dictyochaeta* and 54 species of *Codinaea*) with great diversity on morphology of setae, conidiophores, conidiogenous cells and conidia (Index Fungorum 2020) and distributed all over the world. From taxonomic and nomenclature aspects, the concept and distinction of these two genera have been very confusing and reviewed by many different authors (Morris 1956; Hughes and Kendrick 1968; Gamundi et al. 1977; Morgan-Jones 1982; Holubová-Jechová 1984; Arambarri et al. 1987; Arambarri and Cabello 1990; Kuthubutheen and Nawawi 1991b, d, e, f; Réblová 2000; Whitton, et al. 2000; Réblová 2004; Seifert et al. 2011; Lin et al. 2019; Luo 2019; Hyde et al. 2020; Réblová et al 2020, 2021a, b, c). Two different opinions have in practice been adapted by different researchers: accepting both genera and delimiting by *Codinaea* for species with setose conidia and *Dictyochaeta* for species with non-setose conidia (Réblová 2000, 2004; Réblová and Winka 2000, 2000; Li et al 2012; Wijayawardene et al. 2018; Hernández-Restrepo 2017; Hyde et al. 2020; Réblová 2020, 2021a); or using *Dictyochaeta* to accommodate all these fungi regardless of setose and non-setose conidia (Kuthubutheen and Nawawi 1991a; Whitton et al. 2000; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021c). Based on recent morphological (including re-examination of type specimen *Dictyochaeta fuegiana*) and phylogenetic analysis, more and more evidences support that the setose and non-setose species represent two different groups and should be separated (Réblová and Winka 2000; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021a, b, c, e). In addition, these analysis also showed that these two genera are polyphyletic and suggested on future detailed morpho-molecular analysis with more taxonomic sampling to confirm their phylogenetic status.

Based on analysis of morphology and phylogeny, the two genera *Codinaea* and *Dictyochaeta* were systematically revised by Réblová et al. (2020, 2021b, c, e), who provided an excellent framework for classification of this group of fungi. Both *Codinaea* and *Dictyochaeta* were emended to monophyletic genera with narrow concept, and several new genera were introduced to accommodate other morphologically similar but phylogenetically unrelated fungi. For species with aseptate conidia, *Dictyochaeta*, as typified by *D. fuegiana* Speg. and acceptance of 11 species, is emended with very narrow concept and characterized by presence of sterile or fertile setae, several short conidiophores in fascicles with 1-2 setae, terminal mono- or poly-phialidic conidiogenous cells with funnel-shaped collarettes, and hyaline, aseptate and aseptate conidia. Other species with aseptate conidia are classified into *Achrochaeta* Réblová & Hern.-Restr., *Flectospora* Réblová & Hern.-Restr., *Phialogeniculata* Matsush. and *Phialoturbella* Réblová & Hern.-Restr. (Réblová et al. 2021b, c). For species setose conidia, the genus *Codinaea* Marine s. str., as typified by *C. aristata* Maire and acceptance of 14 species, is also emended with a narrow concept and characterized by four morphotypes of arrangement of setae, conidiophores and conidiogenous cells, and mono- or poly-phialidic conidiogenous cells, and hyaline, aseptate and setose conidia. Other species with setose conidia are accommodated under *Codinaeella* Réblová & Hern.-Restr., *Menispora* Pers., *Multiguttulispora* C.G. Link & J.K. Liu, *Nimesporella* Réblová & Hern.-Restr., *Stilbochaeta* Réblová & Hern.-Restr., *Sriatosphaeria* Samuels & E. Müll., *Tainosphaeria* F.A. Fernández & Huhndorf, *Tainosphaeriella* Réblová & Hern.-Restr., and *Xyladelphia* Réblová & Hern.-Restr.

The result from our phylogenetic analysis by using the combined LSU and ITS sequence data for all sequences available in GeneBank and also freshly generated sequences in this study is aligned with previous studies and also supported the above framework for reclassification of these fungi (Liu et al., 2016; Perera et al. 2016; Hernández-Restrepo et al. 2017; Tibpromma et al. 2018; Yang et al. 2018a; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, e; Figs. 3 and 42). Based on this analysis and for better resolving the classification of these fungi, the framework is further emended by a). redelimitation of *Codinaea* and *Dictyochaeta* in narrow concept, b). acceptance of several established genera (including *Achrochaeta* Réblová & Hern.-Restr.,

Anacraspedodidymum C.R. Silva, R.F. Castañeda & Gusmão, *Codinaea*, *Flectospora*, *Multiguttulispora*, *Phialogeniculata*, *Phialoturbella*, *Tainosphaeria*, *Menispora*, *Multiguttulispora*, *Nimesporella*, *Stilbochaeta*, *Striatosphaeria*, *Tainosphaeria*, *Tainosphaeriella*, and *Xyladelphia*, and c). introducing eight new genera: *Aciculadictyochaeta* W.P. Wu & Y.Z. Diao, typified by *Chaetosphaeria luquillensis* F.A. Fernández & Huhndorf; *Brachydictyochaeta* W.P. Wu & Y.Z. Diao, typified by *B. antillana* (R.F. Castañeda) W.P. Wu & Y.Z. Diao; *Calceisporiella* W.P. Wu & Y.Z. Diao, typified by *C. sinensis* W.P. Wu & Y.Z. Diao; *Curvichaeta* W.P. Wu & Y.Z. Diao, gen. nov., typified by *Curvichaeta curvispora* (Réblová) W.P. Wu & Y.Z. Diao; *Kylindrochaeta* W.P. Wu & Y.Z. Diao, gen. nov., typified by *Kylindrochaeta lignomollis* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao; *Lunatochaeta* W.P. Wu & Y.Z. Diao, typified by *L. shenzhenense* W.P. Wu & Y.Z. Diao; *Neotainosphaeria* W.P. Wu & Y.Z. Diao, typified by *Neotainosphaeria microsperma* W.P. Wu & Y.Z. Diao; *Oxenbollia* W.P. Wu & Y.Z. Diao, typified by *Oxenbollia lunatospora* W.P. Wu & Y.Z. Diao; *Parabahusutrabeeja* W.P. Wu & Y.Z. Diao, typified by *Parabahusutrabeeja minima* W.P. Wu & Y.Z. Diao; *Paracodinaea* W.P. Wu & Y.Z. Diao, typified by *Paracodinaea japonica* W.P. Wu & Y.Z. Diao. Two identification keys for those genera are provided under *Codinaea* and *Dictyochaeta* sessions.

With this modified framework, most species previously known under *Codinaea* and *Dictyochaeta* can be reassigned with right generic name. However, still a number of described species need to be further studied for their phylogenetic relationship and right taxonomic position when those isolates and DNA sequence data will be available in future, especially for those species with synnemata conidiomata, those with non-setouse conidia, those with branched conidiophores or lateral phialides, and those species with colored conidia (Kuthubutheen and Nawawi 1992; Whitton et al. 2000; Kirschner et al. 2001; Kirschner and Chen 2002; Silva and Gusmão 2013).

Dictyochaeta and related genera with aseptate conidia

Among the *Codinaea* and *Dictyochaeta* complex, several genera are with conidia bearing no setulae and they are *Achrochaeta* Réblová & Hern.-Restr., *Aciculadictyochaeta* W.P. Wu & Y.Z. Diao, *Anacraspedodidymum* C.R. Silva, R.F. Castañeda & Gusmão, *Brachydictyochaeta* W.P. Wu & Y.Z. Diao, *Curvichaeta* W.P. Wu & Y.Z. Diao, *Dictyochaeta* Speg., *Flectospora* Réblová & Hern.-Restr., *Kylindrochaeta* W.P. Wu & Y.Z. Diao, *Lunatochaeta* W.P. Wu & Y.Z. Diao, *Phialogeniculata* Matsush., *Phialoturbella* Réblová & Hern.-Restr. Phylogenetically they are polyphyletic and distributed in three different clades in the phylogenetic trees (Fig. 3 and Fig. 61), i.e. 3 genera (*Flectospora*, *Phialogeniculata* and *Phialoturbella*) in *Tainosphaeria* clade, 2 genera (*Curvichaeta* and *Kylindrochaeta*) in *Paragaemannomyces* clade, and all other 6 genera are in the broad *Dictyochaeta* clade.

Phylogenetically all these genera are monophyletic and well-defined (Figs. 4 and 61). Morphologically most of these genera are also well-delimited by a combination of different morphology of setae, conidiophores, conidiogenous cells and conidia, except for *Lunatochaeta* and *Dictyochaeta* which are difficult to be distinguished by morphology but phylogenetically well supported.

The living strains of many studied species were also studied on PDA (Fig. 43), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to *Dictyochaeta* and related genera with aseptate conidia:

1. Sterile or fertile setae present 2
1. Sterile or fertile setae absent 7
2. Setae with or without lateral phialides, terminal cell slightly swollen and sterile 3
2. Setae without lateral branch, terminal cell sterile or fertile, not swollen 4
3. Sterile without lateral phialides; conidia ellipsoidal to oblong, symmetrical *Curvichaeta*
3. Setae with lateral phialides, terminal cell slightly swollen and sterile *Brachydictyochaeta*
4. Conidia obclavate, aciculate, septate *Aciculadictyochaeta*
4. Conidia aseptate, not obclavate or aciculate 4
5. Conidia fusiform, tapering towards both end, centrally constricted *Fusichloridium*
5. Conidia not centrally constricted 5
6. Conidiogenous cells monophialidic; conidia ellipsoid to subglobose *Anacraspedodidymum*
6. Conidiogenous cell mono- or poly-phialidic; conidia cylindrical, obclavate, falcate 6
7. Conidia acicular, obclavate, 3-septate *Aciculadictyochaeta*
7. Conidia falcate, fusiform, aseptate *Dictyochaeta* and *Lunatochaeta*
8. Conidiophores geniculate, extending sympodially; conidia obclavate, septate *Phialogeniculata*
8. Conidiophores not geniculate; conidia other shaped, aseptate 8
9. Conidiogenous cell mono- or poly-phialidic; conidia cylindrical, falcate or lunate 9
9. Conidiogenous cells monophialidic; conidia not falcate or lunate 10
10. Conidia cylindrical to fusiform, multiseptate *Kylindrochaeta*
10. Conidiogenous cells mono- or poly-phialidic; conidia falcate to lunate *Phialoturbella*

11. Collarettes narrowly funnel-shaped and do not become apically incurved; conidia cylindrical-clavate, more gradually tapering toward the basal *Achrochaeta*
 11. Collarettes funnel-shaped and become apically incurved; conidia ellipsoidal to obovoid, slightly curved *Flectospora*

Aciculadictyochaeta W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841519

Etymology: refers to its similarity to *Dictyochaeta* but with aciculate conidia.

Diagnosis: Setae sterile, septate; Conidiophores solitary or in groups of 2-3 associated with base of setae, septate, pale brown. Conidiogenous cells monophialidic or polyphialidic, terminal, collarette conspicuous and funnel-shaped. Conidia acicular with rounded base, 3-septate, hyaline, arranged in slimy mass.

Type species: *Aciculadictyochaeta luquillensis* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao (≡ *Chaetosphaeria luquillensis* F.A. Fernández & Huhndorf).

Saprobe, lignicolous on decorticated wood or petiole. Teleomorph: Ascomata broadly ovoid, dark brown, separate, superficial to partly immersed, papillate, with sparse, scattered setae, light brown, multiseptate, slender, tapering to an acute apex. Ascomatal wall in surface view, opaque in water, textura epidermoidea in lactophenol, composed of pseudoparenchymatic cells. Ascomatal apex papillate, acute, short. Paraphyses sparse, simple, septate. Asci unitunicate, cylindro-clavate, short-stalked, firm-walled, thin apical cap, with 8 ascospores irregularly arranged. Ascospores hyaline, fusiform, sometimes inequilateral, sometimes ends curved opposite directions, mostly one-septate, sometimes two or three-septate, covered with a gelatinous sheath. Anamorph: colony effused. Stroma absent. Setae sterile, straight to slightly flexuous, septate, light brown, smooth or verrucose. Conidiophores macronematous, mononematous, simple, solitary or in groups of 2-3 associated with base of setae, smooth, straight to slightly flexuous, septate, pale brown to subhyaline at apex. Conidiogenous cells monophialidic or polyphialidic, terminal, integrated, conspicuous collarette, smooth, pale brown to subhyaline. Conidia acicular with rounded bases, 3-septate, smooth, hyaline; arranged in slimy mass.

Ecology/Substrate/Host: saprobe on dead branches and rotten wood of palm and broad leaf tree.

Geographical distribution: Brazil, Puerto Rico.

Notes: The new genus *Aciculadictyochaeta* is created to accomodate two species, *Chaetosphaeria luquillensis* F.A. Fernández & Huhndorf and *Dictyochaeta aciculata* S.S. Silva & Gusmão, which are phylogenetically distinct from other *Chaetosphaeria* and *Codinaea*/*Dictyochaeta*. On morphology, these two fungi share some similarity on forming sterile setae, short conidiophores in group clustered with base of setae, terminal phialidic conidiogenous cells with conspicuous collarette, and hyaline, septate, acicular conidia with rounded base and formed in slimy mass (Fernández and Huhndorf 2005; Silva and Gusmão 2013). They differs from *Dictyochaeta* by septate and acicular or obclavate conidia, from *Codinaea* by lacking conidial setulae.

Key to accepted species of *Aciculadictyochaeta*

1. Conidia 3-septate, 36-40 × 1.5-2 µm *A. aciculata*
 1. Conidia 40-49 × 2.7-3 µm *A. luquillensis*

Aciculadictyochaeta aciculata (S.S. Silva & Gusmão) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841681

≡ *Dictyochaeta aciculata* S.S. Silva & Gusmão, Mycosphere 4: 702, 2013.

Saprobies on submerged petiole. Colony effuse, brown. Mycelium, partly superficial, partly immersed in substratum. Teleomorph: Not observed. Anamorph: Setae sterile, straight to slightly flexuous, up to 11-septate, light brown, finely verrucose, 195-205 × 6-9 µm. Conidiophores macronematous, mononematous, simple, solitary or in groups of 2-3 associated with base of setae, smooth, straight to slightly flexuous, 3-5-septate, pale brown to subhyaline at apex, 46.5-70 × 4.5 µm. Conidiogenous cells monophialidic, terminal, integrated, conspicuous collarette, smooth, pale brown to subhyaline, 24-31.5 × 4.5 µm. Conidia acicular with rounded bases, 3-septate, smooth, hyaline, 36-40 × 1.5-2 µm; arranged in slimy mass.

Typification: Brazil: Piauí, Caracol, Serra das Confusões, on submerged petiole, 6. May 2011; S.S. Silva (HUEFS 192225).

Ecology/substrate/host: Saprobes on submerged petiole.

Geographical distribution: Brazil.

Description and illustration: Silva and Gusmão (2013).

Notes: Morphologically *A. aciculata* is closely related to anamorph of *Chaetosphaeria luquillensis*, but differs in producing shorter and narrower conidia (Fernández & Huhndorf 2005; Silva and Gusmão 2013). No living strain is available for molecular phylogeny study.

Aciculadictyochaeta luquillensis (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841680

≡ *Chaetosphaeria luquillensis* F.A. Fernández & Huhndorf, Fung. Div. 18: 32, 2005.

Colony on the substrate effuse, brown. Mycelium, partly superficial, partly immersed in substratum. Anamorph: Setae singly on the substrate, multiseptate, light brown, 124-190 x 5-6.5 µm, tapering to a rounded apex, 3-4.7 µm wide. Conidiophores single, light brown, cylindrical, mostly multiseptate, 28-104 x 3-4.8 µm. Conidiogenous cell a phialide, cylindrical, most often proliferating sympodially to produce multiple lateral conidiogenous loci, sometimes proliferating percurrently, 29-41 x 4.5- 6.3 µm; Conidia obclavate, straight and acute at apex, hyaline, 40-49 x 2.7-3 µm on the substrate.

Typification: Puerto Rico: Caribbean National Forest, El Verde Research Area, 16-ha Grid, Luquillo Mts., 350 to 425 m, [18.3167, -65.8167], on decorticated wood of dead trunks, 15 January 1997, on 30 cm log, S.M. Huhndorf, F.A. Fernández SMH2973 (F; holotype).

Ecology/substrate/host: Saprobe on decorticated wood.

Geographical distribution: Puerto Rico.

Description and illustration: Fernández and Huhndorf (2005).

Notes: Both anamorph and teleomorph of *Chaetosphaeria luquillensis* Fernández & Huhndorf were found on natural substrate, and the connection was also confirmed in pure culture (Fernández and Huhndorf 2005). Its anamorph is very similar with *Dictyochaeta aciculata* S.S. Silva & Gusmão (conidia on nature substrate 36–40 × 1.5–2 µm) and can be distinguished by narrower conidia in the later species (Silva and Gusmão 2013).

Anacraspedodidymum C.R. Silva, R.F. Castañeda & Gusmão, Mycotaxon 128: 12, 2014.

Colonies effuse, hairy, brown to black. Mycelium superficial and immersed. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, unbranched, straight to slightly flexuous, septate, smooth or verruculose, brown to pale brown. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, sometimes with percurrent elongations; collarette funnel shaped or infundibuliform, brown. Conidia solitary, aseptate, solitary, ellipsoid, spherical, globose, obpyriform to obovoid, with an inconspicuous basal hilum or slightly papillate, sometimes with mucous adherences or tunicate ornamentation, hyaline.

Type species: *Anacraspedodidymum aquaticum* C.R. Silva, R.F. Castañeda & Gusmão.

Ecology/Substrate/Host: saprobe on dead branches and rotten wood.

Geographical distribution: Brazil, China.

Description and illustration: Silva et al. (2014).

Notes : The genus *Anacraspedodidymum*, typified by *A. aquaticum*, is characterized by cluster of one long fertile setae and several short conidiophores, monophialidic conidiogenous cells with a broad funnel-shaped collarette, and hyaline, aseptate and ellipsoid conidia without appendage (Silva et al., 2014). Morphologically it is very similar to some species of *Dictyochaeta* and *Codinaea* species, although the authors only compared it with *Bahusutrabeeja* Subram., *Cylindrotrichum* Bonord, *Kylindria* DiCosmo et al. and *Monilochaetes* Halst. No DNA bar coding was provided for the type species, its location in *Chaetosphaeriaceae* is based on the morphological similarity of anamorphic state and also phylogenetical confirmation of the recently described species *A. submersum* Z.F. Yu & R.F. Castañeda-Ruiz. Phylogenetically it has close relationship with members of *Thozetella* (Zheng et al., 2021).

Three species are known in the genus, including *Anacraspedodidymum aquaticum* C.R. Silva, R.F. Castañeda & Gusmão, *A. hyalosporum* (Bhat & W.B. Kendr.) R.F. Castañeda, C.R. Silva & Gusmão and *A. submersum* Z.F. Yu & R.F. Castañeda-Ruiz. They can be distinguished by morphology of setae, conidiophores and conidia (Silva et al. 2014; Zheng et al. 2021). The three known species are morphologically diverse and future phylogenetic analysis is needed to elucidate their relationship. Only one species is known from China.

Key to all accepted species of *Anacraspedodidymum*:

1. Setae present, associated with conidiophores; conidia ellipsoid, 8-12 x 7-8 µm *A. aquaticum*
1. Setae absent 2
2. Conidia 1-septate, short cylindrical to broadly ellipsoidal *A. hyalosporum*
2. Conidia aseptate, globose or subglobose, 6.8-9.4 x 5.6-8.4 µm *A. submersum*

Anacraspedodidymum submersum Z.F. Yu & R.F. Castañeda-Ruiz, Inter. J. Syst. Evol. Microbiol. 2021.

Teleomorph: Unknown. Anamorph: Conidiophores simple, unbranched, straight to slightly flexuous, 2–4-septate, smooth-walled, brown to reddish brown, paler toward the apex, up to 100 µm long, 4.5–6.8 µm wide. Conidiogenous cells monophialidic, terminal, cylindrical to subulate, sometimes with 1–3 enteroblastic percurrent extensions, 13–38×4.6–5.6 µm; collarette funnel shaped, 1.3–2 µm deep, 2–3 µm wide, pale brown. Conidia solitary, globose or subglobose, aseptate, multiguttulate, 6.8–9.4×5.6–8.4 µm, hyaline, smooth-walled, sometimes slightly papillate at the base.

Typification: China: Yunnan Province, Simao Country, Xiaoheijiang Natural Preserve, isolated from leaves of an unidentified dicotyledonous plant submerged in a stream, Oct 2013, Zefen Yu, YMFT 1.04176 (Holotype), Ex-type culture: CGMCC3.19622).

Ecology/substrate/host: Saprobe on decorticated wood.

Geographical distribution: China.

Description and illustration: Zheng et al. (2021).

Notes: *Anacraspedodidymum submersum* can be distinguished from *A. aquaticum* in absence/presence of setae, and the shape and size of their conidia: no setae, and subglobose to globose conidia with smaller size (6.8-9.4 x 5.6-8.4 μm) in *A. submersum*; presence of setae, and ellipsoidal, spherical to obovoid conidia (8-12 x 7-8 μm) with irregular or subreticulate mucilaginous ornamentation in *A. aquaticum*. *A. hyalosporum* can be easily distinguished by having one-septate and short-cylindrical to broadly ellipsoidal conidia (Silva, Castañeda-Ruiz & Gusmão, 2014; Zheng et al., 2021). Its affinity to *Chaetosphaeriaceae* was confirmed by molecular phylogenetic study.

Brachydictyoachaeta W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841520.

Etymology: Refers to its similarity with *Dictyoachaeta* but with branched conidiophores.

Diagnosis: Similar to *Dictyoachaeta*, but differs in setae with sterile and swollen apex and lateral phialides.

Type species: *Brachydictyoachaeta bulliformis* W.P. Wu & Y.Z. Diao.

Colony effuse, hairy, inconspicuous. Mycelium superficial and immersed, pale brown to brown, thick-walled, smooth, septate, from which setae are formed. Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled, septate, apical cell rounded and slightly swollen; basal cell thick-walled, swollen. Teleomorph: Unknown. Anamorph: Conidiophores reduced, consisting of short lateral branches from the setae or short phialides from the superficial hyphae, aseptate or septate. Conidiogenous cells enteroblastic, monophialidic, discrete, produced through pores in the middle section of the setae, also produced directly from the superficial hyphae, pale brown, smooth, thin-walled, lageniform, subcylindrical, tapered to the apex, apex narrow with a very small flared collarete. Conidia aggregated into a moist, slimy mass at the apex of the conidiogenous cells, hyaline, aseptate, smooth, thin walled, typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards one end, setulae absent.

Ecology/Substrate/Host: saprobe on decaying leaf and fruit, rotten wood.

Geographical distribution: China, Cuba.

Notes: In the phylogenetic tree by using the integrated ITS and LSU data, *Dictyoachaeta antillana* R.F. Castañeda and one undescribed species formed a strongly supported clade, and the new genus *Brachydictyoachaeta* is established for them. Morphologically *Brachydictyoachaeta* is similar to *Dictyoachaeta* s. str. in producing sterile or fertile setae and falcate, asymmetrical conidia without setulae; but differs in setae with sterile and swollen apex, monophialidic conidiogenous cells formed from superficial hyphae or laterally on the setae. Two species are accepted under the genus.

Brachydictyoachaeta antillana (R.F. Castañeda) W.P. Wu & Y.Z. Diao, comb. nov., Figs. 44-45, MycoBank MB841682

≡ *Dictyoachaeta antillana* R.F. Castañeda, Fungi Cubenses 3: 7, 1988.

≡ *Dictyoachaetopsis antillana* (R.F. Castañeda) Whitton, McKenzie and K.D. Hyde, Fung. Div. 4: 153, 2000.

Colony effuse, hairy, inconspicuous. Mycelium superficial and immersed, pale brown to brown, thick-walled, smooth, septate, 2-3 μm wide, from which setae are formed. Teleomorph: not observed. Anamorph: Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled, 2-4 septate, apical cell rounded and slightly swollen, 3-4 μm wide; basal cell thick-walled, swollen, up to 10 μm wide. Conidiophores reduced, consisting of short lateral branches from the setae or short phialides from the superficial hyphae, 0-1 septate. Conidiogenous cells enteroblastic, monophialidic, discrete, produced through pores in the middle section of the setae, also produced directly from the superficial hyphae, pale brown, smooth, thin-walled, lageniform, subcylindrical, tapered to the apex, apex narrow with a very small flared collarete, 9-15 μm long, 3-4.5 μm side at the widest part. Conidia aggregated into a moist, slimy mass at the apex of the conidiogenous cells, hyaline, aseptate, smooth, thin walled, typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards one end, setulae absent, 10-16 x 1.5-2 μm .

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, yellow brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China, Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Cinnamomum* sp., 12 June 2015, Wu W.P. (Wu13318); China, Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of bamboo, 12 June 2015, Wu W.P. (Wu13368); China, Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, Wu W.P. (Wu13291). Living strain: 58987 and 59041 (from Wu13318), 59031 (from Wu13291), 59084 (from Wu13368).

Ecology/substrate/host: Saprobe on dead leaves of trees, including *Cinnamomum* sp.

Geographical distribution: China, Cuba, Mexico.

Description and illustration: Castañeda (1988); Heredia et al. (2000); Whitton et al. (2000).

Notes: *Brachydictyochaeta antillana* is characterized by the setae with rounded and slightly swollen apex, lateral lageniform phialides produced through pores in the middle part of the setae, or directly from superficial hyphae, monophialidic conidiogenous cells with a flared or funnel-shaped collarette, and acerose, aseptate and non-setose conidia measuring 10-16 x 1.5-2 μm . Of the five species of *Dictyochaeta* and *Dictyochaetopsis* with non-setose conidia formed in slimy mass around the tips of lateral phialides on setiform conidiophores, only *Dictyochaeta antillana* and *Dictyochaetopsis maharashtrensis* have aseptate conidia. These two species are easily distinguished as *D. maharashtrensis* has long setae (up to 350 μm) which are blunt and often develop into a single phialide, and the conidia are more or less cylindrical and typically straight, the phialides are not flared (Pirozynski and Patil 1970; Castañeda-Ruiz 1988; Heredia et al. 2000; Whitten et al. 2000; Arias et al. 2018; Réblová et al. 2021c). *B. antillana* can hardly be distinguished from *B. bulliformis* described in this paper, but their ITS sequences are significantly different.

Its occurrence on decaying leaves of *Pandanus furcatus* from Hongkong (setae 2-4 septate, 43-110 x 2.5-4 μm ; conidiogenous cells lageniform to cylindrical, 9.5-15.5 x 3-4.8 μm ; conidia aggregated into a slimy mass, 10.5-15.5 x 1.5-2 μm , typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards one end, setulae absent) was also reported (Whitten et al. 2000).

***Brachydictyochaeta bulliformis* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 46-47, MycoBank MB841552**

Etymology: refers to its setae with swollen apex surrounded by mucilaginous sheath.

Diagnosis: Setae 2-5-septate, 37-120 x 2-3 μm , swollen apex up to 6 μm ; Conidiogenous cells monophialidic or polyphialidic, 7-10 x 3-4.5 μm . Conidia acerose, aseptate, 11-18 x 1.5-2 μm .

Type: China: Guangdong Province, Shenzhen, Yangtaishan, on dead leaves of unidentified broad leaf tree, 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17533; ex-type strain CGMCC 3.20759 = NN 78320).

Saprobe, on dead leaves, decaying fruits, rotten wood. Colony effuse. Mycelium superficial and immersed, pale brown to brown, thick-walled, smooth, septate, 2-3 μm wide, from which setae are formed. Teleomorph: Not observed. Anamorph: Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled at the base, becoming thin-walled and paler toward the apex, 2-5 septate, 37-120 x 2-3 μm , with 1-2 percurrent proliferations; apical cell rounded and slightly swollen, 3-4 μm wide; basal cell thick-walled, swollen, up to 6 μm wide; sterile or fertile with lateral phialides right below septa of the main stipe. Conidiophores reduced, consisting of short lateral branches from the setae or short phialides from the superficial hyphae, 0-1 septate. Conidiogenous cells enteroblastic, monophialidic, discrete, produced through pores in the middle section of the setae, or directly from the superficial hyphae, pale brown, smooth, thin-walled, lageniform, subcylindrical, tapered to the apex, apex narrow with a very small flared collarette, 7-10 x 3-4.5 μm . Conidia aggregated into a moist, slimy mass at the apex of the conidiogenous cells, hyaline, aseptate, smooth, thin-walled, typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards base, setulae absent, 11-18 x 1.5-2 μm .

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, yellow brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: On dead fruit of *Cyclobalanopsis* sp., China: Jiangsu Province, Wuxi, Wuxi Forestry Park, 25 Aug 2019, W.P. Wu (Wu16818, 16876); On dead leaves of *Rhododendron* sp., China: Guangxi Province, Damingshan, 18 Dec. 1997, W.P. Wu (Wu1357d); On dead fruit of *Leguminosae*, China: Guangxi Province, Nanning, 3 Jan. 1998, W.P. Wu (Wu1661b); On rotten wood, China: Guangdong Province, Guangzhou, South China Botanical Garden, 4 Mar. 2012, Wu W.P. (Wu12367); on dead leaves of unidentified tree, China: Yunnan Province, Pu Er, 18 June 2018, Yu Zhang (Wu15187); on dead leaves of unidentified tree, Japan: Mie Prefecture, Tsu, Tsukairaku Park, 2 Oct. 2019, W.P. Wu (Wu16938, Wu16952, Wu16948a); China: Guangdong Province, Shenzhen, Yangtaishan, on dead leaves of unidentified broad leaf tree, 17 Oct. 2020, W.P. Wu (Holotype Wu17533). Living strain: 42845 (from Wu1357d), 43907 (from Wu1661b), 54435 (from Wu12367), 76027 and 76028 (from Wu15187), 77173 (from Wu16818), 77189 (from Wu16876), 77400 (from Wu16952), 77358 (from Wu16948b), ex-type strain 78320 and 78324 (from Wu17533).

Ecology/Substrate/Host: Saprobe on decaying leaves, fruit and rotten wood of *Cyclobalanopsis* sp., *Rhododendron* sp. etc.

Geographical distribution: China.

Notes: *Brachydictyochaeta bulliformis* is characterized by the setae with rounded and slightly swollen apex, lateral lageniform phialides produced through pores in the middle part of the setae, or directly from superficial hyphae, monophialidic conidiogenous cells with a flared or funnel-shaped collarette, and acerose, aseptate and non-setose conidia measuring 11-18 x 1.5-2 μm . Among the many described *Codinaea/Dictyochaeta* species, only *Dictyochaeta antillana* produces setae with sterile swollen apices and is comparable to *B. bulliformis* (Pirozynski and Patil 1970; Castañeda-Ruiz 1988; Heredia et al. 2000; Whitten et al. 2000; Arias et al. 2018). As pointed above, morphologically *D. antillana* and *B. bulliformis* can hardly be distinguished, but their ITS sequences are significantly different from each other.

Some morphological variation on septation and length of setiform conidiophores and lateral phialides was observed from different specimens of *B. bulliformis*. For example, in the specimen Wu15187, Wu16948 and Wu17533, no lateral phialide was observed, while the lateral phialide is commonly found in all other collections. In the specimen Wu17533, the setae are fewer septate and somewhat shorter than those in other specimens. Its occurrence on dead petiole of *Archontophoenix alexandrae* from Hong Kong, China (Setae fertile, terminating in a polyphialide, 150-205 x 4.5-5 µm; conidiophores in cluster with setae, 24-42 x 4-4.5 µm; Conidia aseptate, 12.5-15 x 2.5-3.5 µm, without setulae) was also reported by Taylor and Hyde (2003). The 11 ITS sequences obtained from relevant specimens are almost identical (only 1-3 bps differences among them).

Curvichaeta W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB 842442

Etymology: *Curvus*- (L) and *chaeta* (Greek); in reference to the slightly curved ascospore and conidia, and hair-like conidiophores.

Diagnosis: Setae present, sterile and with swollen apex; Conidiophores cylindrical, brown, septate, terminated with a monophialidic conidiogenous cell bearing collarette; Conidia hyaline, aseptate, ellipsoidal to oblong, slightly curved.

Type species: *Curvichaeta curvispora* (Réblová) W.P. Wu & Y.Z. Diao.

Colonies on the natural substratum irregularly effuse, dark brown, hairy, conidiophores occurring among or on the perithecia. Teleomorph: Perithecia superficial, solitary to gregarious, subglobose to globose, papillate, black, setose, ostiolate. Setae sparsely covering the perithecia, arising on the perithecial wall and around the perithecia from the substrate, cylindrical, dark brown, becoming paler towards the upper part, sometimes with percurrent proliferations, septate, unbranched, base bulbous, pale brown to subhyaline, finely verruculose at the obtuse to broadly rounded apex. Ostiolar canal periphysate. Perithecial wall carbonaceous, fragile, consisting of two regions; outer region formed of dark brown, thin-walled, brick-like cells; inner region formed of hyaline, thinner-walled, elongated, compressed cells. Paraphyses persistent, branching, hyaline, septate, not tapering, broadly rounded at the top, longer than the asci. Asci unitunicate, cylindrical-clavate, short-stipitate, truncate at the apex, with a distinct refractive apical annulus, 8-spored. Ascospores fusiform, often curved, inequilateral, 3-septate, not constricted at the septa, hyaline, smooth, 2-seriate in the ascus. Anamorph: Setae present, cylindrical, septate, brown, sterile and with a swollen apex. Conidiophores macronematous, mononematous, solitary, erect, straight or slightly flexuous, cylindrical, unbranched, septate, brown, darker brown at the septa, paler towards the top. Conidiogenous cells phialidic, cylindrical, conidia formed on a single conidiogenous locus within the aperture. Collarette subhyaline to hyaline. Conidia ellipsoidal to oblong, broadly rounded apically, truncate at the base, 0-1-septate, hyaline, smooth (adapted from Réblová 2004).

Ecology/Substrate/Host: Saprobes on decorticated wood.

Geographical distribution: New Zealand.

Notes: The new genus *Curvichaeta* is created to accommodate for *Chaetosphaeria curvispora* Réblová with both teleomorph and anamorphs known (Réblová, 2004). Phylogenetically it is distinct from other genera of Chaetosphaeriaceae. Morphologically its anamorph resembles *Achrochaeta* Réblová & Hern.-Restr., *Dictyochoeta* Speg., *Flectospora* Réblová & Hern.-Restr. and *Phialoturbella* Réblová & Hern.-Restr., but can easily be distinguished from all of them (Réblová et al., 2021a, b, c, d, e). It differs from *Achrochaeta*, *Flectospora* and *Phialoturbella* by presence of sterile setae; differs from *Dictyochoeta* by sterile setae with swollen apex and ellipsoidal to oblong conidia. The genus is also created as possible home for some *Dictyochoeta*-like fungi with asexual conidia but phylogenetically unrelated.

Curvichaeta curvispora (Réblová) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB842445.

≡ *Chaetosphaeria curvispora* Réblová, Stud. Mycol. 50: 176, 2004.

Typification: New Zealand: Tasman Prov., Abel Tasman National Park, Takaka, ca. 100 km NW of Nelson, Pigeon Saddle point, on unpaved road between Tata Beach and Totaranui ca. 10 km NW of Totaranui, on decorticated wood of a branch buried in the soil, 24 Feb. 2003, M. Réblová M.R. 2607/03, PDD 78268, culture ex-type CBS 113644, ICMP 15115.

Ecology/Substrate/Host: saprobe on decorticated wood.

Geographical distribution: broadly distributed incl. Asia, Europe South American, North American.

Description and illustration: Réblová (2004).

Notes: The fungus was fully documented by Réblová (2004).

Dictyochoeta Speg., Physis 7: 18, 1923.

Colonies effuse, hairy, gray to dark brown on the natural substrate, composed of setae, shorter conidiophores, and ascomata. Teleomorph: Ascomata perithecial, nonstromatic, superficial, globose to subglobose, papillate, dark brown to black, glossy, glabrous or clothed with setae and conidiophores of the anamorph. Ostiole

periphysate. Ascomatal wall fragile, carbonaceous, two-layered. Paraphyses abundant, hyaline, branching, septate, persistent, longer than the asci. Asci unitunicate, 8-spored, cylindrical to cylindrical-clavate, short-stipitate, ascal apex nonamyloid with a shallow, refractive apical annulus. Ascospores fusiform to ellipsoidal-fusiform, straight or inequilateral, transversely septate, hyaline, 2-seriate or obliquely 1-seriate within the ascus. Anamorph: Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled, septate, sterile, or fertile. Conidiophores macronematous, mononematous, single or in cluster, cylindrical, pale brown to brown, septate, terminating with a phialide. Conidiogenous cells enteroblastic, mono- or polyphialidic, discrete, terminal from the conidiophores, lateral from setiform conidiophores, or directly from superficial hyphae, pale brown, smooth, thin-walled, lageniform, subcylindrical, tapered to the apex, apex narrow with a very small flared and funnel-shaped collarette. Conidia aggregated into a moist, slimy mass at the apex of the conidiogenous cells, hyaline, aseptate, smooth, thin walled, typically curved, clavate, falcate, asymmetrical, rounded at the apex, tapering towards the truncate base.

Type species: *Dictyochaeta fuegiana* Speg.

Ecology/Substrate/Host: saprobe on decaying leaf and fruit, branches and rotten wood.

Geographical distribution: broadly distributed incl. Asia, Europe South American, North American.

Description and illustration: Hughes and Kendrick (1968); Godeas et al. (1977); Réblová (2004); Réblová et al. (2021c).

Notes: The genus *Dictyochaeta* was redefined with narrow concept and fully documented in a recent publication (Réblová et al. 2021c). The diagnosis characters for the genus include presence of sterile or fertile setae in colony, short conidiophores clustered together with setae, terminal and monophialidic or polyphialidic conidiogenous cells with funnel-shaped collarette, and hyaline, aseptate, falcate, asymmetrical conidia with rounded apex and tapering towards the truncate base (Hughes and Kendrick 1968; Gamundi et al. 1977; Godeas et al. 1977; Réblová 1998a, 2004; Réblová et al. 2020, 2021c). Morphologically it is closely related to several other genera in the *Codinaea/Dictyochaeta* complex, and can be distinguished from *Codinaea*, *Nimesporella*, *Codinaeella* and *Stilbochaeta* by non setose conidia. Réblová (2004) described *Chaetosphaeria fuegiana* Réblová as the sexual stage of *Dictyochaeta fuegiana* Speg. and also clarified the taxonomic status of several related species (including *Dictyochaeta fuegiana*, *D. querna* P.M. Kirk and *Dictyochaeta* anamorph of *Chaetosphaeria callimorpha*) by comparing the types and other herbarium materials.

Réblová et al. (2021c) accepted the following species under the genus and the identification key was also provided for them: *D. abnormis* Hol.-Jech., *D. callimorpha* (Mont.) Réblová & Hern.-Restr., *D. detriticola* Réblová & Hern.-Restr., *D. falcatispora* (M.S. Patil, U.S. Yadav & S.D. Patil) Whitton, McKenzie & K.D. Hyde, *D. fuegiana* Speg., *D. hughesii* (M.B. Ellis) Aramb. & Cabello, *D. montana* (Réblová) Réblová & Hern.-Restr., *D. pluriguttulata* Kuthub. & Nawawi, *D. querna* P.M. Kirk, *D. sampahia* Kuthub. & Nawawi, *D. setosa* Réblová & Hern.-Restr., *D. stratosia* Réblová & Hern.-Restr. and *D. tumidoseta* Kuthub. & Nawawi (Réblová et al., 2020, 2021c). In addition to these species, a few described species with similar morphological characters might well fit into this genus and are discussed below. Only one species, *Dictyochaeta fuegiana* was found from China.

Key to accepted species of *Dictyochaeta* and related genera with aseptate conidia

1. Conidiogenous cell with a tubular extension below the collarette (*Tubulicolla*) 2
1. Conidiogenous cell without a tubular extension (*Dictyochaeta/Lunatochaeta*) 4
2. Conidia spear-shaped, wider at the base, attenuated towards the rounded apex, 12.5-17.5 x 2.5-4 µm *T. stipitocolla*
2. Conidia cylindrical or subcylindrical 3
3. Conidia 4.8–7.2 x 1.1–1.5 µm; long *T. microcylindrospora*
3. Conidia 8-11 x 2-2.5 µm *T. cylindrospora*
4. Setae absent; collarettes narrowly funnel-shaped and not apically incurved; conidia cylindrical-clavate, straight or slightly curved, gradually tapered towards the base, 7.4-11 x 1.6-2.6 µm *Achrochaeta talbotii*
4. Setae present or absent; collarettes usually apically incurved; conidia falcate, clavate, spear-shaped, cylindrical 5
5. Conidia filiform or cylindrical 6
5. Conidia falcate, spear-shaped, not filiform or cylindrical 7
6. Conidia filiform, aseptate, curved, 20–25 x 1 µm; setae sterile, 275–300 µm long; conidiophores 40–130 µm long *D. uncinata*
6. Conidia cylindrical, 1-septate, 12–18 x 1.8 µm; setae 35–55 µm long; conidiophores, 3.5–18 µm long *D. fruticola*
7. Conidia 1-septate 8
7. Conidia aseptate 9
8. Setae with a swollen apex; conidia curved, falcate, 20-24 x 2-2.8 µm *D. setosa*
8. Setae not with swollen apex; conidia 12–18 x 1.8 µm *D. ixorae*

9. Setae absent	10
9. Setae present; conidiophores in group with setae	11
10. Conidia clavate, fusoid, straight, base acute, apex obtuse, 5.5–9.1 x 0.6–1 µm	<i>D. minutissima</i>
10. Conidia falcate, curved, 15–21.5 x 1.2–2 µm	<i>D. seychellensis</i>
11. Conidia broadly to narrowly rounded at sometimes slightly tapered apical end, gradually tapered toward the basal end, with inconspicuous basal scar	12
11. Conidia abruptly tapered toward both ends	23
12. Conidia cylindrical, straight or slightly curved	13
12. Conidia clavate, fusiform to falcate, curved	14
13. Conidia cylindrical, (9–)10–13.5 x 2–2.5 µm	<i>D. abnormis</i>
13. Conidia 8–12 x 1.5–2.2 µm	<i>D. maharashtrensis</i>
14. Conidia 4–6 x 2–2.5 µm	<i>D. tumidoseta</i>
14. Conidia longer than 6 µm	15
15. Conidia 10–15.5 µm long	16
15. Conidia 15 µm long and longer	19
16. Conidia 8–10 x 1–1.2 µm	<i>Lunatochaeta shenzhenensis</i>
16. Conidia more than 10 µm long, 1.5–2.5 µm wide	17
17. Conidia 11–13(–15) x 2–2.5(–3) µm, setae up to 16-septate, ascospores 12.5–16(–17) x (3–)3.5–4.5 µm, asci (88–)92–100 x (8–)9–10 µm	<i>D. callimorpha</i>
17. Conidia slightly narrower, 1.5–2.5 µm wide	18
18. Conidia in vitro 10–14(–15.5) x 1.5–2.5 µm, setae up to 23-septate, apical cell developing into a polyphialide, teleomorph unknown	<i>D. detriticola</i>
18. Conidia in vitro 11–15.5 x 1.5–2 µm, setae absent in vitro; on the natural substrate, setae up to 20-septate, apical cell sterile, rounded, ascospores (15.5–)16.5–19 x 4–5 µm, asci 95–110(–118) x (9.5–)10–13 µm	<i>Dictyochaeta</i> sp.
19. Conidia 20–26 x 2.5–4 µm	<i>D. hughesii</i>
19. Conidia narrower, up to 2.5 µm wide	20
20. Conidia 1.5–2 µm wide	21
20. Conidia 2–2.5 µm wide	22
21. Setae sterile, 190–320 x 5–6 µm; conidiophores 47–110 x 4–6 µm; conidiogenous cells polyphialidic; conidia falcate, 16–19 x 1.8 µm	<i>D. circaei</i>
21. Conidia 15–21(–22) x 1.5–2.5 µm, host specific to decaying wood and acorns of <i>Quercus</i> spp., teleomorph unknown	<i>D. querna</i>
22. Conidia (16–)17–21(–23) µm long, ascospores (15–)17–22 x 4–5 µm, asci (77–)83–92 x 12–13(–15) µm	<i>D. fuegiana</i>
22. Conidia (16.5–)17.5–22 µm long, ascospores (12–)13–16.5(–17) x 3.5–4.5 µm, asci (78–)80–93 x 9–10.5 µm	<i>D. stratosa</i>
23. Conidia less than 10 µm long	24
23. Conidia more than 10 µm long	25
24. Conidia 8–10 x 1.5–2 µm	<i>D. calvatata</i>
24. Conidia 6–9.6 x 1.8–2 µm	<i>D. falcatispora</i>
25. Both ends of conidia elongate into an appendage-like structure, (22–)24–30(–31) x 3–4 µm, ascospores 17–22(–25) x 4.5–5.5 µm, asci 94–116(–130) x 8.5–11 µm	<i>D. montana</i>
25. Conidia without appendage-like structures, pointed at both ends, tapered sharply and attenuated toward the basal end, 14.5–18.5 x 1.25–2 µm, hooked near the apex, sickle-shaped	<i>D. sampahia</i>

Dictyochaeta fuegiana Speg., Physis 7: 18, 1923.

= *Dictyochaeta querna* P.M. Kirk., Trans. Br. Mycol. Soc. 78 (1): 58, 1982.

= *Chaetosphaeria fuegiana* Réblová, Stud. Mycol. 50: 179, 2004.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 4–5 µm wide. Teleomorph: Not observed. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, up to 330 µm long, 5–8 µm wide above the swollen base, up to 20 µm wide at the swollen base, tapering gradually towards the rounded apex, 5–9-septate, dark brown in the lower part, becoming paler towards the apex, apex fertile with a funnel-shaped collarette. Conidiophores macronematous, mononematous, simple, crowded, up to 3 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 1–3-septate, smooth-walled, 30–70 x 3–5 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 20–25 x 4–5 µm, pale brown, thin-walled, collarette funnel-shaped, 2.5–4 µm wide, 2–3.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 17–20 x 1.8–2 µm, aseptate, hyaline, smooth, apex acute, base rounded, with no setulae.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, pale brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: On dead culms of *Arundo donax*, China: Guangxi Province, Damingshan, 19 Dec. 1997, W.P. Wu (Wu1445a); On dead leaves of *Rhododendron* sp., China: Guangxi Province, Damingshan, 18 Dec. 1997, W.P. Wu (Wu1373b). Living strain: 42943 (from Wu1445a), 43191 (from Wu1373b).

Geographical distribution: Argentina, Chile, China, New Zealand, UK.

Description and illustration: Hughes and Kendrick (1968); Kirk (1982); Réblová (2004); Réblová et al. (2021c).

Notes: *Dictyochaeta fuegiana* Speg., described from fallen leaves of *Nothofagus betuloides* from Chile, differs from all known species in the genus *Dictyochaeta* by its fertile setae, monophialidic conidiogenous cells, aseptate conidia without setulae (Réblová et al., 2021c).

Apart from the species documented by Réblová et al. (2021c), several species among the many known species in the genus *Dictyochaeta*, including *D. sampahia* Kuthub. & Nawawi, *D. abnormis* Hol.-Jech., *D. hughesii* (M.B. Ellis) Whitton, McKenzie & K.D. Hyde, *D. circae* Tempesta & Ramb., *Dictyochaeta seychellensis* Whitton, McKenzie & K.D. Hyde and *Dictyochaeta* state of *Chaetosphaeria callimorpha*, resembles *D. fuegiana* in producing fertile or sterile setae and aseptate, non-setose conidia (Spegazzini 1923; Hughes and Kendrick 1968; Matsushima 1971; Ellis 1976; Godeas et al. 1977; Kirk 1982; Holubová-Jechová 1984; Kuthubutheen 1987, 1991; Whitton et al. 2000; Réblová 2004; Réblová et al. 2021c). *D. hughesii* and *D. circae* are with sterile setae, thus can easily be distinguished from *D. fuegiana*. In *D. sampahia* and *D. abnormis*, the setae are fertile, but their conidial shape are rather different from *D. fuegiana*. *Dictyochaeta seychellensis* also produces similar conidia but in this species, no setae are formed. Réblová (2004) noted the anamorphs of *D. fuegiana* and *Chaetosphaeria callimorpha* can only be distinguished by the wider and smaller conidia in the latter species (10-15 x 2-3 µm in *C. callimorpha*). Variation on size of setae, conidiophores and conidia among different collections were reported (Spegazzini 1923; Hughes and Kendrick 1968; Ellis 1976; Godeas et al. 1977; Gamundi et al. 1977; Kirk 1982; Holubová-Jechová 1984; Réblová 2004). The fungus from the Chinese collections agrees well with those in the type specimen (Réblová 2004; Réblová et al. 2021c).

Apart from the accepted species by Réblová et al. (2021c), several known *Dictyochaeta* species might belong to the genus and they are discussed here:

Dictyochaeta circae Tempesta & Rambelli, Flora Mediterranea 19: 269, 2009.

Geographical distribution: Italy.

Description and illustration: Rambelli et al. (2009).

Notes: Seen from the excellent description and illustration, *Dictyochaeta circae* Tempesta & Rambelli fits well to the revised concept of *Dictyochaeta*, including sterile setae, clustered short conidiophores with setae, terminal conidiogenous cells with inconspicuous cylindrical collarette, and falcate and aseptate conidia bearing no setulae. No molecular data is available for phylogenetic study.

Dictyochaeta clavulata (Hol.-Jech.) Hol.-Jech., Folia Geobot. Phytotax. 19: 425, 1984.

≡ *Codinaea clavulata* Hol.-Jech., Stud. Mycol. 13: 55, 1976.

Geographical distribution: Slovakia.

Description and illustration: Gams and Holubová-Jechová (1976).

Notes: Except for lacking the clear description of setae, *Codinaea clavulata* Hol.-Jech. fits well to the revised concept of *Dictyochaeta* by Réblová et al. (2021c). Although no setae was specifically described in the original description, the conidiophores was described as 'forming a dense velvety layer on wood; very dark brown but becoming lighter in the uppermost part, 130-240 µm tall and to 15-septate; sometimes percurrently proliferating after rupture; to 8 µm wide at the base, 2.5-4.5 µm wide centrally, tapering to 1.0-1.5 µm with a very shallow collarette; short sympodial elongations occur.' The broad range in length of conidiophores might indicate presence of fertile setae. Morphologically it differs from other species by smaller conidia (8-10 x 1.7-2.5 µm). No molecular data is available for phylogenetic study.

Dictyochaeta falcatispora (M.S. Patil, U.S. Yadav & S.D. Patil) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

≡ *Codinaea falcatispora* M.S. Patil, U.S. Yadav & S.D. Patil, Indian Phytopath. 44: 308, 1991.

Geographical distribution: India.

Description and illustration: Patil et al. (1991).

Notes: In this species, the presence of setae (up to 120 µm long), short conidiophores (up to 30 µm long), and aseptate, falcate and aetouse conidia (6-9 x 1.8-2 µm) fits the concept of *Dictyochaeta*.

Dictyochaeta fruticola (M.S. Patil, U.S. Yadav & S.D. Patil) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 140, 2000.

≡ *Codinaea fruticola* M.S. Patil, U.S. Yadav & S.D. Patil, Indian Phytopath. 44: 309, 1991.

Geographical distribution: India.

Description and illustration: Patil et al. (1991).

Notes: *Codinaea fruticola* differs from other related species by cylindrical and 1-septate conidia (12-18 x 1.8 µm) without setulae. Its placement in *Dictyochaeta* is questionable due to the septate conidia.

Dictyochaeta ixorae (M.S. Patil, U.S. Yadav & S.D. Patil) Whitton, McKenzie & K.D. Hyde, Fun. Div. 4: 140, 2000.

≡ *Codinaea ixorae* M.S. Patil, U.S. Yadav & S.D. Patil, Indian Phytopath. 44 (3): 309, 1991.

Geographical distribution: India.

Description and illustration: Patil et al. (1991).

Notes: *Dictyochaeta ixorae* produces setae up to 100 µm long, short conidiophores up to 20 µm long, and 1-septate and aseptate conidia 12-18 x 1.8 µm. Its placement in *Dictyochaeta* is questionable due to the septate conidia.

Codinaea maharashtrensis Piroz. & S.D. Patil, Can. J. Bot. 48: 578, 1970.

≡ *Dictyochaetopsis maharashtrensis* (Piroz. & S.D. Patil) Aramb. & Cabello, Mycotaxon 38: 13, 1990.

Geographical distribution: India.

Description and illustration: Pirozynski and Patil (1970).

Notes: *Codinaea maharashtrensis* Piroz. & S.D. Patil was well documented and fits well to the revised *Dictyochaeta* concept. Except for slightly difference on conidial shape, it can hardly be distinguished from *D. callimorpha* and *D. dentriticola* (Réblová et al., 2021c). For now, this species is best place under *Dictyochaeta*, and future molecular phylogenetic study might show this species is co-specific with other known species.

Dictyochaeta minutissima A. Hern. & J. Mena, Mycol. Res. 100: 687, 1996.

Geographical distribution: Cuba.

Description and illustration: Hernández-Gutiérrez and Mena Portales (1996).

Notes: *Dictyochaeta minutissima* A. Hern. & J. Mena is similar with other accepted *Dictyochaeta* species on conidiophores and conidia. However, its conidiogenous cells have a broad and deep cylindrical collarettes where the conidia are produced, which is similar with those in *Chloridium codinaeoides* Piroz. (Pirozynski, 1972; Gams and Holubová-Jechová, 1976). Until the molecular data is available for phylogenetic study, this fungus can be maintained in *Dictyochaeta*.

Dictyochaeta seychellensis Whitton, McKenzie & K.D. Hyde, Fung. Div. 148, 2000.

Geographical distribution: Seychelles.

Description and illustration: Whitton et al. (2000).

Notes: *Dictyochaeta seychellensis* Whitton, McKenzie & K.D. Hyde was originally described on decaying leaves of *Pandanus multispicatus* from Seychelles. Morphologically it fits well into the *Dictyochaeta* genus, including dark brown and septate conidiophores, terminal conidiogenous cells with narrow sporulating loci and inconspicuous collarette, and falcate and aseptate conidia without setulae (Whitton et al. 2000). Until the molecular data is available for phylogenetic study, this fungus can best be placed into *Dictyochaeta*.

Dictyochaeta uninata R.F. Castañeda & W.B. Kendr., Mycol. Res. 102: 58, 1998.

Geographical distribution: Cuba.

Description and illustration: Castañeda-Ruiz and Kendrick (1998).

Notes: Until the molecular data is available for phylogenetic study, *Dictyochaeta uninata* is best maintained in the genus. It differs from other species by narrow and uncinuate conidia (Castañeda-Ruiz & Kendrick, 1998)

Dictyochaeta setosa (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 148, 2000.

≡ *Codinaea setosa* S. Hughes & W.B. Kendr., New Zealand J. Bot. 6:360, 1968.

≡ *Dictyochaeta setosa* (S. Hughes & W.B. Kendr.) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

Geographical distribution: Brazil, New Zealand.

Description and illustration: Cruz et al. (2008), Hughes and Kendrick (1968); Arambarri and Cabello (1989).

Notes: This species has sterile setae, clustered conidiophores with setae, polyphialidic conidiogenous cells, and falcate, 1-2-septate conidia. Its placement in *Dictyochaeta* is questionable due to the septate conidia.

Kylindrochaeta W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB842443

Etymology: *Kylindro* - refers to its similarity to some members of *Kylindria* in conidiophores, conidiogenous cells and conidia; *chaeta* (Greek) hair, bristle.

Diagnosis: Ascospore cylindrical-fusiform, hyaline to subhyaline, 7-septate. Conidiophores simple and terminated with conidiogenous cells, mono- or poly-phialidic, with sympodial extension; Conidia hyaline, cylindrical, multiseptate, aseptate.

Type species: *Kylindrochaeta lignomollis* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao.

Teleomorph: Ascomata broadly ovoid to obpyriform, dark brown, separate, superficial on the substratum, with a few, scattered setae, brown, multiseptate, slender, tapering to an attenuated apex. Ascomatal wall of textura angularis in surface view, composed of pseudoparenchymatic cells. Ascomatal apex broad, papillate, short. Paraphyses unbranched, septate, hyaline. Asci cylindro-clavate, short stalked, unitunicate, thin-walled, with 8 biseriately arranged ascospores. Ascospores cylindrical-fusiform, sometimes inequilateral, sometimes one end slightly curved, hyaline to subhyaline, seven-septate, septa sometimes diagonal or at angles. Anamorph: Conidiophores produced in fascicles of three or more on the substrate, unbranched, dark brown becoming light brown towards the apex, multiseptate. Conidiogenous cell phialidic, terminal, cylindrical, mono- or poly-phialidic with a single apical collarette and multiple lateral old conidiogenous loci that appear as refractive pegs. Proliferation mostly sympodial, occasionally percurrent. Conidia hyaline, cylindrical, broadly rounded at the apex, with a truncate base, 3-6 septa, straight or diagonal, unevenly spaced (Based on Fernández and Huhndorf 2005).

Ecology/Substrate/Host: Saprobe on decorticated wood.

Geographical distribution: Costa Rica, Peruto Rico.

Notes: The new genus *Kylindrochaeta* is created to accommodate *Chaetosphaeria lignomollis* F.A. Fernández & Huhndorf which is phylogenetically distinct from other known genera in Chaetosphaeriaceae. Morphologically it is also unique in produce hyaline, multiseptate and cylindrical to fusiform ascospore and conidia bearing no setae (Fernández and Huhndorf 2005).

Kylindrochaeta lignomollis (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB842444

≡ *Chaetosphaeria lignomollis* F.A. Fernández & Huhndorf, Fung. Div. 18: 27, 2005.

Ascomata broadly ovoid to obpyriform, dark brown, 148-198 µm in diam., 178-218 µm in height, separate, superficial on the substratum, with a few, scattered setae, brown, multiseptate, slender, 135-292 × 3.5-6.5 µm, tapering to an attenuated apex. Ascomatal wall of textura angularis in surface view, 10.5-17.5 µm thick in longitudinal section, composed of pseudoparenchymatic cells. Ascomatal apex broad, papillate, short. Paraphyses unbranched, septate, hyaline, 2-3 µm wide. Asci cylindro-clavate, short stalked, 92.5-118 × 9.7-14 µm, unitunicate, thin-walled, with 8 biseriately arranged ascospores, apical ring 2.8-3.1 µm wide, 1.2-1.5 µm deep. Ascospores cylindrical-fusiform, sometimes inequilateral, sometimes one end slightly curved, 24-33 × 4.7-6 µm, hyaline to subhyaline, seven-septate, septa sometimes diagonal or at angles. Conidiophores produced in fascicles of three or more on the substrate, unbranched, dark brown becoming light brown towards the apex, multiseptate, 162-192 × 4-5.9 µm on the substrate. Conidiogenous cell polyphialide with a single apical collarette and multiple lateral old conidiogenous loci that appear as refractive pegs. Proliferation mostly sympodial; percurrent proliferation was also observed. Conidia hyaline, cylindrical, broadly rounded at the apex, with a truncate base, 3-6 septa, straight or diagonal, unevenly spaced, 21-28 × 6-7.3 on the substrate (Based on Fernández and Huhndorf 2005).

Typification: Puerto Rico: Caribbean National Forest, El Verde Research Area, 16-ha Grid, Luquillo Mts., 350 to 425 m, 16 Jan 1997, on wood fragment, S.M. Huhndorf, F.A. Fernández, *SMH3015* (F; holotype).

Ecology/Substrate/Host: Saprobe on decorticated wood.

Geographical distribution: Costa Rica, Peruto Rico.

Description and illustration: Fernández and Huhndorf (2005).

Notes: *Kylindrochaeta lignomollis* is fully described and illustrated by Fernández and Huhndorf (2005).

Lunatochaeta W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841521

Etymology: Refers to its lunate-shaped conidia and similarity with *Dictyochoeta* in producing setae.

Diagnosis: Setae sterile and with slightly swollen apex. Conidiophores in group and associated with setae, cylindrical, septate. Conidiogenous cells terminal, mono- or poly-phialidic, cylindrical, with funnel-shaped collarette. Conidia lunate, symmetrical, aseptate, without setulae, in slime head. Similar to *Dictyochoeta* but differs in producing setae with swollen apex; also similar to *Brachydictyochoeta* but differs in lacking of lateral phialides. In addition, they phylogenetically differs from each other.

Type species: *Lunatochaeta shenzhenense* W.P. Wu & Y.Z. Diao

Colony effuse. Mycelium superficial and immersed, pale brown to brown, thick-walled, smooth, septate, from which setae and conidiophores are formed. Teleomorph: Not observed. Anamorph: Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled, septate, basal cell swollen, apical cell sterile and rounded at the apex; basal cell thick-walled, swollen. Conidiophores in cluster and associated with setae, cylindrical, straight, or flexuous, brown, slightly paler toward the apex, thick-walled, smooth, septate, terminating by a conidiogenous cell. Conidiogenous cells terminal, monophialidic, brown,

smooth, thin-walled, cylindrical, subcylindrical, tapered to the apex, apex narrow with flared collarete, often with percurrent proliferations. Conidia aggregated into slimy mass at the apex of the conidiogenous cells, falcate, hyaline, aseptate, smooth, thin walled, typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards one end, setulate absent.

Ecology/Substrate/Host: Saprobe on dead leaves of broad leaf tree.

Geographical distribution: China.

Notes: Morphologically *Lunatochaeta* W.P. Wu & Y.Z. Diao resembles *Dictyochaeta* s. str. in producing setae, clustered conidiophores with setae, and falcate conidia without setulae. However our phylogenetic analysis show they belong to two different genera.

***Lunatochaeta shenzhenensis* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 48, MB841553**

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Similar to species of *Dictyochaeta*, but differs in producing lunate conidia in smaller size (8-10 x 1-1.2 μm) and different ITS sequence.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17504; ex-type strain CGMCC 3.20757 = NN 78259).

Colony effuse. Mycelium superficial and immersed, pale brown to brown, thick-walled, smooth, septate, 2-3 μm wide, from which setae and conidiophores are formed. Teleomorph: Not observed. Anamorph: Setae simple, erect, straight, brown, dark brown towards the base, fading to pale brown towards the apex, smooth, thick-walled, 4-8-septate, 100-150 x 3.5-4 μm , basal cell swollen and 11-15 μm wide, apical cell sterile and rounded at the apex and 2-2.2 μm wide; basal cell thick-walled, swollen, up to 10 μm wide. Conidiophores 2-5 in cluster around 1 setae, cylindrical, straight, or flexuous, brown, slightly paler toward the apex, thick-walled, smooth, 0-2-septate, 14-50 x 2.2-2.8 μm , terminating by a conidiogenous cell. Conidiogenous cells terminal, monophialidic, brown, smooth, thin-walled, cylindrical, subcylindrical, tapered to the apex, apex narrow with 1-5 very small flared collarete, 15-20 x 1.8-2.3 μm , often with 1-2 percurrent proliferations, collarete 1-1.5 μm wide and 2-2.5 μm deep. Conidia aggregated into slimy mass at the apex of the conidiogenous cells, falcate, hyaline, aseptate, smooth, thin walled, typically curved, acerose, both ends attenuated and rounded, sometime slightly tapering towards one end, setulate absent, 8-10 x 1-1.2 μm .

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China, Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Wu17505); China, Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17504). Living strains: ex-type strains 78259 and 78345 (from Wu17504). 78326 and 78347 (from Wu17505).

Ecology/Substrate/Host: Saprobe on dead leaves of broad leaf tree.

Geographical distribution: China.

Notes: *Lunatochaeta shenzhenensis* W.P. Wu & Y.Z. Diao is characterized by presence of sterile setae with rounded and slightly swollen apex, lageniform phialides directly produced from superficial hyphae, and falcate, aseptate and non setulate conidia formed in wet spore mass. It differs from *Dictyochaeta* species by producing sterile setae with slightly swollen apex, and lunate, symmetrical conidia; from *Brachydictyochaeta* by producing no lateral phiales on setae, and lunate, symmetrical conidia (Hughes and Kendrick 1968; Pirozynski and Patil 1970; Taylor and Hyde 2003; Castañeda-Ruiz 1988; Kirk 1982; Réblová 1998a; Whitten et al. 2000; Réblová 2004; Réblová et al. 2020, 2021c).

***Phialogeniculata* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea (Kobe): 471, 1971.**

Colonies hairy, brown, or blackish brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, cylindrical then becoming geniculate due to sympodial proliferation, smooth, septate, thick-walled, brown to dark brown, with sympodial proliferation. Conidiogenous cells cylindrical, obclavate, pale brown to brown, thin- and smooth-walled; collarete funnel-shaped, with a narrow sporulating locus. Conidial ontogeny holoblastic by apical wall building. Conidial maturation synchronous with conidial ontogeny. Conidial secession schizolytic. Conidia acrogenous, solitary, borne in a liquid droplet, hyaline, aseptate or septate, smooth, obclavate, base obtuse and with a narrower truncate scar, apex acute.

Type species: *Phialogeniculata guadalcanalensis* Matsush.

Ecology/Substrate/Host: saprobe on decaying leaf, seed, branches and rotten wood.

Geographical distribution: Asia, South Africa, South America.

Description and illustration: Matsushima (1971); Kuthubutheen and Nawawi (1991); Réblová et al. (2021b).

Notes: The genus *Phialogeniculata* Matsush. was introduced by Matsushima (1971) for the dematiaceous hyphomycete, *Phialogeniculata guadalcanalensis* Matsush. and it has been found to be a common fungus from subtropical and tropical area, including Australasia, South Africa, South America (Brazil). Kuthubutheen and Nawawi (1991) transferred this to *Dictyochaeta*, based on closely related morphology. However, the phylogenetic analysis based on rDNA sequences shows the type species of this genus is closely related to members of *Tainosphaeria* but formed a distinct subclade (Réblová et al., 2021b). Morphologically it is also unique in producing unbranched and septate conidiophores with geniculate proliferations, funnel-shaped collarettes, and hyaline, aseptate or septate conidia without setulae. Under the generic name *Phialogeniculata*, a total of four species, mainly distinguished by shape, size and septation of conidia, are known and future molecular-based revision is needed for the rest four species, including *P. africana* Goh, K.D. Hyde & Steinke, *P. dimorpha* Matsush., *P. guadalcanalensis* Matsush. and *P. multiseptata* Matsush. (Matsushima 1971, 1993; Hyde et al. 1998).

Key to known species of *Phialogeniculata*

1. Conidia obclavate, aseptate, 10-15 x 2.5-4 µm	<i>P. obclavata</i>
1. Conidia septate	2
2. Conidia 1-septate	3
2. Conidia 2-5-septate	4
3. Conidia 1-septate in the middle, 17-21 x 5-6 µm	<i>P. guadalcanalensis</i>
3. Conidia with 1 subapical septa, 11-16 x 2.5-3 µm	<i>P. africana</i>
4. Conidia 2-septate, 13-22 x 4-6 µm	<i>P. dimorpha</i>
4. Conidia 2-5-septate, 26-50 x 3-5 µm	<i>P. multiseptata</i>

Phialogeniculata guadalcanalensis Matsush., Microfungi of the Solomon Islands and Papua-New Guinea (Kobe): 472, 1971.

≡ *Dictyochaeta guadalcanalensis* (Matsush.) Kuthub. & Nawawi, Mycol. Res. 95: 1220, 1991.

= *Tainosphaeria obclavata* D.F. Bao, Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99:604, 2019.

Colonies hairy, brown, or blackish brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, cylindrical then becoming geniculate due to sympodial proliferation, smooth, 7-9-septate, thick-walled, brown to dark brown, with sympodial proliferation, 110-140 x 4.5-5 µm. Conidiogenous cells cylindrical, obclavate, pale brown to brown, thin- and smooth-walled, with a funnel-shaped collarette of 2.5-3.5 µm deep and 3.5-5 µm wide, with a narrow sporulating locus of 2-2.5 µm wide. Conidial ontogeny holoblastic by apical wall building. Conidial maturation synchronous with conidial ontogeny. Conidial secession schizolytic. Conidia acrogenous, solitary, borne in a liquid droplet, hyaline, uniseptate, smooth, obclavate, 20-22 x 4.5-5 µm, base obtuse and with a narrower truncate scar, apex acute.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangdong Province, Dinghushan, on rotten wood of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1850f); China: Yunnan Province, Xishuangbanna, on dead branches, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2864b). Living strain: 44662 (rom Wu1850f).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, Brazil, China, Papua-New Guinea, South Africa, Thailand.

Description and illustration: Matsushima (1971); Kuthubutheen and Nawawi (1991); Hyde et al. 1998); Luo et al. (2019); Réblová et al. (2021b).

Notes: *Tainosphaeria obclavata* D.F. Bao, Z.L. Luo, K.D. Hyde & H.Y. Su, a recently described fungus on submerged decaying wood from Thailand, is identical to *P. guadalcanalensis* in both morphology (conidia aseptate, obclavate, 17-21 x 5-6 µm) and ITS sequence.

Phialogeniculata obclavata (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841684

≡ *Chloridium obclavatum* Matsush., Matsush. Mycol. Mem. 7: 47, 1993.

Colonies hairy, brown, or blackish brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, cylindrical then becoming geniculate due to sympodial proliferation, smooth, 3-7-septate, thick-walled, brown to dark brown, with sympodial proliferation, 60-100 x 4.5-5 µm. Conidiogenous cells cylindrical, obclavate, pale brown to brown, thin- and smooth-walled, with a funnel-shaped collarette of 2-2.5 µm deep and 4.5-5 µm wide, with a narrow sporulating locus of 2-2.5 µm wide. Conidia acrogenous, solitary, borne in a liquid droplet, hyaline, aseptate, smooth, obclavate, guttulate, 10-15 x 2.5-4 µm, base obtuse and with a narrower truncate scar, apex acute.

Material examined: On rotten wood of unidentified plant, China: Jilin Province, 20 Aug. 2001, W.P. Wu (Wu1885b). Living strain: 44678 (from Wu1885b).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Peru.

Description and illustration: Matsushima (1993); Hyde et al. (1998).

Notes: *Chloridium obclavatum* Matsush. was originally described for the fungus with similar morphology as *Phialogeniculata guadalcanalensis* Matsush., but with aseptate and smaller conidia (6-18 x 2.5-4 µm) (Matsushima, 1993). Phylogenetic analysis based on rDNA sequences showed that *C. obclavatum* is closely related to members of *Phialogeniculata* and differs from all other known species in the genus. Among the known species under *Phialogeniculata*, *Chloridium* and *Dictyochoeta*, *P. africana* Goh, K.D. Hyde & Steinke is very similar with *C. obclavatum* on conidial shape (obclavate) and size (11-16 x 2.5-3 µm), but the conidia in this species are with a septum near the apex (Hyde et al. 1998).

Other known *Phialogeniculata* species:

Phialogeniculata africana Goh, K.D. Hyde & Steinke, South African J. Bot. 64: 156, 1998.

Typification: South Africa: Durban, Palmiet River, on submerged wood, Nov. 1994, K.D. Hyde & TD. Sleinke, SAPR 54 (HKU(M) 2122, holotype).

Geographical distribution: South Africa.

Description and illustration: Matsushima (1993); Hyde, Goh and Steinke (1998).

Notes: *Phialogeniculata africana* Goh, K.D. Hyde & Steinke, described from submerged wood from South Africa, has geniculate conidiophores with percurrent proliferation (35-70 x 3-4.5 µm), funnel-shaped conidiogenous cells, ad obclavate conidia in 11-16 x 2.5-3 µm, and except for the 1-septate conidia, this is very similar to those in the original description of *Chloridium obclavatum*, (Hyde et al. 1998).

Phialogeniculata dimorpha Matsush., Matsush. Mycol. Mem. 7: 60, 1993.

Typification: Isolated from palm petiole, Peru: Loreto, Rio Amazonas, Rio Momon, June 1991 (IP-347, holotype, preserved in MFC, Kobe, Japan). Ex-type strain is also in MFC.

Geographical distribution: Peru.

Description and illustration: Matsushima (1993).

Notes: *Phialogeniculata dimorpha* Matsush. differs from other known species in the genus by producing two type of conidia: macroconidia obclavate, 2-septate, 13-22 x 4-6 µm; microconidia ellipsoid, 3-6 x 1.8-2.2 µm (Matsushima, 1993).

Phialogeniculata multiseptata Matsush., Matsush. Mycol. Mem. 7: 60, 1993.

Typification: isolated from palm petiole, Peru: Loreto, Rio Amazonas, Rio Negro, June 1992 (2P-011, holotype in MFC, Kobe, Japan). Ex-type strain is also in MFC.

Geographical distribution: Mexico, Peru.

Description and illustration: Matsushima (1993); Becerra-Hernández et al. (2011).

Notes: *Phialogeniculata multiseptata* Matsush. differs from other known species in the genus by obclavate and 2-5-septate conidia measured 26-50 x 3-5 µm (Matsushima, 1993).

Phialoturbella Réblová & Hern.-Restr., Journal of Fungi 7 (6, no. 438): 27, 2021.

Colonies on the natural substrate effuse, hairy, mycelium partly superficial, partly immersed, hyphae brown, composed of conidiophores, occasionally ascomata. Teleomorph: Ascomata perithecial, non-stromatic, superficial, sub-globose to conical, papillate or with a beak-like neck, dark brown, glabrous. Ostiole periphysate. Ascomatal wall two-layered, carbonaceous. Paraphyses persistent, septate, hyaline. Asci unitunicate, cylindrical-clavate, sessile or with a short stipe, apical apex with a non-amyloid apical annulus, 8-spored. Ascospores ellipsoidal, hyaline, aseptate, smooth. Anamorph: Setae absent. Conidiophores macronematous, mononematous, single or arise in groups from dark stromatic cells, unbranched, erect, straight or flexuous, septate, smooth, brown. Conidiogenous cells integrated, terminal, mono- or polyphialidic, extending percurrently and sympodially, cylindrical, pale brown, subhyaline towards the apex; collarettes funnel-shaped. Macroconidia falcate, lunate or oblong and curved, slightly truncate at the basal hilum, hyaline, aseptate, without setulae, accumulate in slimy fascicles. Microconidia (observed only in culture) falcate, lunate or oblong-clavate, curved, truncate at the basal hilum, hyaline, aseptate, without setulae, formed from the same conidiogenous loci.

Type species: *Phialoturbella lunata* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr.

Geographical distribution: China, Japan and New Zealand.

Ecology/Substrate/Host: Saprobe on dead plant material.

Description and illustration: Réblová et al. (2021b)

Note: *Phialoturbella* Réblová & Hern.-Restr. was established to accommodate two known *Tainosphaeria* species (*Tainosphaeria aseptata* and *T. lunata*) and one undescribed fungus (*P. calva* Réblová & Hern.-Restr.) which are clustered together as a separate lineage, and characterized by macronematous, solitary or crowded, simple conidiophores with mono- occasionally polyphialidic conidiogenous cells and aseptate, falcate to lunate conidia without setulae. Species of this genus are known as saprobes on decaying bark and wood in China, Japan and New Zealand. Réblová et al. (2021b) also mentioned that several morphologically similar species of *Dictyochaeta* can be considered relatives or possible candidates for inclusion in *Phialoturbella*, namely *D. apiculata*, *D. botulispora*, *D. heteroderae*, *D. illinoensis* and *D. occidentalis*. Here we confirmed the affinity of *D. apiculata* to *Phialoturbella*. Unfortunately, none of the other species has available DNA sequence or culture for phylogenetic analysis.

Key to known species of *Phialoturbella* and *Flectospora*

1. Conidia ellipsoidal to obovoid, slightly curved, aseptate, 5–6 x 2.5–3 µm *F. laminata*
1. Conidia fusiform, falcate or oblong-clavate 2
2. Conidia two types; macroconidia falcate to lunate or oblong and slightly curved, tapering towards both ends, with a basal hilum, hyaline, 12.5–17 x 2–3 µm; Microconidia falcate or oblong-clavate, 4–6.5 x 1–1.5 µm *P. calva*
2. Only macroconidia produced 3
3. Conidia fusiform, allantoid, curved, 14.5–17 x 2.8–3.2 µm, rounded at both ends *P. apiculata*
3. Conidia 3.5–5.5 µm wide 4
4. Conidia long fusiform, curved, 14.5–20 x 3–4.5 µm *P. aseptata*
4. Conidia fusiform, curved, 16–24 x 3.5–5.5 µm, with short setulae up to 3 µm long *P. lunata*

Phialoturbella apiculata (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov., Figs. 49, MycoBank MB841685.

≡ *Codinaea apiculata* Matsush., Icon. Microfung. Matsush. Lect. (Kobe): 35, 1975.

≡ *Dictyochaeta apiculata* (Matsush.) Aramb. & Cabello, Mycotaxon 34: 681, 1989.

≡ *Dictyochaeta apiculata* (Matsush.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 136, 2000.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3–5 µm wide. Teleomorph: Not observed. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, 2–4 septate, smooth, 50–100 x 3–4 µm. Conidiogenous cells integrated, terminal, monophialidic with sympodial proliferation, cylindrical, 18–22 x 3–4 µm, pale brown to brown, thin-walled, ending in a flared collarete which is funnel-shaped, 2.5–3.5 µm wide, 1.5–2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, allantoid, straight or curved, aseptate, hyaline, smooth, 14.5–17 x 2.8–3.2 µm, rounded at both ends.

Material examined: China: Hubei Province, Shengnongjia, on rotten wood of unidentified plant, 14 Sept. 2004, W.P. Wu (Wu8115c). Living strain: 48020 (from Wu8115c).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Japan.

Description and illustration: Matsushima (1975).

Notes: *Phialoturbella apiculata* (Matsush.) W.P. Wu & Y.Z. Diao is characterized by absence of setae, monophialidic conidiogenous cells with sympodial proliferation, aseptate and lunate conidia with very short rudimentary setulae at both ends (Matsushima 1975). Among the known *Dictyochaeta* species, few species, including *D. illinoensis* (Hewings & J.L. Crane) Whitton, McKenzie & K.D. Hyde, *Dictyochaeta* state of *Chaetosphaeria pulchriseta* and *Dictyochaeta zapatensis* R.F. Castañeda & W.B. Kendr., produce conidia with rudimentary setulae (Hughes and Kendrick 1968; Hewing and Crane 1981; Castañeda-Ruiz and Kendrick 1993). *D. illinoensis* and *D. zapatensis* differs from *D. apiculata* by their 1-septate conidia. *Dictyochaeta* state of *Chaetosphaeria pulchriseta* (conidia 23–29 x 2.4–3 µm) differs from *P. apiculata* by its larger conidia.

Phialoturbella aseptata (C.G. Lin & J.K. Liu) Réblová & Hern.-Restr., J. Fungi 7 (6, no.438): 27, 2021.

≡ *Tainosphaeria aseptata* C.G. Lin & J.K. Liu, Mycosphere 10: 683, 2019.

Colonies on plant substrate effuse, aggregate, brown, with a hyaline, glistening conidial mass, hairy, short. Teleomorph: Not observed. Anamorph: Conidiophores mononematous, macronematous, cylindrical, 3–8-septate, erect, straight, or flexuous, unbranched, septate, smooth, dark brown at the base, paler towards the apex, often with percurrent proliferations, 50–120 µm long, 3–4.5 µm wide at the base. Conidiogenous cells monophialidic, integrated, terminal, pale brown to subhyaline, clavate, cylindrical, 30–50 x 3–4 µm, with sympodial proliferation, collarettes funnel-shaped, 3–3.5 µm wide and 1.5–2.2 µm deep. Conidia aggregated in slimy mass at the apex of the conidiophore, acrogenous, smooth, hyaline, aseptate, straight to curved, long fusiform, 16–20 x 3–4.3 µm, base truncated, apex acute.

Material examined: On rotten wood of unidentified plant, China: Hubei Province, Shengnongjia, 14 Sept. 2004, W.P. Wu (Wu8316a). Living strain: 50689 (from Wu8316a).

Ecology/Substrate/Host: Saprobe on rotten wood.

Geographical distribution: China.

Description and illustration: Lin et al. (2019).

Notes: *Phialoturbella aseptata* is characterized by unbranched, solitary conidiophores, monophialidic conidiogenous cells extending percurrently and long fusiform, curved, aseptate conidia. *P. aseptata* is similar to *Dictyochaeta heteroderae* (Morgan-Jones) Carris & Glawe, *Codinaea lunata* Matsush. and *D. lunulospora* (Hewings & J.L. Crane) Hol.-Jech. by having mononematous conidiophores without fertile lateral branches, lacking setae, and aseptate, curved conidia without setulae. However, the conidia of *D. heteroderae* (9–13 × 3–4 µm) and *D. lunulospora* (8.8–12.0 × 0.8–1.0 µm) are smaller than those of *T. aseptata* (15.7–23.3 × 3.8–4.5 µm) and they are also guttulate (Matsushima, 1975). It was also compared with *D. illinoensis* by Réblová et al. (2021b).

Phialoturbella lunata (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., Journal of Fungi 7 (6, no.438): 29, 2021.

≡ *Tainosphaeria lunata* Z.L. Luo, K.D. Hyde & H.Y. Su, Fungal Diversity 99: 604. 2019.

Saprobic on submerged decaying wood. Asexual morph Colonies effuse, greyish brown, in groups. Mycelium partly superficial, composed of septate, branched, brown, smooth hyphae. Teleomorph: Not observed. Anamorph: Conidiophores 50–90 µm long, 3–4 µm wide, macronematous, mononematous, 2–4-septate, unbranched, erect, flexuous, greyish black, pale towards apex, in groups, arising from a common stroma. Conidiogenous cells monophialidic, 15–20 × 3–3.5 µm, with conspicuous, flared collarette, terminal, determinate. Conidia 19–24 µm long, 3.5–3.8 µm wide, acrogenous, fusiform, solitary, guttulate, aseptate, curved, hyaline, smooth-walled, narrow and rounded at both ends, without or with very short polar appendages less than 3 µm long.

Material examined: On rotten wood of unidentified plant, China: Hubei Province, Shengnongjia, 14 Sept. 2004, W.P. Wu (Wu8270a). Living strain: 50674 (from Wu8270a).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Description and illustration: Luo et al. (2019).

Notes: *Tainosphaeria lunata* Z.L. Luo, K.D. Hyde & H.Y. Su is a recently described species on submerged decaying wood from Yunnan, China and it differs from the relevant species in the genus by lunate-shaped conidia without setulae (Liu et al. 2016; Lu et al. 2016; Luo et al. 2019). On the conidial morphology, the fungus from our collection agrees well with the those in the original description, but it has relatively longer but narrower conidia (19–24 × 4–4.5 µm vs. 16–19 × 4.5–5.5 µm in the original description). The ITS sequence from our collection Wu8270a is identical to the one from the type specimen.

Codinaea and related genera with conidia bearing setulae

Among the *Codinaea* and *Dictyochaeta* complex, most genera are with conidia bearing setulae and they are *Calceisporiella* W.P. Wu & Y.Z. Diao, *Codinaea* Marie, *Codinaeella* W.P. Wu & Y.Z. Diao, *Dictyochaetopsis* Aramb. & Cabello, *Xyladelphia* W.P. Wu & Y.Z. Diao, *Nimesporella* W.P. Wu & Y.Z. Diao, *Multiguttulispora* C.G. Lin & J.K. Liu, *Neotainosphaeria* W.P. Wu & Y.Z. Diao, *Oxenbollia* W.P. Wu & Y.Z. Diao, *Parabahusutrabeeja* W.P. Wu & Y.Z. Diao, *Paracodinaea* W.P. Wu & Y.Z. Diao, *Stilbochaeta* Réblová & Hern.-Restr., *Tainosphaeria* F.A. Fernández & Huhndorf, *Tainosphaeriella* Réblová & Hern.-Restr. and *Xyladelphia* Réblová & Hern.-Restr.

Phylogenetically all these genera are well-defined monophyletic genera (Fig. 3), however they are polyphyletic and distributed in several different clades in the phylogenetic trees, i.e. the *Codinaea* clade (*Bahusutrabeeja*, *Codinaea*, *Codinaeopsis*, *Nimesporella*, *Phialolunulospora*), the *Xyladelphia* clade (*Xyladelphia*), the *Multiguttulispora* clade (*Multiguttulispora*), the *Dictyochaeta* clade (*Neotainosphaeria* and many other genera), the *Codinaeella* clade (*Calvolachnella*, *Codinaeella*, *Rattania*), the *Stilbochaeta* clade (*Falholtia*, *Stilbochaeta*), and the *Tainosphaeria* clade (*Calceisporiella*, *Oxenbollia*, *Parabahusutrabeeja*, *Paracodinaea*, *Tainosphaeria*, *Tainosphaeriella*).

Morphologically most of these genera are also well-delimited by a combination of setae, conidiophores, conidiogenous cells and conidia, except for *Oxenbollia*, *Paracodinaea*, *Codinaeella*, *Tainosphaeria* and *Tainosphaeriella* which are difficult to be distinguished by morphology. The living strains of many studied species were also studied on PDA, some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to genera of *Codinaea* and related genera with conidia bearing setulae

1. Sterile or fertile setae present2

1. Sterile or fertile setae absent	7
2. Setae sterile or fertile only at the apex, unbranched	3
2. Setae fertile and with lateral phialides or secondary branches	6
3. Conidia septate	<i>Stilbochaeta</i>
3. Conidia aseptate	4
4. Setae versicolored, uniformly brown except at the ultimate or penultimate cells which are dark brown; conidia multiguttulate, with or without setulae	<i>Xyladelphia</i>
4. Setae uniformly brown; conidia with setulae	5
5. Conidiophores in clusters with 1 centrally located setae	<i>Codinaea</i>
5. Conidiophores and setae not formed in clusters, effuse	<i>Codinaeella</i>
6. Setae regularly branched; conidiophores bearing short encircling collar hyphae; conidia with setulae	<i>Codinaeopsis</i>
6. Setae irregularly branched; no encircling collar hyphae	<i>Dictyochaetopsis/Codinaeella*</i>
7. Conidia 3-septate, ellipsoidal	<i>Multiguttulispora</i>
7. Conidia aseptate	8
8. Conidia globose, subglobose, ellipsoid, broadly fusiform, straight	9
8. Conidia falcate, fusiform, allantoid, curved	13
9. Conidiogenous cells mostly polyphialidic; conidia broadly ellipsoid, guttulate, with 1 setula at each end	<i>Nimesporella</i>
9. Conidiogenous cells monophialidic; conidia globose to subglobose, pyriform	10
10. Conidia globose, thin-walled, with 1 very short setula	<i>Parabahusutrabeeja</i>
10. Conidia globose to subglobose, thick-walled, with more than 1 setula	11
11. Conidia subglobose, with 1 terminal setula at each end	<i>Calceisporiella</i>
11. Conidia globose, subglobose, pyriform, setulae terminal or lateral	12
12. Conidiogenous cells rough-walled; conidia globose, with 2-3 lateral setulae	<i>Neotainosphaeria</i>
12. Conidiogenous cells smooth-walled, mono- or poly-phialidic; conidia with more than 3 or more setulae	<i>Bahusutrabeeja</i>
13. Conidia long lunate, vermiform to sigmoid, with basal appendage only; appendage cellular unbranched and eccentric appendage	<i>Phialolunulospora</i>
13. Conidia falcate, fusiform, lunate, allantoid, bearing 1 setulae at each end	14
14. Conidia allantoidal, curved	<i>Paracodinaea</i>
14. Conidia lunate, falcate, fusiform, straight or curved	15
15. Conidia lunate, guttulate, symmetrical, strongly curved	<i>Oxenbollia</i>
15. Conidia falcate, fusiform, symmetrical or asymmetrical	<i>Codinaeella</i> , <i>Tainosphaeria</i> and <i>Tainosphaeriella**</i>

(*Only include one species of *Codinaeella*, *P. sinense*; **different phylogenetic genera, but morphologically can hardly be distinguished).

***Calceisporiella* W.P. Wu & Y.Z. Diao, gen. nov.** MycoBank MB841522.

Etymology: refers to its similarity on conidial morphology with *Calceispora* Matsush.

Diagnosis: Similar to *Codinaea* Marie but differs in conidiogenous cells with inconspicuous collarettes and thick-walled conidia with setulae at ends.

Type species: *Calceisporiella sinensis* W.P. Wu & Y.Z. Diao.

Saprobe on dead branches. Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, or slightly flexuous, cylindrical, dark brown, septate, smooth or verruculose, thick-walled, proliferating percurrently. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, smooth or verruculose, with a narrow or broad sporulating loci and collarette, proliferating percurrently through the collarette. Conidia holoblastic, acrogenous, solitary, globose to subglobose, aseptate, hyaline, smooth, with one slender at each end. Conidia secession schizolytic.

Ecology/Substrate/Host: saprobe on dead branches of broad leaf tree.

Geographical distribution: China.

Notes: *Codinaea* Marie and *Calceispora* Matsush. are similar to *Calceisporiella* in producing hyaline, ellipsoidal to subglobose, aseptate conidia with unbranched appendages from monophialidic conidiogenous cells (Carmichael et al. 1980; Sutton 1993; Seifert et al. 2011; Réblová et al. 2021c). Phylogenetically *Codinaea* and *Calceisporiella* are distinctly related and grouped into two different clades. The appendages in *Calceispora* are cellular and much wider, and differs from the setulae appendage in *Calceisporiella*.

***Calceisporiella sinensis* W.P. Wu & Y.Z. Diao, sp. nov.**, Fig. 50, MycoBank MB841555

Etymology: refers to the locality (China) where this fungus was originally discovered.

Diagnosis: Conidiophores simple, erect, cylindrical, dark brown, 7-12-septate, 200-300 x 4.5-5.5 µm; Conidiogenous cells terminal, monophialidic, cylindrical, verruculose, 23-30 x 4-5 µm, apex with a narrow sporulating locus, no collarette or only a small one. Conidia acrogenous, solitary, subglobose, ellipsoidal, aseptate, hyaline, 15-17 x 11.5-12.5 µm, with one setula inserted laterally at each end, 8-10 µm long.

Type: China: Guangdong Province, Dinghushan, on dead branches of unidentified tree, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu1900a; ex-type strain CGMCC 3.20635 (=NN 44684)).

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, or slightly flexuous, cylindrical, dark brown, 7-12-septate, smooth- and thick-walled, 200-300 x 4.5-5.5 µm, proliferating percurrently through the collarette. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, pale brown to medium brown, verruculose, 23-30 x 4-5 µm, apex with a narrow sporulating locus, no collarette or only a small one. Conidia holoblastic, acrogenous, solitary, subglobose, ellipsoidal, aseptate, hyaline, smooth, 15-17 x 11.5-12.5 µm, with one setula inserted laterally at each end, 8-10 µm long.

Colonies on PDA effuse, colonies 1.5-2.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of unidentified tree, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu1900a). Living strain: ex-type strain CGMCC 3.20635 (=NN 44684).

Ecology/Substrate/Host: Saprobe on dead branches of broad leaf tree.

Geographical distribution: China.

Notes: *Calceisporiella sinensis* W.P. Wu & Y.Z. Diao is characterized by absence of stroma and setae, macronematous conidiophores, monophialidic conidiogenous cells with a narrow sporulating loci and inconspicuous collarettes, aseptate and ellipsoidal conidia with thick wall and one appendage at each end. *C. sinensis* resemble *Calceispora hachijoensis* Matsush. and *Calceispora subglobosa* B. Sutton by producing verruculose conidiogenous cells, narrow sporulating loci without distinct periclinal thickening, and larger conidia with single setulae inserted laterally at each end, 8-10 µm long (Matsushima 1975; Sutton 1993). Among the known *Dictyochaeta* and *Tainosphaeria* species, only two species, including *D. fimbriaspora* Whitton, McKenzie & K.D. Hyde and *D. ciciata* (Onofri & Rambelli) Bhat & W.B. Kendr., are closely related to *C. sinensis* on absence of setae, monophialidic conidiogenous cells and ellipsoidal to subglobose conidia with setulate at both ends (Rambelli and Onofri 1987; Bhat and Kendrick 1993; Kuthubutheen and Nawawi 1990; Whitton et al. 2000). *D. fimbriaspora* differs from *C. sinensis* by its smooth-walled conidiogenous cells with a broad sporulating loci and conspicuous collarette (Whitton et al. 2000). *D. ciciata* differs from *C. sinensis* by its smaller and thin-walled conidia (Rambelli and Onofri, 1987). Both LSU and ITS sequences were obtained from the single spore isolate of the type specimen and its affinity to other members of *Chaetosphaeriaceae* was confirmed by phylogenetic analysis.

Codinaea Maire, Publ. Inst. Bot. Barcelona 3: 15, 1937.

= *Menisporella* Agnihotr., Proc. Natl. Acad. Sci. India B 56: 98, 1962.

= *Codinaeopsis* Morgan-Jones, Mycotaxon 4: 166, 1976.

= *Bahusutrabeja* Subram. & Bhat, Can. J. Bot. 55: 204, 1977.

= *Phialolunulospora* Z.F. Yu & R.F. Castañeda, MycoKeys 76: 23, 2020.

Colonies on natural substrate effuse, hairy, brown to black, composed of setae and conidiophores, mycelium semi-immersed or immersed. Teleomorph: Unknown. Anamorph: Setae present or absent, if present single or arise in groups from stromatic cells or knots of hyphal cells, erect, straight or flexuous, septate, pigmented, thick-walled, paler and thinner-walled toward the apex, unbranched, apex sterile, tapering or modified into a phialide with a terminal or several lateral openings. Conidiophores macronematous, mononematous, single or arise in fascicles from stromatic cells or knots of hyphal cells around the base of the setae, erect, straight or flexuous to slightly geniculate or undulate, unbranched or branched, occasionally with nodose or collar-like hyphae formed just below the septa, septate, smooth, pigmented, paler toward the apex, terminating into a phialide or with a sterile setiform extension. Conidiogenous cells integrated, terminal or discrete, lateral, mono- or polyphialidic, extending percurrently and sympodially, paler than the conidiophore; collarettes funnel-shaped. Conidia of two morphologically distinct types; macroconidia predominantly falcate to lunate, sometimes oblong-falcate, ellipsoid to ellipsoid-fusiform or broadly oblong, occasionally vermiform, slightly truncate at the base, with an inconspicuous basal scar, with a straight or gently curved setula at each end, sometimes setulae also inserted ventrally and dorsally, or also globose to pyriform with setulae distributed over the surface of the conidium, aseptate, hyaline, conidia accumulate in slimy fascicles; microconidia (formed occasionally and only in vitro) ellipsoidal to oblong, aseptate, hyaline, with a miniature setula (Adapted from Réblová et al. 2021e).

Type species. *Codinaea aristata* Maire, Publ. Inst. Bot. Barcelona 3: 15, 1937

Ecology/Substrate/Host: saprobe on decaying plant materials.

Geographical distribution: Broadly distributed.

Description and illustration: Maire (1937); Hughes and Kendrick (1968); Réblová et al. (2021e).

Notes: The genus *Codinaea* was proposed by Maire (1937) with *C. aristata* Maire as the type species and redescribed by Hughes and Kendrick (1968). Gamundi et al. (1977) rediscovered *Dictyochaeta fuegiana* Speg., the type species of *Dictyochaeta* (Spegazzini 1923) and proposed *Codinaea* as a synonym. However, recent molecular phylogenetic studies suggested that species with setulate conidia (*Codinaea*) are distinct from those lacking conidial setulae (*Dictyochaeta*) (Réblová and Winka 2000; Seifert et al. 2011; Li et al. 2012; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021c). Based on both morphological and phylogenetic analysis, the genus *Codinaea* is recently emended with a narrow concept by Réblová et al. (2021e). The emended concept of the genus include 14 accepted species with diverse morphology in term of presence or absence of setae, morphology of conidiophores, conidiogenous cells and conidia.

Our phylogenetic analysis with inclusions of more species supported the separation of *Codinaea* from other related genera, as proposed by Réblová et al. (2021e). A total of 18 species with similar morphological characters as the type species of *Codinaea*, *Codinaea aristata*, formed a distinct phylogenetic group from other *Codinaea*/*Dictyochaeta* (Fig. 3 and Fig. 51). These species include *Codinaea assamica* (Agnihotri.) S. Hughes & W.B. Kendr., *C. paniculata* Réblová & J. Fourn, *Dictyochaeta ellipsoidea* Z.L. Luo, K.D. Hyde & H.Y. Su, *D. lignicola* Z.L. Luo, H.Y. Su & K.D. Hyde, *D. lithocarp* R.H. Perera, E.B.G. Jones & K.D. Hyde, *D. pandanicola* Tibpromma & K.D. Hyde, *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu, *D. terminalis* C.G. Luo, K.D. Hyde & H.Y. Su and ten undescribed species.

Based on the arrangement of setae and conidiophores and their branching pattern, Réblová et al. (2021e) distinguished four morphotypes C1–C4 in *Codinaea*. In the phylogenetic analysis, all the 14 accepted species with 4 different morphotype (C1–C4) were clustered together as monophyletic genus. Majority of nine accepted species are with long sterile or fertile setae associated with short conidiophores at the base. Among species without distinct differentiation of setae and conidiophores, *Codinaea dwaya* (Subram. & Bhat) Réblová & Hern.-Restr., *C. ellipsoidea* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., *C. lignicola* (Z.L. Luo, H.Y. Su & K.D. Hyde) Réblová & Hern.-Restr., *C. puerensis* W.P. Wu & Y.Z. Diao and *C. trisetula* W.P. Wu & Y.Z. Diao are with unbranched, dark brown, thick-walled conidiophores that closely resemble the setae and terminate into a monophialide (C2); *C. pyriformis* W.P. Wu & Y.Z. Diao and *C. vermispura* (Z.F. Yu & R.F. Castañeda) Réblová & Hern.-Restr. with short conidiophores and monophialidic conidiogenous cells (C2) and only known from pure culture; *C. amazonensis* with conidiophores with a sterile setiform extension and integrated, terminal phialides borne in groups on short unilateral, branched stalks (C3), and *C. gonytrichodes* Shearer & J.L. Crane with branched conidiophores and discrete, lateral phialides borne on nodose hyphae or directly on conidiophores (C4) (Réblová et al. 2021e).

Conidia from all accepted species are aseptate and setose, but also show some variability in shape (Réblová et al. 2021e). They are mostly falcate to lunate, curved, occasionally vermiform but several species have also ellipsoidal-fusiform to more or less ellipsoidal conidia with setulae inserted at the apical and basal ends. The globose to pyriform conidia of *C. dwaya*, *C. pyriformis* and *C. trisetula* with both polar and lateral setulae irregularly distributed over the surface represent a character that is unusual in *Codinaea*. The falcate conidia of *C. phasma* Hern.-Restr. & Réblová form a simple setula at each end under natural conditions, however, in culture, they become irregularly ellipsoidal and have 3(–5) setulae inserted also on the ventral and dorsal sides.

Apart from the above mentioned species, several other described species under *Codinaea* and *Dictyochaeta* clearly belong to *Codinaea* and should be correctly included under *Codinaea*, including *Codinaea britannica* M.B. Ellis, *C. fertilis* S. Hughes & W.B. Kendr., *C. pakhalensis* S.M. Reddy & S.S. Reddy, *Dictyochaeta brachysetula* Y.L. Jiang & T.Y. Zhang, *D. chinensis* Y.L. Jiang & T.Y. Zhang and *D. plovercovensis* Goh & K.D. Hyde (Hughes and Kendrick 1968; Ellis 1976; Reddy and Reddy 1977; Kuthubutheen and Nawawi 1991a; Goh and Hyde 1999; Whitton et al. 2000; Liu et al. 2016; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021c). All these species are briefly discussed as well. Phylogenetic relationship of a large number of described species under *Codinaeopsis* and *Dictyochaetopsis* is unclear and remained to be studied for reclassification.

The living strains of many studied species were also studied on PDA (Fig. 79), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Codinaea* (C.)

1. Sterile or fertile setae present 2
1. Sterile or fertile setae absent; conidiophores solitary or irregularly in groups 32
2. Only setiform conidiophores present, with lateral branches 3
2. Both setae or setiform and non-setiform conidiophores present, and formed in fascicles 4
3. Conidiophores with unilateral phialide-bearing stalks just below the septa; conidiogenous cells arise from stalks; conidia 9–11.5 x 1.5–3; setulae 5.5–9 long *C. amazonensis*

3. Conidiophores with nodose and collar-like hyphae below septa; conidiogenous cells in groups of 3-6 arise from nodose or collar-like hyphae; conidia 12–14.5 x 2–2.5(–3) µm; setulae 7.5–11.5 µm long	<i>C. gonytrichoides</i>
4. Setae becoming fertile, terminated with a mono- or poly-phialide	5
4. Setae consistently sterile	28
5. Conidia 24-26 x 6-8 µm; setula spiral and only apical, 65-135 µm long	<i>C. gyrosetulata</i>
5. Conidia bearing setulae at both ends	6
6. Conidia 16-25 µm long	7
6. Conidia less than 16 µm long	13
7. Conidia broadly fusiform, falcate, 20-25 x 10-12.5 µm; setulae 5-6 µm	<i>C. tiklifrei</i>
7. Conidia fusiform, falcate, less than 6.5 µm wide	8
8. Conidiophores 4-6 in clusters from basal stroma; conidiogenous cells mono- or poly-phialidic; conidia 16-26 x 4-6 µm; setulae 8-13.5 µm long	<i>C. pandanicola</i>
8. Conidia less than 4 µm wide	9
9. Conidial setulae 7-15 µm long	10
9. Conidial setulae 5-8.5 µm long	11
10. Conidia 16-20 x 2-3 µm; setulae 10-15 µm long	<i>C. gamundiae</i>
10. Conidia 15.5-21 x 2.5-4 µm; setulae 7-12 µm long	<i>C. siamensis</i>
11. Conidiogenous cells polyphialidic; conidia 10-20 x 2-4 µm, usually 14 x 3; setulae absent or present, in one to two ends 1.5-8 µm long	<i>C. zhangii</i>
11. Conidiogenous cells monophialidic; conidia always with setulae at both ends	12
12. Conidia 12-19.5 x 2.3-3.5 µm; setulae 4.7-8.5 µm long	<i>C. coryli</i>
12. Conidia in two types: narrower and longer, 13.5-17 x 2.5-3.5 µm; shorter and usually wider, 11.5-13.5 x 3-3.5 (–4) µm, falcate, asymmetrical; setulae 5-8 µm long	<i>C. paniculata</i>
13. Conidia 1.5-2 µm wide	14
13. Conidia 2-5 µm wide	16
14. Conidia 6-11 x 1.7-2 µm; setulae 4-10 µm long	<i>C. pakhalensis</i>
14. Conidia 13-15 µm long	15
15. Conidia 13–15 x 1.5–2 µm; setulae 8-9 µm long	<i>C. plovercovensis</i>
15. Conidia falcate, fusiform, 13-15 x 2 µm, setulae 5-7 µm long	<i>C. oxenbolliae</i>
16. Conidia 10-13 µm long	17
16. Conidia 11-17 µm long	19
17. Setae, 130-215 x 4-6 µm; conidiophores 30-85 x 3.5-5 µm, with terminal polyphialidic conidiogenous cells bearing several funnel-shaped collarettes; conidia falcate, fusiform, 11-13 x 2.5-3 µm; setulae 6 -12 µm long	<i>C. latispota</i>
17. Conidial setulae 4-6 µm long	18
18. Setae up to 420 µm long; conidiophore 45-80 x 3.5-5 µm, terminated with a polyphialidic conidiogenous cell bearing up to 10 funnel-shaped collarette; conidia falcate, 10-11 x 2-3 µm, setulae 4-5 µm long	<i>C. tengii</i>
18. Setae 150-200 x 5-6.5 µm; conidiophores 50-80 x 2.5-4 µm; conidiogenous cells Conidiogenous cells monophialidic or rarely polyphialidic, cylindrical to clavate, 30-50 x 3-4 µm; conidia 11-13 x 2-2.5 µm; setulae 4-6 µm long	<i>C. dinghushanensis</i>
19. Conidia 2-3 µm wide	20
19. Conidia 3-5 µm wide	23
20. Conidial setulae 5-10 µm long	21
20. Conidial setulae 8-12 µm long	25
21. Setae 195-240 x 4.5-5 µm; conidiophores 50-85 x 3-3.5 µm, with a terminal monophialidic conidiogenous cell; conidia falcate, 15-17 x 2.2-2.5 µm; setulae 6-7 µm long	<i>C. simaoensis</i>
21. Conidiogenous cells polyphialidic; conidia 9-15.5 µm long	22
22. Conidiophores 2-3 fasciculate; conidiogenous cells cylindrical, up to 10 successive proliferations; conidia 9-15.4 x 2-3 µm; setulae 5-10 µm	<i>C. fertilis</i>
22. Setae 300-370 x 4-5 µm; conidiophores 45-100 x 2.8-3.3 µm; conidiogenous cell clavate; conidia falcate, fusiform, 11-15.5 x 2.5-3 µm; setulae 5-9.5 µm long	<i>C. clavatophora</i>
23. Setae up to 400 µm long; conidiophores up to 6-fasciculate, up to 140 µm long; conidiogenous cells with up to 2 successive proliferations; conidia 14-16.8 x 2.6-2.8 µm; setulae 9.6-12.8 µm	<i>C. assamica</i>
23. Setae up to 250 µm long	24
24. Setae sterile or fertile, 170-200 µm long; conidiophores 2-5 fasciculate, 65-89 x 3-5 µm. Conidiogenous cells monophialidic, 23-30 x 3-3.5 µm, with funnel-shaped collarettes, 2-2.5 (–8.5) µm wide, 1.5-3 µm deep; conidia 15-16.5 x 2-2.5 µm; setulae 9.5-12.5 µm long	<i>C. fanglanii</i>

24. Setae fertile, 180-235 x 4-6 µm; conidiophores 55-110 x 4-5 µm; conidiogenous cells 18-25 x 3-4 µm, with up to 3 funnel-shaped collarettes 2-3 µm wide, 1.5-2 µm deep; conidia falcate, fusiform, 13-15 x 2-2.8 µm, setulae 8-12 µm long	<i>C. kendrickii</i>
25. Conidiogenous cells monophialidic; conidia 13-15 x 5.5-6.5 µm, guttulate; setulae 8-10 µm long	<i>C. ellipsoidea</i>
25. Conidiogenous cells mono or polyphialidic; conidia 2.5-4.5 µm wide	26
26. Conidia 7-15 x 2.5-4 µm long; setulae up to 5 µm long	<i>C. branchsetula</i>
26. Conidial setulae longer than 5 µm	27
27. Conidia 13-15 x 4.5-5.5 µm; setulae 8-10 µm long	<i>C. lignicola</i>
27. Conidia 13.5-18 x 3-4 µm; setulae 5-13 µm	<i>C. phasma</i>
28. Basal and terminal setulae of unequal length; conidia 12-14 x 2 µm; terminal setula 4-6 µm long	<i>C. aristata</i>
28. Basal and terminal setulae of equal length	29
29. Conidia falcate, slightly curved, 6-8 x 1.5-2 µm; setulae 5-7 µm long	<i>C. minima</i>
29. Conidia more than 10 µm long	30
30. Conidia 15-20 x 2-3 µm; setulae 5-9 µm long	<i>C. britannica</i>
30. Conidia broader, 2-3.8 µm wide	31
31. Conidia 16-21 x 3-3.5 µm; setulae 5-7.5 µm long	<i>C. australensis</i>
31. Conidia (11-)15.5-21.5 x 2-3.8; setulae 7.3-9.5 long	<i>C. lithocarp</i>
32. Conidia with polar setulae only	33
32. Conidia with both polar and lateral setulae	34
33. Conidiophores 8-12-septate, 200-300 x 6-8 µm, terminated with a monophialidic conidiogenous cells; conidia fusiform, 14-16.5 x 2.8-3.5 µm; setulae 6-8 µm long	<i>C. puerensis</i>
33. Conidiophores up to 4-septate and 150 µm long, terminated with a monophialidic conidiogenous cells; conidia lunate, vermiform, 31-55 x 2.5-3.5 µm; setulae 1.5-4.6 µm long	<i>C. vermiform</i>
34. Conidia ellipsoidal to subglobose, 15-16 x 15-16 µm; setulae numerous, 1-1.5 µm long	<i>C. dwaya</i>
34. Conidia with less than 5 setulae	35
35. Conidiogenous cells polyphialidic, with sympodial proliferation, 15-20 x 6-7 µm; conidia ellipsoidal, slightly papillate at the apex, 13-15 x 8-10 µm; setulae one at the apex and 2 setulae in the middle part of the conidial body, 5-10 µm long	<i>C. trisetula</i>
35. Conidiogenous cells monophialidic, with a broad sporulating loci and collarette, 22-35 x 5-6 µm; collarette funnel-shaped, up to 5 µm wide, 2-2.5 µm deep; conidia globose to subglobose, 8-11 x 6.5-7.5 µm, with one apical and 2 lateral setulae appendages of 2-3 µm long	<i>C. pyriformis</i>

Codinaea assamica (Agnihotr.) S. Hughes & W.B. Kendr., New Zealand J. Bot. 6: 334, 1968.

≡ *Menispora assamica* Agnihotr., Proc. Indian Acad. Sci. 56: 99, 1962.

≡ *Dictyochoeta assamica* (Agnihotr.) Aramb., Cabello & Mengasc., Darwiniana 28: 297, 1988.

= *Codinaea acaciae* Crous & M.J. Wingf., Persoonia 34: 181, 2015.

Saprobe on dead leaves and fruit. Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-3 µm wide. Teleomorph: Not observed. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, up to 250 µm long, 6-8 µm wide above the swollen base, tapering gradually towards the rounded apex, 12-18-septate, dark brown in the lower part, becoming paler towards the rounded apex. Conidiophores macronematous, mononematous, simple, crowded, up to 5 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 3-4-septate, thin- and smooth-walled, 50-80 x 3-3.5 µm. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 20-25 x 3.5-4 µm, pale brown, thin-walled, collarette funnel-shaped, around 3-3.5 µm wide, 1.5-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 12-14 x 2.2-2.5 µm, aseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 7-9 µm long.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of ?*Smilax* sp., Oct. 9 1998, W.P. Wu (Wu2083b); China: Ningxia Province, Shiwandashan, on dead leaves of palm, 31 Dec. 1997, W.P. Wu (Wu1574a).

Ecology/Substrate/Host: Saprobe on decaying woody plant material including wood, rood, leaf litter, petioles etc..

Geographical distribution: Argentina, Brazil, Brunei Darussalam, China, Cuba, England, India, Malaysia, Mexico.

Description and illustration: Agnihotrudu (1962); Hughes and Kendrick (1968); Hyde and Goh (1999); Réblová et al. (2021e).

Notes: *Codinaea assamica* (Agnihotr.) S. Hughes & W.B. Kendr. is characterized by presence of basal stroma, clustered conidiophores and sterile or fertile setae, polyphialidic conidiogenous cells, falcate and aseptate conidia

bearing one setula at each end (Hughes and Kendrick 1968; Ellis 1976; Reddy and Reddy 1977; Whitton et al. 2000; Arias et al. 2018; Réblová et al. 2021e). It resembles *C. britannica*, *C. paniculata*, *C. plovercovensis*, *C. siamensis* and *C. terminalis*, but can be distinguished by size of conidiophores, conidia and setulae (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991b, d, e, f; Whitton et al. 2000; Liu et al. 2016).

Codinaea brachysetula (Y.L. Jiang & T.Y. Zhang) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841686.
≡ *Dictyochaeta brachysetula* Y.L. Jiang & T.Y. Zhang, Mycotaxon 131: 387, 2016.

Setae straight or curved, pale brown to brown, paler and almost always fertile towards the apex where there are persistent collarettes, smooth, up to 380 µm long, 2.5–4.5 µm thick. Conidiophores solitary or in small groups often associated with setae, rather closely septate, pale brown to brown, smooth, up to 150 µm long, 2.5–4 µm thick, polyphialidic; collarettes funnel-shaped with thick walls. Conidia fusiform, curved, hyaline, smooth, aseptate, 7–15 × 2.5–4 µm, with a setula not more than 5 µm long at each end or sometimes only at the apical end.

Typification: China: Sichuan Province, Luding County, isolated from soil sample, 24 June 2006, Y.L. Jiang (HMAS196298, isotype).

Ecology/Substrate/Host: Saprobe, isolated from soil.

Geographical distribution: China.

Description and illustration: Jiang et al. (2016).

Notes: The isotype material of *Dictyochaeta brachysetula* Y.L. Jiang & T.Y. Zhang, preserved in HMAS, was examined. It is most similar with *D. assamica* (Agnihotth.) Aramb., *D. fertilis* (S. Hughes & W.B. Kendr.) Hol.-Jech., *D. gamundiae* Aramb. & Cabello and *D. plovercovensis* Goh & K.D. Hyde, but differs from these species by its broader conidia (7–15 × 2.5–4 µm) (Kuthubutheen and Nawawi 1991a; Holubová-Jechová 1984; Arambarri et al. 1987; Whitton et al. 2000).

Codinaea britannica M.B. Ellis, More Dematiaceous Hyphomycetes: 472, 1976.

≡ *Dictyochaeta britannica* (M.B. Ellis) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3.5–4.5 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, up to 200 µm long, 6–9 µm wide above the swollen base, up to 10 µm wide at the swollen base, tapering gradually towards the rounded apex, 5–8-septate, dark brown, apex acute and sterile. Conidiophores macronematous, mononematous, simple, crowded, up to 5 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 1–2-septate, smooth-walled, 30–60 × 3–5 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 10–20 × 4–5 µm, pale brown, thin-walled, collarette funnel-shaped, 2.5–3 µm wide, 1.5–2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 15–20 × 2–3 µm, aseptate, hyaline, smooth, apex acute, base rounded, with one setula of 5–9 µm at each end.

Material examined: China: Yunnan Province, Kunming, Kunming Botanical Garden, on dead leaves of undetermined tree, 25 Nov. 1995, W.P. Wu (Wu952a); UK: Perthshire, Loch Clunie, on dead stems of *Filipendula ulmaria*, Nov. 1953, M.B. Ellis (Holotype IMI 54365).

Ecology/Substrate/Host: Saprobe on dead leaves.

Geographical distribution: China, Brazil, Kenya, UK.

Description and illustration: Ellis (1976); Kirk (1985); Cruz et al. (2008).

Notes: For comparison, the holotype specimen IMI54365 of *Dictyochaeta britannica* was examined and the fungus from the Chinese collection fits well to *D. britannica*. Its occurrence on submerged wood in a stream was also reported from Hong Kong (Lu et al. 2001).

Codinaea clavatophora W.P. Wu & Y.Z. Diao, sp. nov., Fig. 53, MycoBank MB841556

Etymology: named after the clavate-shaped conidiophores.

Diagnosis: Setae 300–370 × 4–5 µm; Conidiophores 45–100 × 2.8–3.3 µm, with terminal polyphialidic conidiogenous cells bearing funnel-shaped collarette; Conidia falcate, fusiform, 11–15.5 × 2.5–3 µm, setulae 5–9.5 µm long.

Typification: China: Hubei Province, Shennongjia, on dead leaves of unidentified tree, 12 Sept 2004, W.P. Wu (Holotype WFH Wu8015; ex-type strain CGMCC 3.20792 = NN 47943).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2–5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores 3–5 in cluster arising from basal stroma; stroma 20–30 µm diam, formed by irregular, dark brown, thick-walled cells, with 1 long setae in the middle and several conidiophores which are shorter than fertile setae. Setae straight, single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, with a basal cell up to 13 µm wide, 300–370 µm long, 4–5 µm wide, tapering gradually towards the apex, multi-septate, dark brown to black, becoming paler towards the apex, terminated with a fertile conidiogenous cell. Conidiophores macronematous, mononematous, simple, in

cluster, up to 5 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, cylindrical, 3-4 septate, wall thick and smooth, 45-100 x 3.8-3.3 μm . Conidiogenous cells integrated, terminal, polyphialidic, clavate, 20-25 x 3.5-5 μm , pale brown to brown, thin-walled, collarette funnel-shaped, 2-3 μm wide, 1.5-2 μm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, fusiform, curved, 11-15.5 x 2.5-3 μm , aseptate, hyaline, smooth, apex acute to rounded, with one setulae at each end, 5-9.5 μm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Hubei Province, Shennongjia, on dead leaves of unidentified tree, 12 Sept 2004, W.P. Wu (Holotype WFH Wu8015). Living strain: ex-type strain NN 47943.

Ecology/Substrate/Host: Saprobies on dead leaves.

Geographical distribution: China.

Notes: *Codinaea clavatophora* resembles *C. oxenbollii* W.P. Wu & Y.Z. Diao in producing setae, clustered conidiophores with setae, polyphialidic conidiogenous cells and fusiform conidia with one setulae at each end, but differs from it by broader conidia with slightly longer setulae in the former species. In addition, their ITS sequences are also different.

***Codinaea dinghushanensis* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 54-56, MycoBank MB841557.**

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Similar to *Codinaea pakhalensis*, *Dictyochoeta siamensis* and *D. plovercovensis*, but differs in smaller conidial size (11-13 x 2-2.5 μm) and shorter setulae (4-6 μm long).

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of *Smilax* sp., 5 March 2012, W.P. Wu (Holotype WFH Wu12155; ex-type strain CGMCC 3.20647 (=NN 54218)).

Saprobe on dead leaves. Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-5 μm wide. Teleomorph: Not observed. Anamorph: Setae straight, arising mostly single, erect, straight, or flexuous, cylindrical, smooth- and thick-walled, 150-200 μm long, 5-6.5 μm wide, tapering gradually towards the apex, up to 10-septate, dark brown, becoming paler towards the apex, terminated with a fertile conidiogenous cell. Conidiophores 4-8 in cluster arising from basal stroma formed by irregular, dark brown, thick-walled cells, with 1 long setae in the middle and 4-5 conidiophores which are shorter than fertile setae. Conidiophores macronematous, mononematous, simple, in cluster, up to 8 around the base of setae, erect, straight or slightly flexuous, brown in the basal part, becoming paler towards the apex, cylindrical to clavate, 3-5-septate, wall thick and slightly verruculose, 50-80 x 2.5-4 μm . Conidiogenous cells integrated, terminal, monophialidic or rarely polyphialidic, cylindrical to clavate, 30-50 x 3-4 μm , pale brown, thin-walled, collarette funnel-shaped, 2-3 μm wide, 1.5-2 μm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, 11-13 x 2-2.5 μm , aseptate, hyaline, smooth, apex acute to rounded, base slightly truncate to rounded, with one setula at each end, 4-6 μm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of *Smilax* sp., 5 March 2012, W.P. Wu (Wu12155, holotype); China: Guangdong, Guangzhou, South China Agriculture University, on dead leaves of *Acacia* sp., 3 Dec. 2018, W.P. Wu (Wu16380); China: Guangdong Province, Shenzhen, Lianhuashan Park, on rotten seed of *Bombax ceiba*, 18 Oct. 2020, W.P. Wu (Wu17442); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Macadamia ternifolia*, 4 March 2012, W.P. Wu (Wu12317); China: Guangdong Province, Guangzhou, Baiyunshan, on dead seed pod of unidentified *Leguminosae*, 5 March 2012, W.P. Wu (Wu12043); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 4 March 2012, W.P. Wu (Wu12301); China: Guangdong, Guangzhou, South China Botanical Garden, 2 Dec. 2018, W.P. Wu (Wu16230); dead fruit of unidentified tree, China, Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16234, Wu16321); China, Guangdong, Guangzhou, on dead leaves of unidentified tree 10 Dec. 2013, W.P. Wu (Wu12660, Wu16230a1); China, Guangdong, Guangzhou, on dead leaves of unidentified tree 10 Dec. 2013, W.P. Wu (Wu12610); China, Guangdong, Shenzhen, Lianhuashan Park, on rotten wood, 11 Nov. 2019, W.P. Wu (Wu17112, Wu17114); On rotten wood, China: Guangxi Province, Nanning, Qingxiushan, 12 Nov. 2013, W.P. Wu (Wu13131); China: Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, on dead leaves of palm, 15 Nov 2013, W.P. Wu (Wu13066); China: Yunnan Province, Xishangbanna, on dead leaves of unidentified tree, 12 June 2018, Yu Zhang (Wu15156). Living strain: 54216 (from Wu12043), ex-type strain CGMCC 3.20647 (=NN 54218) (from Wu12155), 54323 (from Wu12301), 54384 (from Wu12317), 57445 (from Wu13131), 57442 (from Wu13066), 57618 (from Wu12610), 57682 and 57683 (from Wu12660), 75990 (from Wu15156), 75990 (from Wu15156), 76569 (from Wu16234), 76638 (from Wu16230), 76648 (from Wu16321), 76743 and 76756 (from Wu16380), 77521 and 77552 (from Wu17114), 77646 and 77649 (from Wu17112), 78212 and 78213 (from Wu17442).

Ecology/Substrate/Host: Saprobe on dead leaves of different plants including *Acacia* sp., *Macadamia ternifolia*, palm, and unidentified tree.

Geographical distribution: China.

Notes: *Codinaea dinghushanensis* W.P. Wu & Y.Z. Diao is characterized by associated conidiophores and fertile setae formed from basal stroma, monophialidic or polyphialidic conidiogenous cells, and hyaline, aseptate conidia (11-13 x 2-2.5 µm) with one 4-6 µm long setula at each end. Among the *Codinaea* and *Dictyochaeta* species with clustered conidiophores and fertile setae, several species produce aseptate conidia with setulae at both ends and they are *Codinaea fertilis* S. Hughes & W.B. Kendr., *C. pakhalensis* S.M. Reddy & S.S. Reddy, *Dictyochaeta plovercovensis* Goh & K.D. Hyde and *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu (Kuthubutheen and Nawawi 1991b, d, e, f; Goh and Hyde 2000; Whitton et al., 2000; Liu et al. 2016). *C. pakhalensis* (conidia 16.5-18 x 3.5-4.5 µm, setulae up to 9 µm long), *D. siamensis* (conidia 15.5-21 x 2.5-4 µm, setulae 7-12 µm long) and *D. plovercovensis* (conidia 13-15 x 1.5-2 µm, setulae 8-9 µm long) produce significant longer conidia with longer setulae than those in *D. dinghushanense*. Compared to *D. dinghushanense*, *C. fertilis* (conidia 9-15.3 x 2-3 µm, setulae 5-10 µm long) has larger conidia with longer setulae and polyphialidic conidiogenous cells with up to 10 conspicuous collarettes. The ITS sequences were obtained from many different strains and they are almost identical.

Codinaea dwaya (Subram. & Bhat) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 32, 2021.

≡ *Bahusutrabeeja dwaya* Subram. & Bhat, Can. J. Bot. 55: 2204, 1977.

Saprobe on dead branches and rotten wood. Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, simple or occasionally branched, erect, dark brown, septate, smooth- and thick-walled. Conidiogenous cells integrated, terminal, phialidic, cylindrical, with a broad sporulating loci and collarette, proliferating percurrently through the collarette. Conidia holoblastic, acrogenous, solitary, globose to subglobose, aseptate, hyaline, smooth, 12-14 µm diam, with up to 13 slender appendages of up to 6 µm long distributed over the surface, accumulating in a slime head at the tips of the conidiogenous cells.

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1853b); China: Guangxi Province, on rotten wood submerged in a stream, 23 Dec. 1997, Wu W.P. (Wu2102c); China: Jilin Province, Changbaishan, on rotten wood of *Betula* sp., 5 Sept. 1998, W.P. Wu (Wu1872a); China: Yunnan Province, Xishuangbanna, on rotten wood, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2908c). Living strain: 44655 (from Wu1853b), 44641 (from Wu1872a).

Ecology/substrate/host: Saprobe on dead branch and rotten wood of tree, including *Betula* sp.

Geographical distribution: China, India, Malaysia.

Description and illustration: Subramanian and Bhat (1977); Chang (1992); Kuthubutheen et al. (1992); Tsui et al. (2001); Wu and McKenzie (2003); Réblová et al. (2021e).

Notes: *Bahusutrabeeja dwaya* Subraman., is characterized by monophialidic conidiogenous cells with a single broad collarette, globose or slightly ellipsoidal conidia with several setulae (Subramanian and Bhat 1977). It differs from other relevant species by conidial size, and number of conidial setulae. This fungus has been well documented from different substrates and geography (Subramanian and Bhat 1977; Chang 1992; Kuthubutheen et al. 1992; Tsui et al. 2001a; Wu and McKenzie 2003; Bhat et al. 2010; Réblová et al. 2021e). Its occurrences on decaying twigs and submerged wood in Hong Kong in Taiwan were reported by Chang (1990) and Tsui et al. (2001) respectively. Much larger conidia (15-18 µm diam.) were recorded from the collection in Taiwan (Chang 1990).

Phylogenetically *Bahusutrabeeja dwaya* Subram. & Bhat, the type species of the genus *Bahusutrabeeja*, is clustered together with other *Codinaea* species and thus transferred into *Codinaea* (Bhat et al. 2010; Lin et al. 2019; Réblová et al. 2021e). Reclassification is needed for the six remaining species under the genus, including *B. angularis* V.G. Rao & de Hoog, *B. bunyensis* McKenzie, *B. dwaya* Subram. & Bhat, *B. dubhashii* Bhat, *B. exappendagiculata* Xiao X. Li & X.G. Zhang, *B. globosa* Bhat & W.B. Kendr. and *B. manoharacharii* Pratibha & Bhat (Subramanian and Bhat 1977; Rao and de Hoog 1986; Bhat and Kendrick 1993; Bhat 1994; McKenzie 1997; Pratibha and Bhat 2005; Réblová et al. 1999; Seifert et al. 2011; Li et al. 2013; Li et al. 2014; Gao et al. 2015). Under the genus *Bahusutrabeeja*, three species, *B. angularis*, *B. dwaya* and *B. exappendagiculata*, were recently reported from China and they can be identified with the following key (Chang 1990; Wu and McKenzie 2003; Li et al. 2014; Gao et al. 2015).

Codinaea ellipsoidea (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 33, 2021.

≡ *Dictyochaeta ellipsoidea* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99: 593, 2019.

Saprobic on submerged decaying wood. Teleomorph: Unknown. Anamorph: Conidiophores 254–288 µm long, 8–10 µm wide, septate, unbranched, erect, flexuous, dark brown below, pale towards apex, smooth, percurrently proliferating. Conidiogenous cells monophialidic, confined to apical region on conidiophore, with conspicuous, flared, funnel-shaped collarette. Conidia 13–15 x 5.5–6.5 µm wide, acrogenous, ellipsoid, solitary, aggregating in a globose mucoid mass, curved, slightly pointed at both ends, with polar appendage, aseptate, guttulate, often accumulating at tip of phialide, hyaline, smooth-walled.

Typification: China: Yunnan Province, Nujiang River, saprobic on submerged decaying wood, October 2016, Z.L. Luo, S-898 (MFLU 18–1612, holotype), ex-type living culture MFLUCC 18–1574.

Ecology/substrate/host: Saprobe on submerged decaying wood.

Geographical distribution: China.

Description and illustration: Luo et al. (2019).

Notes: *Dictyochaeta ellipsoidea* Z.L. Luo, K.D. Hyde & H.Y. Su is a recently described species with long conidiophores and broad conidia (Luo et al. 2019). In absence of setae, the species is an exception in *Codinaea*. However, it is phylogenetically clustered together with other *Codinaea* species. It mostly resembles *D. tropicalis* Bhat & W.B. Kendr. and *D. multisetula* Whitton, McKenzie & K.D. Hyde in absence of setae, monophialidic and terminal conidiogenous cells with funnel-shaped collarette, and hyaline, aseptate, ellipsoid conidia with one setula at each end (Bhat and Kendrick 1993; Whitton et al. 2000; Luo et al. 2019). *C. ellipsoidea* differs from *D. tropicalis* (conidiophores 90–130 µm long; conidia 7.5–9.5 x 3–5 µm) in having longer conidiophores and guttulate, larger conidia (Bhat and Kendrick 1993); differs from *D. multisetula* in multi-setulae at each end of conidium in *D. multisetula* (Whitton et al. 2000; Luo et al. 2019).

***Codinaea fanglanii* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 57–58, MycoBank MB841558**

Etymology: named after the former Chinese mycologist Fanglan Dai, who laid down the foundation for mycology in China.

Diagnosis: Similar to *Codinaea fertilis*, *C. pakhalensis*, *D. plovercovensis* and *D. siamensis*, but can be distinguished by a combination of morphological characters including setae, conidiophores, conidiogenous cells and conidia

Typification: China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Holotype Wu13345; ex-type strains CGMCC 3.20658 (=NN 58983)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2–3 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, crowded, arising mostly single, and surrounded by 2–5 conidiophores, smooth- and thick-walled, 170–200 µm long, 4.5–5 µm wide, tapering gradually towards the pointed apex, 7–9 septate, dark brown, becoming pale brown towards apex; basal cell dark brown and swollen, 8–10 µm wide; apex sterile and truncated or fertile with conidiogenous cells. Conidiophores macronematous, mononematous, simple, crowded, 2–5 around the base of 1 setae, erect, straight or slightly flexuous, pale brown to brown, becoming pale brown towards the apex, 4–6 septate, dark brown but becoming paler towards the apex, thin- and smooth-walled, 65–89 x 3–5 µm. Conidiogenous cells integrated, terminal, phialidic, polyblastic, with percurrent proliferation, cylindrical, 23–30 x 3–3.5 µm, pale brown, thin-walled, ending in a flared collarette which is funnel-shaped, 2–2.5 (–8.5) µm wide, 1.5–3 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, attenuated towards both ends, 15–16.5 x 2–2.5 µm, aseptate, hyaline, smooth, guttulate, with setulae at each end of the conidium, 9.5–12.5 µm long.

Colonies on PDA effuse, colonies 3–3.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Shan'Xi Province, Xi An, Hua Qing Chi, on dead leaves of bamboo, 1 July 2015, W.P. Wu (Wu13368); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Wu13345, holotype). Living strain: 59084 (from Wu13368), ex-type strain CGMCC 3.20658 (=58983) and 59025 (from Wu13345).

Ecology/substrate/host: Saprobe on submerged decaying leaf.

Geographical distribution: China.

Notes: *Codinaea fanglanii* W.P. Wu & Y.Z. Diao resembles several *Codinaea* and *Dictyochaeta* species with clustered conidiophores, fertile setae, and aseptate, setose conidia, including *C. fertilis* S. Hughes & W.B. Kendr., *C. pakhalensis* S.M. Reddy & S.S. Reddy, *D. plovercovensis* Goh & K.D. Hyde and *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu. They can be distinguished by a combination of morphological characters including setae, conidiophores, conidiogenous cells and conidia (Hughes and Kendrick 1968; Holubová-Jechová 1984; Kuthubutheen and Nawawi 1991b, d, e, f; Goh and Hyde 1999; Whitton et al. 2000; Liu et al. 2016). In *D. siamensis* (conidia 15.5–21 x 2.5–4 µm, setulae 7–12 µm long) and *C. pakhalensis* (conidia 16.5–18 x 3.5–4 µm, setulae up to 9 µm long), the conidia are significantly larger than those in *D. fanglanii*. In *D. fertilis* (conidia 9–15 x 2–3 µm, setulae 5–10 µm long) and *D. plovercovensis* (conidia 13–15 x 1.5–2 µm, setulae 8–9 µm long), the

conidia are slightly smaller and the conidiogenous cells are polyphialidic with several flared collarettes. The ITS sequences obtained from three strains are identical.

Codinaea fertilis S. Hughes & W.B. Kendr., N.Z. J. Bot. 6:347, 1968.

= *Dictyochoaeta fertilis* (S. Hughes & W.B. Kendr.) Hol.-Jech., Folia Geobot. Phytotax. 19:387, 1984.

Setae 155-385 μm long, 4.5-7 μm wide towards the base, 3.5-5 μm wide at the apex, 10-20 septate, up to 15 successive sympodial proliferations. Conidiophores 54-170 μm long, 3-5 μm wide towards the base, 6-11 septate. Conidia 9-15 x 2.2-3 μm . Setulae up to 9 μm long.

Ecology/substrate/host: Saprobies on decaying leaves and branches.

Geographical distribution: broadly distributed in Africa, Australasia, Europe, South and North America, and Southeast Asia, including Brazil, Brunei, Canada, China, Czech Republic, Ivory Coast, Malaysia, Mexico, New Zealand, The Netherlands, Philippine, Slovak Republic, UK and USA.

Description and illustration: Hughes and Kendrick (1968); Ellis (1971); Holubová-Jechová (1984); Kuthubutheen and Nawawi (1991); Heredia et al. (2000); Whitton et al. (2000); Réblová et al. (2021e).

Notes: *Codinaea fertilis* was reported on decaying leaves of *Pandanus tectorius* from Hongkong (Whitton et al. 2000).

Codinaea gonytrichoides Shearer & J.L. Crane, Mycologia 63: 245, 1971.

≡ *Codinaeopsis gonytrichoides* (Shearer & J.L. Crane) Morgan-Jones, Mycotaxon 4: 167, 1976.

≡ *Dictyochoaeta gonytrichoides* (Shearer & J.L. Crane) Kuthub. & Nawawi, Mycol. Res. 94: 845, 1990.

≡ *Dictyochoetopsis gonytrichoides* (Shearer & J.L. Crane) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 156, 2000.

Colony effuse, whitish or cream to brown. Mycelium partly superficial and partly immersed, composed of branched, septate, pale brown to brown, smooth, thick-walled hyphae, 2-4 μm wide, from which conidiophores are formed. Teleomorph: Unknown. Anamorph: Setae scattered or gregarious in large group, erect, straight or slightly curved, dark brown, paler towards the very pale brown apex, dark brown towards the base, smooth, thick-walled, 15-20 septate, 230-470 x 5-7 μm ; apical cell sterile and rounded, up to 2 μm wide; basal cell thick-walled, swollen, up to 12 μm wide. Conidiophores macronematous, mononematous, arising from encircling hyphae formed right below each septum in the lower 2/3 part of the setae, consisting of short lateral branches from the setae or short phialides from the superficial hyphae, 0-1 septate, 2-3 in clusters. Conidiogenous cells enteroblastic, monophialidic, discrete, borne terminally and laterally on encircling hyphae, pale brown, smooth, thin-walled, cylindrical to lageniform, tapered to the apex, apex narrow with a funnel-shaped collarette, 12-20 x 3-4 μm , collarette up to 1 μm high and 2-2.5 μm wide. Conidia aggregated into a moist, slimy mass at the apex of the conidiogenous cells, hyaline, aseptate, smooth, thin walled, typically curved, both ends attenuated, obtuse and with one setulae, 10-12 x 1-2.5 μm ; setula 7.5-8.5 μm long.

Material examined: China: Guangdong Province, Shenzhen, Lianhuashan Park, on rotten seed of *Liquidambar formosana*, 23 Nov 2019, W.P. Wu (Wu17140, 16795); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead seed of *Liquidambar formosana*, 25 Aug 2019, W.P. Wu (Wu16798); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead seed of *Cyclobalanopsis* sp., 25 Aug 2019, W.P. Wu (Wu16873, 16807); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead leaves of *Cyclobalanopsis* sp., 25 Aug 2019, W.P. Wu (Wu16844); China: Shanghai, Shanghai Botanical Garden, on dead leaves of unidentified tree, 22 May 2015, W.P. Wu (Wu13303); China: Sichuan Province, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17209); China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead fruit of *Diospyros kaki*, 16 Oct. 2019, W.P. Wu (Wu16985); China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead fruit of *Ficus* sp., 16 Oct. 2019, W.P. Wu (Wu16995); China: Zhejiang Province, Huaan County, Qiandaohu, on dead leaves of *Camellia japonica*, 18 Oct. 2018, W.P. Wu (Wu16031); China: Zhejiang Province, Huaan County, Qiandaohu, on rotten cone of *Pinus* sp., 18 Oct. 2018, W.P. Wu (Wu16154); China: Zhejiang Province, Huaan County, Qiandaohu, on dead leaves of *Platanus occidentalis*, 18 Oct. 2018, W.P. Wu (Wu16019); China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead fruit of *Platanus* sp., 16 Oct. 2019, W.P. Wu (Wu17014); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, June 12 2015, W.P. Wu (Wu13332a,b, Wu13333a,b); China: Zhejiang Province, Huaan County, Qiandaohu, on rotten seed of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16077); China: Zhejiang Province, Huaan County, Qiandaohu, on rotten wood, 18 Oct. 2018, W.P. Wu (Wu16086); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on rotten fruit of unidentified tree, 3 Oct 2019, W.P. Wu (Wu16902). Living strain: 59068 (13332a); 58996 (13332b), 58995 (13333a), 58994 (13333b), 77536 (from Wu17140), 77568 (from Wu17209), 59069 (from Wu13303), 76202 and 76203 (from Wu16019), 76206 (from Wu16031), 76213 and 76214 (from Wu16077), 76319 and 76320 (from Wu16086), 76342 and 76343 (from Wu16154), 77113 and 77114 (from Wu16795), 77116 (from Wu16798), 77117 and 77118 (from Wu16807), 77126 and 77127 (from Wu16844), 77208 (from Wu16873), 77364 (from Wu16985), 77370 and 77299 (from Wu16995), 77313 (from Wu16902), 77337 (from Wu17014).

Ecology/Substrate/Host: Saprobies on dead leaves, seed of different plants, including *Camellia japonica*, *Cyclobalanopsis* sp., *Diospyros kaki*, *Ficus* sp., *Liquidambar formosana*, *Platanus occidentalis*, *Pinus* sp.

Geographical distribution: China, Japan, North America, and many other countries.

Description and illustration: Shearer and Crane (1971); Morgan-Jones (1976); Kuthubutheen and Nawawi (1990); Whitton et al. (2000); Réblová et al. (2021).

Notes: *Codinaea gonytrichoides* Shearer & J.L. Crane differs from other species in the genus by exhibiting *Gonytrichum*-like arrangement of conidiogenous cells on short collar hyphae which encircle a central setose at intervals and hyaline, aseptate, allantoid-shaped conidia bearing a single setula at each end (Shearer and Crane 1971; Pirozynski and Patil 1970; Morgan-Jones 1976; Whitten et al. 2000; Seifert et al. 2011). This species seems to be a rather broadly distributed species and has been found on dead leaves, fruit, seed, wood, stem etc of many plants in the world. Its occurrence in Taiwan was also recorded.

Under the *Codinaeopsis* and *Dictyochaetopsis*, two genera with setiform and branched conidiophores, there is 17 species and revision based on molecular phylogeny is needed in future (Réblová et al. 2021e). These 17 species (including two invalidly published ones) are known with branched conidiophores and/or lateral phialides and setose or non-setose conidia, and most of them are now assigned to the genus *Dictyochaetopsis* Aramb. & Cabello, including 5 species with non-setose conidia (*Dictyochaetopsis antillana* (R.F. Castañeda) Whitton, McKenzie & K.D. Hyde, *D. apicalis* (Berk. & M.A. Curtis) Aramb. & Cabello, *D. glauconigra* (Cooke & Ellis) Aramb. & Cabello, *D. hamata* (Kuthub. & Nawawi) Whitton, McKenzie & K.D. Hyde and *C. maharashtrensis* (Piroz. & S.D. Patil) Aramb. & Cabello) and 12 species with setose conidia (*Dictyochaetopsis brasiliensis* M. Caldusch, Gené, Stchigel & Guarro, *D. dingleyae* Aramb. & Cabello (invalid), *D. elegantissima* (Lunghini) Aramb. & Cabello, *C. filamentosa* (Onofri) Aramb. & Cabello, *C. gonytrichodes* (Shearer & J.L. Crane) Whitton, McKenzie & K.D. Hyde, *D. intermedia* (Rambelli) Aramb. & Cabello, *D. menisporoides* (Hol.-Jech.) Aramb. & Cabello, *D. pahangensis* (Kuthub. & Nawawi) Whitton, McKenzie & K.D. Hyde, *D. polysetosa* R.F. Castañeda, Gusmão, Guarro & Saikawa, *Codinaea sinensis* D.W. Li, W.B. Kendr. & Jingyuan Chen, *Dictyochaeta santa-barbarensis* J.S. Monteiro, R.F. Castañeda & Gusmão (invalid), *Menispora amazoneis* Matsush. (Whitton et al. 2000). Including more species in future phylogenetic analysis by isolating the living strains from fresh specimens will be required to elucidate their generic delimitation and phylogenetic relationship (Morgan-Jones 1976; Arambarri and Cabello 1989; Seifert et al. 2011; Whitton et al. 2000; Caldusch et al. 2002b; Castañeda-Ruiz et al. 2008; Li et al. 2011a, b).

Codinaea kendrickii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 59-60, MycoBank MB841559

Etymology: Named after the mycologist B.W. Kendrick.

Diagnosis: Setae fertile, 180-235 x 4-6 µm; Conidiophores 55-110 x 4-5 µm, with mono- or polyphialidic terminal conidiogenous cells bearing funnel-shaped collarette; Conidia falcate, fusiform, 13-15 x 2-2.8 µm, setulae 8-12 µm long.

Typification: China: Sichuan Province, Ya An, Yucheng, Bifengxia, on dead leaf sheath of bamboo, 15 Dec. 2013, W.P. Wu (Holotype WFH Wu13208; ex-type strain CGMCC 3.20718 = NN 57551);

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2.5-3.5 µm wide. Basal stroma dark brown, composed of several irregular, thick-walled cells, 20-30 µm side, from which the setae and conidiophores formed. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, 180-235 µm long, 4-6 µm wide above the swollen base, 8-11-septate, dark brown in the lower part, becoming paler towards the apex; apical cells fertile, cylindrical, pale brown, thin- and smooth-walled, mono- or poly-phialidic, often with proliferations, 25-30 x 3.5-4.5 µm, with a conspicuous funnel-shaped collarette of 2-3.5 µm wide and up to 1.5 µm deep. Conidiophores macronematous, mononematous, simple, crowded, 4-6 in clusters around the base of 1 setae, formed from basal stroma, erect, straight or slightly flexuous, brown in the basal part, becoming paler towards the apex, 3-5-septate, thin- and smooth-walled, 55-110 x 3-5 µm. Conidiogenous cells integrated, terminal, mono- or poly-phialidic, with percurrent proliferations, cylindrical, 18-25 x 3-4 µm, pale brown, thin-walled, up to 3 funnel-shaped collarettes; collarette 2-3 µm wide, 1.5-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, hyaline, smooth, curved, aseptate, slightly asymmetrical, bluntly pointed at the basal part and proximally somewhat tapered with a well-marked scar, apex rounded, (12-) 13-15 x 2-2.8 µm, with one setulae at each end and (6-) 8-12 µm long.

Colonies on PDA effuse, colonies up to 1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, yellow to light brown, reverse pale brown to brown.

Material examined: China: Sichuan Province, Ya An, Yucheng, Bifengxia, on dead leaf sheath of bamboo, 15 Dec. 2013, W.P. Wu (Holotype WFH Wu13208); China: Sichuan Province, Ya An, Yucheng, Bifengxia Zhen, on dead leaf sheath of bamboo, 15 Dec. 2013, W.P. Wu (Wu13253); China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on dead fruit of *Quercus* sp., 15 Oct. 2003, W.P. Wu (Wu7244a); . Living strain: 47741 (from Wu7244a), 57551 (from Wu13208), 57560 (from Wu13253).

Ecology/Substrate/Host: Saprobe on decaying leaves of plant, including bamboo and *Quercus* sp.

Geographical distribution: China.

Notes: *Codinaea kendrickii* W.P. Wu & Y.Z. Diao differs from all known species in the genus *Codinaea* and *Dictyochaeta* by its fertile setae, mono- or poly-phialidic conidiogenous cells, aseptate and smaller conidia with setulae at each end. Morphologically *C. kendrickii* resembles *C. dinghushanensis*, *C. fertilis*, *C. pakhalensis* S, *D. plovercovensis* and *D. siamensis*, in fertile setae, aseptate conidia with one setula at each end (Hughes and Kendrick 1968; Matsushima 1971; Holubová-Jechová 1984; Kuthubutheen 1987, 1991; Kuthubutheen and Nawawi 1991b, d, e, f; Goh and Hyde 1999; Whitton et al. 2000; Liu et al. 2016). *C. pakhalensis* (conidia 16.5-18 x 3.5-4.5 µm, setulae up to 9 µm long) and *D. siamensis* (conidia 15.5-21 x 2.5-4 µm, setulae 7-12 µm long) produce significant larger conidia than *C. kendrickii*. In *C. fertilis* (conidia 9-15.3 x 2-3 µm, setulae 5-10 µm long), *C. dinghushanensis* (conidia 11-13 x 2-2.5 µm, setulae 4-6 µm long) and *D. plovercovensis* (conidia 13-15 x 1.5-2 µm, setulae 8-9 µm long), the conidia are slightly smaller and with shorter setulae than those in *C. kendrickii*. *C. assamica* produces similar-shaped and sized conidia as in *C. kendrickii* but has sterile setae with blunted apical cells.

Codinaea latispora W.P. Wu & Y.Z. Diao, sp. nov., Figs. 61-62, MycoBank MB841560

Etymology: refers to its broad conidia.

Diagnosis: Setae fertile, 130-215 x 4-6 µm; Conidiophores 30-85 x 3.5-5 µm, with polyphialidic terminal conidiogenous cells bearing funnel-shaped collarette; Conidia falcate, fusiform, 11-13 x 2.5-3 µm, setulae 6-12 µm long.

Typification: China: Zhejiang, Deqing, Moganshan, Luhadang, on dead culm of bamboo, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu17038; ex-type strain CGMCC 3.20739 = NN 77341).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2.5-3.5 µm wide. Basal stroma dark brown, composed of several irregular, thick-walled cells, 20-30 µm side, from which the setae and conidiophores formed. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, 130-215 µm long, 4-6 µm wide above the swollen base, 8-11-septate, dark brown in the lower part, becoming paler towards the apex; apical cells fertile, cylindrical, pale brown, thin- and smooth-walled, poly-phialidic, often with percurrent proliferations, 22-30 x 4-6 µm, with a conspicuous funnel-shaped collarette of 3-3.5 µm wide and up to 1-2 µm deep. Conidiophores macronematous, mononematous, simple, crowded, 4-6 in clusters around the base of 1 setae, formed from basal stroma, erect, straight or slightly flexuous, brown in the basal part, becoming paler towards the apex, (1-) 3-5-septate, thin- and smooth-walled, 30-85 x 3.5-5 µm. Conidiogenous cells integrated, terminal, poly-phialidic, with percurrent proliferations, cylindrical, 20-25 x 4-4.6 µm, pale brown, thin-walled, up to 4 funnel-shaped collarettes; collarette 2.5-3.5 µm wide, 1-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, hyaline, smooth, curved, aseptate, slightly symmetrical, bluntly pointed at the basal part and proximally somewhat tapered with a well-marked scar, apex rounded, 11-13 x 2.5-3.5 µm, with one setulae at each end and 6-12 µm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, white to pale brown, with pale colored margin, reverse pale-yellow brown.

Material examined: China: Zhejiang, Deqing, Moganshan, Luhadang, on dead culm of bamboo, 16 Oct. 2019, W.P. Wu (Wu17037, Wu17038). Living strain: ex-type strain 77341 (from Wu17038), 77382 and 77340 (from Wu17037).

Ecology/Substrate/Host: Saprobe on dead leaf sheath of bamboo.

Geographical distribution: China.

Notes: *Codinaea latispora* W.P. Wu & Y.Z. Diao differs from all known species in the genus *Codinaea* and *Dictyochaeta* by its fertile setae, mono- or poly-phialidic conidiogenous cells, aseptate and shorter but broader conidia with relatively longer setulae at each end. *C. parassamica* is only known on dead culm of bamboo.

Codinaea lignicola (Z.L. Luo, H.Y. Su & K.D. Hyde) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 39, 2021.

≡ *Dictyochaeta lignicola* Z.L. Luo, H.Y. Su & K.D. Hyde, Fung. Div. 99: 595, 2019.

Saprobic on submerged decaying wood. Colonies on natural substrate, effuse, superficial, hairy, greyish brown, in groups. Mycelium immersed, composed of branched septate, smooth hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, dark brown, straight or flexuous, 8-11-septate, smooth, thick-walled at the base, becoming paler and thin-walled towards the upper part, fertile at the apex, 240-315 x 4.5-6 µm. Conidiophores 3-6 in clusters with one setae, macronematous, mononematous, solitary, cylindrical, erect, straight, or slightly flexuous, unbranched, mid brown at the lower part, becoming paler towards the apex, 45-105 x 2.3-5 µm, terminated with polyphialidic conidiogenous cell. wide septate, brown, becoming pale brown towards the apex, smooth. Conidiogenous cells poly-phialidic, determinate, terminal, subhyaline, 25-30 x 5-6 µm, with funnel-shaped collarettes. Conidia 12-13.7 x 3-3.5 µm, solitary, guttulate, aggregating in a globose mass at apex of conidiophore, aseptate, navicular to fusiform, curved, no appendages observed, hyaline, smooth-walled.

Material examined: China: Hunan Province, Zhangjiajie, on decaying wood, Sept 2000, W.P. Wu (Wu4527c). Living strain: 46470.

Ecology/substrate/host: Saprobe on submerged decaying wood.

Geographical distribution: China.

Description and illustration: Luo et al. (2019).

Notes: *Codinaea lignicola* is a recently described species from submerged wood in China. It resembles *D. renispora* Whitton, McKenzie & K.D. Hyde in absence of setae, long cylindrical conidiophore with monophialidic conidiogenous cell, and hyaline, aseptate, setose conidia aggregating in a mucoid mass, but having longer conidiophores (204-276 vs. 95-220 µm) and polyphialidic conidiogenous cells, and larger conidia (13-15 x 4.5-5.5 vs. 6-8.5 x 3-4.5 µm) (Whitton et al. 2000; Lin et al. 2019; Luo et al. 2019).

Codinaea lithocarpi (R.H. Perera, E.B.G. Jones & K.D. Hyde) W.P. Wu & Y.Z. Diao, comb. nov. Mycobank MB841690

≡ *Dictyochoaeta lithocarpi* R.H. Perera, E.B.G. Jones & K.D. Hyde, Mycosphere 11: 2124, 2020.

Saprobe on dead leaves and fruit. Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-3 µm wide. Teleomorph: Not observed. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, (150-) 260-450 x 5-6.5 µm, 6-8 µm wide above the swollen base, tapering gradually towards the rounded apex, (5-)12-18-septate, dark brown in the lower part, becoming paler towards the rounded apex, sterile or fertile at the apex. Conidiophores macronematous, mononematous, simple, crowded, up to 5 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 3-8-septate, thin- and smooth-walled, 40-130 x 3-4 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 15-20 x 3.5-4 µm, pale brown, thin-walled, collarete funnel-shaped, 2.5-3.5 µm wide, 1.5-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, falcate, slightly curved, (11-) 13-16 x 2.2-2.5 µm, aseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 7-11 (-13) µm long.

Colonies on PDA effuse, colonies 2-3 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey to dark brown, reverse brown to dark brown.

Material examined: China: Guangdong Province, Dinghushan, on dead culm of *Arundo donax*, 9 Oct. 1998, W.P. Wu (Wu1888b); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of *Camellia* sp., 17 Oct 2020, W.P. Wu (Wu17510); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of unidentified tree, 17 Oct 2020, W.P. Wu (Wu17572, 17573, 17519); China: Guangxi Province, Shiwandashan, on dead leaves of palm, 31 Dec. 1997, W.P. Wu (Wu1574a); Living strain: 44671 (from Wu1888b), 78264 and 78265 (from Wu17510), 78272 and 78349 (from Wu17519), 78375 (from Wu17572).

Ecology/Substrate/Host: Saprobe on dead fruit of plants including *Camellia* sp., *Lithocarpus* sp. and palm, and dead culm of *Arundo donax*.

Geographical distribution: China, Thailand.

Description and illustration: Perera et al. (2020).

Notes: *Codinaea lithocarpi* was originally described on dead fruit of *Lithocarpus* sp. from Thailand. It resembles *D. pandanicola* and *D. assamica*, but differs from *D. pandanicola* by having smaller conidia (14-17 x 1.5-2.8 vs. 16-26 x 4-6 µm) and presence of setae; differs from *D. assamica* by the ITS sequences (Kuthubutheen and Nawawi 1991; Whitton et al. 2000; Cruz and Gusmão 2009; Tibpromma et al. 2018).

Codinaea minima W.P. Wu & Y.Z. Diao, sp. nov., Fig 63, MycoBank MB841561

Etymology: refers to its small conidia.

Diagnosis: Differs from all other species in very small sized conidia (6-8 x 1.5-2 µm).

Typification: China: Guangdong Province, Dinghushan, on dead stem of *Arundo donax*, 10 Oct. 1998, W.P. Wu (Holotype WFH Wu1942b).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2.5-4 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight, or flexuous, cylindrical, smooth- and thick-walled, up to 200 µm long, 3-4 µm wide above the swollen base, 6-8-septate, dark brown in the lower part, apex acute and sterile. Conidiophores macronematous, mononematous, simple, crowded, up to 3 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 2-4-septate, thin- and smooth-walled, 30-60 x 2-3 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 10-20 x 2.5-3.5 µm, pale brown, thin-walled, collarete funnel-shaped, 1.5-2 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 6-8 x 1.5-2 µm, aseptate, hyaline, smooth, both ends acute, with one setula at each end, 5-7 µm long.

Material examined: China: Guangdong Province, Dinghushan, on dead stem of *Arundo donax*, 10 Oct. 1998, W.P. Wu (Holotype WFH Wu1942b); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of bamboo, 2 Jan. 1997, W.P. Wu (Wu1266d). Living strain 43987.

Ecology/Substrate/Host: Saprobe on dead culm of *Arundo donax* and bamboo.

Geographical distribution: China.

Notes: *Codinaea minima* W.P. Wu & Y.Z. Diao differs from all known species in the genus *Codinaea* and *Dictyochaeta* by clustered conidiophores and sterile setae, monophialidic conidiogenous cells, and very smaller conidia with one setula at each end (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991b, d, e, f; Whitton et al. 2000; Liu et al. 2016; Lin et al. 219; Luo et al. 2019). No living strain was obtained.

***Codinaea oxenbolliae* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 64, MycoBank MB841562**

Etymology: named after the former mycologist and also senior leader of Novozymes A/S, Karen Oxenboll, who introduced the author Wu into Novozymes and also gave strong support to this work.

Diagnosis: Setae 230-300 x 4-5 µm; Conidiophores 60-110 x 2.5-3.5, with terminal polyphialidic conidiogenous cells bearing funnel-shaped collarette; Conidia falcate, fusiform, 13-15 x 2 µm, setulae 5-7 µm long.

Typification: China: Sichuan, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17179; ex-type strain CGMCC 3.20747 = NN 77595).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores 3-5 in cluster arising from basal stroma; stroma 20-30 µm diam, formed by irregular, dark brown, thick-walled cells, with 1 long setae in the middle and several conidiophores which are shorter than fertile setae. Setae straight, single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, with a basal cell up to 13 µm wide, 230-300 µm long, 4-5 µm wide, tapering gradually towards the apex, multi-septate, dark brown to black, becoming paler towards the apex, terminated with a fertile conidiogenous cell. Conidiophores macronematous, mononematous, simple, in cluster, up to 5 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, cylindrical, 4-7 septate, wall thick and slightly verruculose, 60-110 x 2.5-3.5 µm. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical to clavate, 25-32 x 4-5 µm, pale brown to brown, thin-walled, collarette funnel-shaped, 2-3 µm wide, 1.5-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, fusiform, curved, 13-15 x 2-2.5 µm, aseptate, hyaline, smooth, apex acute to rounded, with one setulae at each end, 5-8 µm long.

Colonies on PDA effuse, colonies up to 1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Hubei Province, Shennongjia, on dead leaves of unidentified tree, 12 Sept. 2004, W.P. Wu (Wu8269b); China: Sichuan, Chengdu, Qingchengshan, 9 Nov. 2019, on dead leaves of unidentified tree, W.P. Wu (Wu17179, Wu17183, Wu17185, Wu17183). Living strain: CGMCC 3.20643 (=50631) (from Wu8269b), 77595 (from Wu17179), 77598 (from Wu17183), 77599 (from Wu17185) and 77600 (from Wu17187).

Ecology/Substrate/Host: Saprobes on dead leaves.

Geographical distribution: China.

Notes: *Codinaea oxenbolliae* W.P. Wu & Y.Z. Diao is characterized by clustered conidiophores and fertile setae formed from basal stroma, polyphialidic conidiogenous cells, and hyaline, aseptate conidia with one setulae at each end. Among the *Codinaea*/*Dictyochaeta* species with clustered conidiophores and fertile setae, several species produce aseptate conidia with setulae at both ends and they are *C. dinghushanensis* W.P. Wu & Y.Z. Diao, *C. fertilis* S. Hughes & W.B. Kendr., *C. pakhalensis* S.M. Reddy & S.S. Reddy, *D. plovercovensis* Goh & K.D. Hyde and *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu, (Hughes and Kendrick 1968; Holubová-Jechová 1984; Kuthubutheen and Nawawi 1991b, d, e, f; Goh and Hyde 1999; Whitton et al., 2000; Liu et al. 2016). *C. pakhalensis* (conidia 16.5-18 x 3.5-4.5 µm, setulae up to 9 µm long), *D. siamensis* (conidia 15.5-21 x 2.5-4 µm, setulae 7-12 µm long) and *D. plovercovensis* (conidia 13-15 x 1.5-2 µm, setulae 8-9 µm long) produce significant longer conidia than *C. oxenbolliae*. *C. fertilis* (conidia 9-15.3 x 2-3 µm, setulae 5-10 µm long) and *C. dinghushanensis* (conidia 11-13 x 2-2.5 µm, setulae 4-6 µm long) produces smaller conidia as in *C. oxenbolliae*, however, *C. dinghushanensis* has shorter setae (up to 200 µm long) and conidiophores (50-80 µm long), monophialidic conidiogenous cells; and *C. fertile* has slightly longer conidia and setulae.

***Codinaea pandanicola* (Tibpromma & K.D. Hyde) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 39, 2021.**

≡ *Dictyochaeta pandanicola* Tibpromma & K.D. Hyde, Fung. Div. 93: 127, 2018

Ecology/Substrate/Host: Saprobe on decaying leaves of *Pandanus* sp.

Geographical distribution: China.

Description and illustration: Tibpromma et al. (2018).

Notes: In the phylogenetic analysis, *Dictyochaeta pandanicola* Tibpromma & K.D. Hyde is well-separated from other *Codinaea* and *Dictyochaeta* species. Morphologically, *D. pandanicola* is similar with *D. siamensis* J.

Yang, K.D. Hyde & J.K. Liu, but differs in that *D. siamensis* has larger conidia (17.5 x 3 µm) with longer setulae (7-12 µm long) (Liu et al. 2016; Tibpromma et al. 2018).

Codinaea paniculata Réblová & J. Fourn., MycoKeys 74: 30, 2020.

Colonies on the nature substrate effuse, hairy, greyish brown. Teleomorph: Unknown. Anamorph: Setae erect, straight or slightly flexuous, smooth-walled, dark brown and thick-walled, becoming pale brown to subhyaline and thin-walled towards the apex, (7)10-16-septate, (130-)250-310 µm long, 4-5.5 µm wide above the base, tapering gradually towards the apex, sterile or fertile with a mono- or poly-phialide. Conidiophores macronematous, mononematous, 50-60 x 3-4 µm, 2-5-septate, erect, straight, or flexuous, arising singly or in groups of 2-5 from hyphal cells associated with setae, mid-brown to pale brown becoming gradually paler towards the apex, basal cell swollen and 9-11 µm wide. Conidiogenous cells 11-20 µm long (20-30 µm long for the terminal conidiogenous cells from the setae), 3-4 µm wide, tapering to 2 µm just below the collarette, integrated, terminal, mono- or poly-phialidic, cylindrical to cylindrical-lageniform, pale brown at the base becoming subhyaline towards the apex, smooth-walled; collarettes funnel-shaped, 3-3.6 µm wide, 1-2 µm deep. Conidia in slimy droplets, hyaline in mass, of two types, narrower and longer, 14.5-17.5 x 2.2-2.5 µm, and shorter and usually wider. Usually from the setiform conidiophores, 11.5-13 x 3 µm, falcate, asymmetrical, rounded at the apical end, with an inconspicuous scar at the basal end, hyaline, aseptate, smooth-walled, with simple, straight, or gently curved setulae at both ends, 6-7.5 µm long.

Material examined: China: Sichuan, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17166, Wu17167a). Living strain: 77592 and 77719 (from Wu17166), 77593 (from Wu17167b), 77738 (from Wu17167a).

Ecology/Substrate/Host: Saprobes on dead leaf and branch.

Geographical distribution: China, France.

Description and illustration: Réblová et al. (2020); Réblová et al. (2021e).

Notes: *Codinaea paniculata* Réblová & J. Fourn. with two different types of conidia is a recently described species with comparison to *Codinaea assamica* S. Hughes & W.B. Kendr. and *Dictyochaeta terminalis* (Réblová et al., 2020). *C. assamica* differs from *C. paniculata* by slightly longer (14.6-16.8 x 2.6-2.8 µm) conidia with longer setulae (9.6-12.8 µm) (Hughes & Kendrick 1968). *D. terminalis* also produce the monophialidic conidiogenous cells and aseptate conidia, but the conidia are slightly longer and wider (14.7-20.7 x 2.9-4.2 µm) (Lin et al. 2019). The ITS sequences obtained from the two Chinese collections are identical to those obtained from European material.

Codinaea plovercovensis (Goh and K.D. Hyde) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841692.

≡ *Dictyochaeta plovercovensis* Goh and K.D. Hyde, Fung. Div. 3:69, 1999.

Ecology/Substrate/Host: Saprobe on submerged wood.

Geographical distribution: China, Mexico.

Description and illustration: Goh and Hyde (1999); Becerra-Hernández et al. (2011).

Notes: No specimen was examined by us and the above description is based on the original description (Goh and Hyde, 1999). *Codinaea plovercovensis* resembles *C. fertilis* S. Hughes and W.B. Kendr., which also has long fertile setae, fasciculate conidiophores, and unicellular conidia with one setulae at each end (Holubová-Jechová 1984; Arambarri et al. 1987; Kuthubutheen and Nawawi 1991a). Although *C. fertilis* has conidia of about the same size as those of *C. plovercovensis*, the former species differs in lacking a stroma and in having dense fascicles of long conidiophores (up to 300 µm) which end in a polyphialide with up to 8 successive proliferations. Its occurrence on submerged wood in China, including Hong Kong and Yunnan, was reported by Goh and Hyde (1999) and Luo et al. (2004, 2019).

Codinaea puerensis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 65, MycoBank MB841563

Etymology: refers to the location Pu Er in Yunnan, where the type specimen was collected.

Diagnosis: Setae absent; Conidiophores 8-12-septate, 200-300 x 6-8 µm, terminated with a monophialidic conidiogenous cells; conidia fusiform, 14-16.5 x 2.8-3.5 µm, with one setulae at each end 6-8 µm long.

Typification: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 12 June 2018, Y. Zhang (Holotype WFH Wu15148; ex-type strain CGMCC3.20724 = NN 75986).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, solitary or in groups, cylindrical, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 8-12-septate, thick- and smooth-walled, 200-300 x 6-8 µm, terminated with a monophialidic conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, 30-40 x 3.5-4.5 µm, pale brown to brown, thin-walled, collarette funnel-shaped, around 2-2.5 µm wide, 1.5-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of

conidiogenous cells, fusiform, slightly curved, 14-16.5 x 2.8-3.5 μm , aseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 6-8 μm long.

Colonies on PDA effuse, colonies up to 1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey brown to dark brown, with brown colored margin, reverse brown to dark brown.

Material examined: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 12 June 2018, Y. Zhang (Holotype WFH Wu15148). Living strain: ex-type strain NN 75986.

Ecology/Substrate/Host: Saprobe on dead leaves.

Geographical distribution: China.

Notes: *Codinaea puerensis* differs from other species in lacking setae and producing broader conidia. Furthermore, phylogenetic analysis shows it clearly belongs to *Codinaea* but as a different species.

***Codinaea pyriformis* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 66, MycoBank MB841564**

Etymology: refers to its pyriform conidia.

Diagnosis: Similar to *Bahusutrabeeja manoharacharii* but differs in larger conidia with 4-5 setulae.

Typification: China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 16 Oct 1999, W.P. Wu & Yan Huang (Holotype WFH Wu2746b1; ex-type strain CGMCC 3.20707 = NN 45929).

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae, 2-4 μm wide. Teleomorph: not observed. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight or slightly flexuous, medium brown, 1-2-septate, smooth- and thin-walled, 55-60 x 4-5 μm . Conidiogenous cells integrated, terminal, monophialidic, cylindrical, with a broad sporulating loci and collarette, 22-35 x 5-6 μm , pale brown, smooth, collarette funnel-shaped, up to 5 μm wide, 2-2.5 μm deep. Conidia holoblastic, acrogenous, solitary, formed in wet spore mass, globose to subglobose, aseptate, hyaline, smooth, 8-11 x 6.5-7.5 μm , with one apical and 2 lateral setulae appendages of 2-3 μm long.

Colonies on PDA effuse, colonies up to 1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with white colored margin, reverse brown to dark brown.

Material examined: China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 16 Oct 1999, W.P. Wu & Yan Huang (Holotype WFH Wu2746b1). Living strain: ex-type strain NN 45929.

Ecology and substrate: Saprobe on dead leave of unidentified broad leaf tree.

Geographical distribution: China.

Notes: *Codinaea pyriformis* phylogenetically belongs to *Codinaea*, but morphologically resemble *Bahusutrabeeja manoharacharii* Pratibha & Bhat. They can be distinguished by smaller conidia with 4 appendages in *B. manoharacharii* (Subramanian and Bhat 1977; Rao and de Hoog 1986; Bhat and Kendrick 1993; Bhat 1994; McKenzie 1997; Pratibha and Bhat 2005). Morphology of this fungus on PDA is very similar to those observed from natural substrate, such as short conidiophores, distinct collarette and subglobose conidia, however no setulae was observed from pure culture.

***Codinaea siamensis* (J. Yang, K.D. Hyde & J.K. Liu) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 43, 2021. Figs. 67**

$\equiv$ *Dictyochoaeta siamensis* J. Yang, K.D. Hyde & J.K. Liu, Mycol. Progress 15: 1159, 2016

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 μm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, 300-400 μm long, 5-6 μm wide above the swollen base, tapering gradually towards the rounded apex, 10-18-septate, dark brown in the lower part, becoming paler towards the apex, apex fertile with a funnel-shaped collarette. Conidiophores macronematous, mononematous, simple, crowded, up to 3 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 3-7-septate, thin- and smooth-walled, 60-100 x 3-4 μm . Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 15-25 x 3.5-4.5 μm , pale brown, thin-walled, collarette funnel-shaped, around 3 μm wide, 2-3 μm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 12-16 x 2-2.5 μm , aseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 8-10 μm long.

Colonies on PDA effuse, colonies 2-3 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey to grey brown, reverse pale brown to dark brown.

Material examined: China: Guangdong Province, Dinghushan, on dead fruit of unidentified plant, 10 Oct. 1998, W.P. Wu (Wu1965); China: Guangdong Province, Dinghushan, on dead leaves of ?*Smilax* sp., 10 Oct. 1998, W.P. Wu (Wu1935b); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1872d); China: Guangdong Province, isolated from leaf litter, 9 Oct. 1998, W.P. Wu (Wu2068); China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Wu12645); China: Guangdong Province, Guangzhou, Sough China Botanical Garden, on dead seed of *Arecoideae*, 10 Dec. 2013, W.P. Wu (Wu 12670); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17112, Wu17249); China: Guangdong

Province, Shenzhen, Lianhuashan Park, on decaying seed of *Acacia* sp., 18 Oct. 2020, W.P. Wu (Wu17484); China: Guangdong Province, Shenzhen, Lianhuashan Park, on decaying petiole of palm, 18 Oct. 2020, W.P. Wu (Wu17455, Wu17464, Wu17471, Wu17472, Wu17562); China: Guangdong Province, Shenzhen, Lianhuashan Park, on decaying leaves of unidentified tree, 18 Oct. 2020, W.P. Wu (Wu17546); China, Guangdong, Guangzhou, South China Agriculture University, on dead leaves of unidentified tree, 3 Dec. 2018, W.P. Wu (Wu16287, Wu16365); China: Guangxi Province, Damingshan, on dead culms of bamboo, 18 Dec. 1997, W.P. Wu (Wu1392d); China: Guangxi, on dead leaves of unidentified plant, 23 Dec. 1997, W.P. Wu (Wu2203); China: Sichuan Province, Huanglong Nature Reserve, on dead culm of bamboo, 8 Aug. 2000, W.P. Wu (Wu3525); China: Yunnan Province, Shilin, on dead leaves, 12 June 2004, W.P. Wu (Wu7244d); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2737d). Living culture: 44644 (from Wu1872d), 44718 (from Wu1935b), 57699 (from Wu12645), 57681 (from 12670), 76615 and 76616 (from Wu16287), 76665 and 76666 (from Wu16365), 77648 (from Wu17112b), 77663, 77664 and 77665 (from Wu17249), 78223 (from Wu17455a), 78227 and 78228 (from Wu17464), 78232 (from Wu17472), 78243 (from Wu17484), 78298 and 78299 (from Wu17546), 78339 (from Wu17471), 78365 (from Wu175862a).

Ecology/Substrate/Host: Saprobe on dead leaves, branches, culm, fruit of different plants, including bamboo. Geographical distribution: China, Thailand.

Description and illustration: Liu et al. (2016); Réblová et al. (2021e).

Notes: *Codinaea siamensis* (J. Yang, K.D. Hyde & J.K. Liu) W.P. Wu & Y.Z. Diao is characterized by clustered conidiophores and fertile setae formed from basal stroma, polyphialidic conidiogenous cells, hyaline and aseptate conidia with one setula at each end. *C. siamensis* is another commonly found species in China. Morphologically, the fungus found on all these examined collections from China in general agrees with the description of *C. siamensis* given in the original description, but some variations on size of setae, number of proliferations in conidiogenous cells and conidial size are also observed (Hughes and Kendrick 1968; Ellis 1976; Whitton et al. 2000; Liu et al. 2016). In *C. siamensis*, the setae are up to 365 µm long, the conidiophores are up to 110 µm high and the conidia are 15.5–21 x 2–4.5 µm and with one 7–12 µm long setulae at each end.

***Codinaea simaoensis* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 68–69, MycoBank MB841565**

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Setae 195–240 x 4.5–5 µm, fertile at the apex; Conidiophores 50–85 x 3–3.5 µm, with a terminal monophialidic conidiogenous cell bearing a funnel-shaped collarette; Conidia falcate, 15–17 x 2.2–2.5 µm, setulae 6–7 µm long.

Typification: China: Yunnan Province, Pu Er, on dead leaves of unidentified plant, 12 June 2018, Yu Zhang (Holotype WFH Wu15214; ex-holotype strain CGMCC 3.20800 (= NN 76046).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3–5 µm wide. Stroma dark brown, composed of a few dark brown, irregular cells, from which the setae and conidiogenous cells formed. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, 195–240 µm long, 4.5–5 µm wide above the swollen base, tapering gradually towards the rounded apex, upper part 3.5–4 µm wide, 6–8-septate, dark brown in the lower part, becoming paler towards the apex, apex terminated with a fertile mono-phialidic conidiogenous cells, collarette conspicuous and funnel-shaped. Conidiophores macronematous, mononematous, simple, crowded, up to 2–4 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 2–5-septate, thin- and smooth-walled, 50–85 x 3–3.5 µm. Conidiogenous cells integrated, terminal, monophialidic, ellipsoidal, slightly obclavate, 19–29 x 4–4.5 µm, pale brown to brown, becoming paler towards the apex, thin-walled, collarette inconspicuous or funnel-shaped, around 2.5 µm wide, 1.5–2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, (12–)15–17 x 2.2–2.5 µm, aseptate, hyaline, smooth, guttulate, apex rounded, base slightly truncate to rounded, with one setula at each end, 6–7 µm long.

Material examined: China: Yunnan Province, Pu Er, on dead leaves of unidentified plant, 12 June 2018, Yu Zhang (Holotype WFH Wu15214). Living strain: ex-holotype strain 76046.

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: China.

Notes: *Codinaea simaoensis* W.P. Wu & Y.Z. Diao is characterized by clustered conidiophores (2–4, up to 85 µm long) and fertile setae (up to 235 µm long) formed from basal stroma, mono-phialidic conidiogenous cells with funnel-shaped collarette, hyaline and aseptate conidia (15–17 x 2.2–2.5 µm) with one setulae (6–7 µm long) at each end (Hughes and Kendrick 1968; Ellis 1976; Whitton et al. 2000; Liu et al. 2016).

Among the *Codinaea* and *Dictyochaeta* species with clustered conidiophores and fertile setae, *C. dinghushanensis* W.P. Wu & Y.Z. Diao, *C. fertilis* S. Hughes & W.B. Kendr., *C. pakhalensis* S.M. Reddy & S.S. Reddy, *D. plovercovensis* Goh & K.D. Hyde and *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu produce aseptate conidia with setulae at both ends and they are distinguished by a combination of morphological characters including setae, conidiophores, conidiogenous cells and conidia (Hughes and Kendrick 1968; Kuthubutheen and

Nawawi 1991b, d, e, f; Whitton et al. 2000; Liu et al. 2016). *C. simaoensis* differs from these species by its unique combination of morphological characters including setae, conidiophores, conidiogenous cells and conidia. In addition, phylogenetically they are also very different.

Codinaea tengii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 70, MycoBank MB841566

Etymology: named after the former Chinese mycologist S.C. Teng.

Diagnosis: Setae fertile, up to 420 µm long. Conidiophore 45-80 x 3.5-5 µm, terminated with a polyphialidic conidiogenous cell bearing up to 10 funnel-shaped collarette; Conidia falcate, 10-11 x 2-3 µm, setulae 4-5 µm long.

Typification: China: Guangxi Province, Nanning, on dead stem of palm, 3 Jan 1998, W.P. Wu (Holotype WFH Wu1645c).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2.5-3.5 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight or flexuous, cylindrical, smooth- and thick-walled, up to 420 µm long, 6-7 µm wide above the swollen base, 13-16-septate, dark brown in the lower part, becoming paler towards the apex, apex fertile with a few funnel-shaped collarettes. Conidiophores macronematous, mononematous, simple, crowded, up to 3 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 3-5-septate, thin- and smooth-walled, 45-80 x 3.5-5 µm. Conidiogenous cells integrated, terminal, polyphialidic with up to 10 funnel-shaped collarettes, cylindrical, 15-45 x 3.5-5 µm, pale brown, thin-walled, collarette 3-4 µm wide, 2-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 10-11 x 2-3 µm, aseptate, hyaline, smooth, both ends rounded, with one setula at each end, 4-5 µm long.

Material examined: China: Guangxi Province, Nanning, on dead stem of palm, 3 Jan 1998, W.P. Wu (Holotype WFH Wu1645c).

Ecology/Substrate/Host: Saprobe on dead stem of palm.

Geographical distribution: China.

Notes: *Codinaea tengii* W.P. Wu & Y.Z. Diao differs from all known species in the genus *Dictyochaeta* by its fertile setae, polyphialidic conidiogenous cell, and aseptate, smaller conidia with shorter setulae at each end (Hughes and Kendrick 1968; Matsushima 1971; Kuthubutheen 1987, 1991; Whitton et al. 2000; Lin et al. 2019; Luo et al. 2020; Réblová et al. 2020). Morphologically *C. tengii* resembles *C. fertilis* S. Hughes & W.B. Kendr., *D. siamensis* J. Yang, K.D. Hyde & J.K. Liu, *C. pakhalensis* S.M. Reddy & S.S. Reddy and *D. ploverscovensis* Goh & K.D. Hyde. However, in all these known species, their conidia are significantly longer than 13 µm in average, thus can easily be distinguished from *D. tengii*. No living strain was obtained, thus its phylogenetic relationship with other *Codinaea* and related fungi cannot be defined at this moment.

Codinaea terminalis (C.G. Lin & K.D. Hyde) Réblová & Hern.-Restr., J. Fungi 7 (12, no 1097): 44, 2021.

≡ *Dictyochaeta terminalis* C.G. Lin & K.D. Hyde, Mycosphere 10: 672, 2019.

Colonies effuse, gregarious, brown, shining. Mycelium mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. Teleomorph: Unknown. Anamorph: Setae fertile, erect, dark brown at the base, paler towards the apex, septate, thick-walled, unbranched, smooth, cylindrical, 6-10-septate, (120-)180-320 µm long, 4-5.5 µm wide at the base, terminating with a monophialidic conidiogenous cell. Conidiophores mononematous, macronematous, in groups of 2-9 arising from the mycelial knots from the base of setae, short, cylindrical, 60-95 x 3-4.3 µm, sometimes percurrent, dark brown at the base becoming pale brown towards the apex, straight or slightly flexuous, 3-6-septate, thick-walled, smooth. Conidiogenous cells 25-38 x 3.5-3.2 µm, terminal, integrated, monophialidic, clavate, subcylindrical, with flared collarette up to 3.5 µm wide, 1.5-2 µm deep. Conidia aggregating in a globose mass at apex of conidiophores and setae, acrogenous, aseptate, long fusiform, straight to curved, hyaline, smooth, 13-16 x 2.5-3 µm, with a hair-like, 8-10.5 µm long appendage at both ends.

Colonies on PDA effuse, colonies up to 2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white to pale brown, reverse white to pale brown.

Material examined: China, Sichuan, Chengdu, Qingcheng Shan, on dead cone of *Picea* sp. 9 Nov. 2019, W.P. Wu (Wu17210); China: Sichuan, Chengdu, Qingcheng Shan, On dead leaves of unidentified tree 9 Nov. 2019, W.P. Wu (Wu17203, Wu17207, 17208); China: Yunnan, Baoshan, Teng Chong, Gaoligongshan, on dead leaves of unidentified tree, 15 Oct 2003, W.P. Wu (Wu7105b). Living strain: 47726 (from Wu7105b), 77563 (from Wu17203), 77566 (from Wu17207), 77567 (from Wu17208), and 77669 (from Wu17210).

Ecology/Substrate/Host: Saprobes on dead leave and fruit of *Picea* sp. and other trees.

Geographical distribution: China.

Notes: *Codinaea terminalis* is a recently described species and similar with *Codinaea pakhalensis* S.M. Reddy & S.S. Reddy, *C. assamica* (Agnihotth.) S. Hughes & W.B. Kendr., *C. fertilis* S. Hughes & W.B. Kendr., *D. gamundiae* Aramb. & Cabello and *D. ploverscovensis* Goh & K.D. Hyde in having fertile setae, mononematous

conidiophores, and aseptate and hyaline conidia with setulae at each end (Agnihotrudu 1962, Hughes and Kendrick 1968, Reddy and Reddy 1977; Arambarri et al. 1987; Kuthubutheen and Nawawi 1991b; Goh and Hyde 1999, Whitton et al. 2000). However, *C. terminalis* differs from these species by its conidiogenous cells on setae, the conidiophores are monophialidic and without intercalary conidiogenous loci, and its conidia are bigger. The conidia from the Chinese collections are somewhat smaller than those in the original description.

Codinaea trisetula W.P. Wu & Y.Z. Diao, sp. nov., Figs. 71, MycoBank MB841554

Etymology: refers to its conidia with three setulae.

Diagnosis: Conidiogenous cells polyphialidic, with up to 10 funnel-shaped collarettes, 15-20 x 6-7 µm. Conidia ellipsoidal, slightly papillate at the apex, obtuse or truncate at the base, 13-15 x 8-10 µm, aseptate, with one setulae at the apex and 2 setulae in the middle part of the conidial body, 5-10 µm long.

Type: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 10 Oct. 1998, W.P. Wu (Holotype WFH Wu1930c; ex-type strain CGMCC 3.20636 (=NN 44720)).

Saprobe on dead branches of broad leaf tree. Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 7-10-septate, dark brown at the lower part, becoming paler towards the apex, smooth, 200-300 x 6-8 µm, base with a swollen and lobbed cell up to 10 µm wide, proliferation percurrent. Conidiogenous cells integrated, terminal or intercalary due to percurrent proliferation, polyphialidic with up to 10 collarettes, cylindrical, 15-20 x 6-7 µm, pale brown, thin- and smooth-walled, collarette funnel-shaped, 2-3 µm wide, 2-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, ellipsoidal, slightly papillate at the apex, obtuse or truncate at the base, 13-15 x 8-10 µm, aseptate, hyaline, smooth, with one setulae at the apex and 2 setulae in the middle part of the conidial body, 5-10 µm long.

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1324a); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 10 Oct. 1998, W.P. Wu (Wu1930c, holotype). Living strain: ex-type strain CGMCC 3.20636 (=NN 44720), 44490 (from Wu1324a)

Ecology/Substrate/Host: Saprobe on dead branches of broad leaf tree.

Geographical distribution: China.

Notes: *Codinaea trisetula* W.P. Wu & Y.Z. Diao differs from all other species known in the genus by polyphialidic conidiogenous cells with up to 10 collarettes and ellipsoidal conidia with one apical and two lateral setulae. Among the species with appendaged conidia in the genus *Codinaea* and *Bahusutrabejea* Subram. & Bhat, the setulae are always inserted at one or both ends of the conidia (Subramanian and Bhat 1977; Rao and de Hoog 1985; Bhat and Kendrick 1993; McKenzie 1997; Li et al. 2013). On conidial morphology, *C. trisetula* also resembles *Dictyochoeta fimbriaspora* Whitton, McKenzie & K.D. Hyde in having ellipsoidal conidia with multisetulae, however the conidial setulae in the latter species are inserted only at the ends and no lateral appendages formed (Whitton et al. 2000). Both LSU and ITS sequences were obtained from the single spore isolate of the type specimen and its affinity to other members of Chaetosphaeriaceae was confirmed by phylogenetic analysis.

Codinaea vermispora (Z.F. Yu & R.F. Castañeda) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 45, 2021.

≡ *Phialolunulospora vermispora* Z.F. Yu & R.F. Castañeda, MycoKeys 76: 23, 2020.

Ecology/Substrate/Host: isolated from plant leaves.

Geographical distribution: China.

Description and illustration: Zheng et al. (2020).

Notes: *Phialolunulospora* Z. F. Yu & R. F. Castañeda is a recently described genus with the freshwater fungus *P. vermispora* Z. F. Yu & R. F. Castañeda as type species from China. It is morphologically similar to some other genera of Chaetosphaeriaceae in hyaline conidia with basal eccentric cellular appendages, including *Rattania* Prabhug. & Bhat (Prabhugaonkar and Bhat 2009). Based on the phylogenetic analysis this fungus was transferred into *Codinaea* (Réblová et al. 2021e).

Codinaea zhangii W.P. Wu & Y.Z. Diao, nom. nov., MycoBank MB841687

= *Dictyochoeta chinensis* Y.L. Jiang & T.Y. Zhang, Mycotaxon 131: 387, 2016.

Etymology: named after the Chinese mycologist Prof. T.Y. Zhang, who made great contribution to hyphomycetes taxonomy in China and also discovered this fungus from China.

Teleomorph: Unknown. Anamorph: Setae straight or curved, septate, pale brown to brown, paler and almost always fertile towards the apex where there are persistent collarettes, smooth, up to 320 µm long, 2.5–5 µm thick. Conidiophores solitary or in small groups often associated with setae, straight or flexuous, septate, pale brown to

brown, smooth, 50–200 × 2.5–4 µm, polyphialidic; collarettes funnel-shaped with thick walls. Conidia fusiform or sometimes cylindrical, mostly curved, hyaline, smooth, aseptate, 10–20 × 2–4 µm (commonly 14 × 3 µm), usually with a setula at each end, sometimes without setulae or only on one end, setulae 1.5–8 µm long.

Material examined: China: Guizhou Province, Leishan County, isolated from soil sample, 18 Sept 2005, Y.L. Jiang (Isotype HMAS 196299).

Geographical distribution: China.

Description and illustration: Jiang & Zhang (2016).

Notes: *Dictyochaeta chinensis* Y.L. Jiang & T.Y. Zhang is most similar with *C. assamica* (Agnihothr.) S. Hughes & W.B. Kendr., *Codinaea fertilis* S. Hughes & W.B. Kendr., *D. brachysetula* Y.L. Jiang & T.Y. Zhang, *D. gamundiae* Aramb. & Cabello and *D. plovercovensis* Goh & K.D. Hyde. *D. brachysetula* differs from all these species by its longer and broader conidia (10–20 × 2–4 µm) (Holubová-Jechová 1984; Arambarri et al. 1987; Kuthubutheen and Nawawi 1991; Whitton et al. 2000). According to the CGMCC, the ex-type strain CGMCC3.13766 for *C. chinensis* was contaminated and reisolation of the original strain was not successful.

Other accepted species in the genus *Codinaea*:

Codinaea aristata Maire, Publ. Inst. Bot. Barcelona 3:15, 1937.

Description and illustration: Maire (1937); Hughes and Kendrick (1976).

Notes: *Codinaea aristata* Maire is the type species of the genus *Codinaea*. Although the type specimen could not be located, Marine's illustration and complete description clearly provided a good diagnosis for it. It differs from other species by sterile setae, and falcate and aseptate conidia (12–14 × 2 µm) with a terminal setula 4–6 µm long and a basal setula about 1 µm long (Hughes & Kendrick, 1976). It has not been found from other than the type specimen.

Codinaea australiensis B. Sutton, Proc. Royal Soc. Queensland 91: 14, 1980.

= *Dictyochaeta australiensis* (B. Sutton) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

Geographical distribution: Australia.

Description and illustration: Sutton (1980); Matsushima (1989).

Notes: *Codinaea australiensis* B. Sutton is similar with *C. simplex* but with bigger and symmetrical conidia.

Codinaea coryli (R.H. Perera, E.B.G. Jones & K.D Hyde) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841695

≡ *Dictyochaeta coryli* R.H. Perera, E.B.G. Jones & K.D Hyde, Mycosphere 11: 2120, 2020.

Geographical distribution: UK.

Description and illustration: Perera et al. (2020).

Notes: *C. coryli* R.H. Perera, E.B.G. Jones & K.D Hyde is a recently described species on dry fruit of *Corylus avellana*. Both morphological and phylogenetic study confirmed its affinity to the genus *Codinaea* (Perera et al. 2020).

Codinaea gamundiae (Aramb. & Cabello) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841696

≡ *Dictyochaeta gamundiae* Aramb. & Cabello, Mycotaxon 29: 29, 1987.

Geographical distribution: Argentina.

Description and illustration: Arambarri et al. (1987).

Notes: *Dictyochaeta gamundiae* Aramb. & Cabello is well described and illustrated in the original publication and fits well to the genus *Codinaea*. It has fertile setae, terminal mono- or poly-phialidic conidiogenous cells with funnel-shaped collarettes, and fusiform, symmetrical and aseptate conidia (16–20 × 2–3 µm) with a simple setula 10–15 µm long at each end (Arambarri et al. 1987). No molecular data is available for phylogenetic analyses.

Codinaea gyrosetula (Kuthub., Nawawi & G.M. Liew) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841697.

≡ *Dictyochaeta gyrosetula* Kuthub., Nawawi & G.M. Liew, Mycol. Res. 95: 1211, 1991.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991).

Notes: *Dictyochaeta gyrosetula* Kuthub., Nawawi & G.M. Liew is unique in producing fertile setae, monophialidic conidiogenous cell with funnel-shaped collarette, and fusiform, aseptate conidia (24–26 × 6–8 µm) with a single and spiral setulae 65–135 µm long borne only at the apical end (Kuthubutheen and Nawawi 1991). Except for the conidia with only one apical setula, *D. gyrosetula* fits well to the concept of *Codinaea*, thus it is transferred to the genus.

Codinaea pakhalensis S.M. Reddy & S.S. Reddy, Sydowia 30: 186, 1978.

≡ *Dictyochaeta pakhalensis* (S.M. Reddy & S.S. Reddy) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 145, 2000.

Geographical distribution: India.

Description and illustration: Reddy and Reddy (1978).

Notes: Based on the original description and illustration, *Codinaea pakhalensis* S.M. Reddy & S.S. Reddy should be kept in the genus *Codinaea*. It differs from other species by producing fertile setae, polyphialidic conidiogenous cells with funnel-shaped collarette, and fusiform, aseptate conidia with one short setula at each end.

Codinaea tilikfrei (Bhat & B. Sutton) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841698.

≡ *Dictyochaeta tilikfrei* Bhat & B. Sutton, Trans. Br. Mycol. Soc. 84: 725, 1985.

Geographical distribution: Ethiopia.

Description and illustration: Bhat & Sutton (1985).

Notes: *Dictyochaeta tilikfrei* Bhat & B. Sutton produces fertile setae and conidiophores in clusters, mono- or poly-phialidic conidiogenous cells with funnel-shaped collarette, and broadly fusiform, falcate, aseptate conidia (20-25 x 10-12.5 µm) with a simple setula 5-6 µm long at each end. It differs from other species by its big conidia (Bhat and Sutton 1985b; Kuthubutheen and Nawawi 1990; Whitton et al. 2000).

Codinaeella Réblová & Hern.-Restr., J. Fungi 7 (12, no 1097): 45, 2021.

Colonies on natural substrate effuse, lanose, brown to reddish-brown, composed of conidiophores and setae, mycelium semi-immersed or immersed. Teleomorph: Unknown. Anamorph: Setae present or occasionally absent, grow singly or in small groups from repent hyphae or knots of hyphal cells, erect, straight or flexuous, septate, brown, unbranched, always fertile with a terminal or several lateral phialidic openings, setae rarely absent. Conidiophores macronematous, mononematous, crowded, arise singly or in groups from repent hyphae or knots of hyphal cells, scattered among the setae if present, unbranched, occasionally branched, erect, straight or flexuous, sometimes geniculate, brown, septate, smooth. Conidiogenous cells integrated, terminal on conidiophores or short phialide-bearing branches, or discrete, lateral on conidiophores or 1–2-celled stalks, mono- and polyphialidic, extending percurrently and sympodially, pigmented, often with persistent remnants of the collarettes; collarettes flared, funnel-shaped, the apical part may become soon evanescent. Conidia falcate, cylindrical-fusiform, curved, slightly asymmetrical, tapering toward both ends, slightly truncate at the base with an inconspicuous scar, aseptate, hyaline, with straight or gently curved setula at each end inserted terminally at the apex and subterminally at the base, accumulate in slimy fascicles (Adapted from Réblová et al. 2021e).

Type species: *Codinaeella minuta* (Tubaki) Réblová & Hern.-Restr.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Broadly distributed.

Description and illustration: Réblová et al. (2021e).

Notes: *Codinaeella* is recently created to accommodate eight *Codinaea*-like fungi with two layers of conidiophores, terminal mono- or poly-phialidic conidiogenous cells with percurrent and sympodial proliferation, and cylindrical fusiform and aseptate conidia bearing one setulae at each end (Réblová et al. 2021e). The eight accepted species include: *Codinaeella filamentosa* (Onofri) Réblová & Hern.-Restr., *Ca. lambertiae* (Crous) Réblová & Hern.-Restr., *Ca. lutea* Réblová & Hern.-Restr., *Ca. mimusopis* (Crous & M.J. Wingf.) Réblová & Hern.-Restr., *Ca. minuta* (Tubaki) Réblová & Hern.-Restr., *Ca. parvilobata* Réblová & Hern.-Restr., *Ca. pini* Réblová & Hern.-Restr. and *Ca. yunnanensis* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr. *Codinaeella* is separated from *Codinaea* by molecular and morphological characters. The two genera differ in the arrangement of setae (if present) and conidiophores on the natural substrate and partly also in the production of pigments in vitro. The morphology of *Codinaea* is more complex and consists of four morphotypes (C1-C4), but none of them is comparable with those of *Codinaeella* (CA1 and CA2).

In our phylogenetic tree generated by the combined ITS and LSU dataset (Figs. 3 and 72), a total of 14 species formed a strongly supported clade and different from other *Codinaea* and *Dictyochaeta* species. The group is consisting of *Codinaea lambertiae* Crous, *C. pini* Crous & M.J. Wingf., *C. simplex* S. Hughes & W.B. Kendr., *C. sinensis* D.W. Li, W.B. Kendr. & Jingyuan Chen, *C. yunnanensis* Z.L. Luo, K.D. Hyde & H.Y. Su, *Dictyochaeta mimusopis* Crous & M.J. Wingf., *D. coryli* R.H. Perera, E.B.G. Jones & K.D. Hyde, and several new species. All these species share very similar morphological characters as *C. pini*, including forming two layers of conidiophores, solitary or clustered conidiophores, terminal mono- or poly-phialidic conidiogenous cells with sympodial and percurrent extension, funnel-shaped collarettes, and hyaline, aseptate, fusiform to falcate conidia with setulae at both ends. None of these species is known with teleomorph. The recently established new genus *Codinaeella* Réblová & Hern.-Restr. is adapted to accommodate all these species. Based on both morphological and phylogenetic analysis, 9 new species, all with ITS barcodes, is added into the genus.

Réblová et al. (2021e) recognized two morphotypes among *Codinaeella* species, which is further supported from our study with inclusion of additional species. Species with the predominant morphotype CA1 (e.g., *Ca. minuta*, *Ca. lutea*, *Ca. parvilobata*) form unbranched conidiophores that grow singly or in small groups from repent hyphae or knots of hyphal cells and are usually scattered among longer, darker and thicker-walled unbranched setae. The setae resemble conidiophores; they are always fertile and terminate into a mono- or polyphialide. The other morphotype CA2 is less widespread and it is represented by *Ca. filamentosa* and *Ca. sinensis* only. It is characterized by single, branched conidiophores with a sterile setiform extension and lower fertile part, and they are accompanied by shorter, unbranched conidiophores. Conidiogenous cells are monophialidic, discrete, lateral and also integrated, terminal on stalks or short phialide-bearing branches and shorter conidiophores. In addition, we also discovered a third morphotype (CA3) represented by a new species *Codinaeella menispora*, with solitary, unbranched and sterile setae among short conidiophores with terminal mono- or poly-phialidic conidiogenous cells in one layer.

Morphologically several known species, including *Codinaea austrainensis* B. Sutton, *C. coffeae* Maggi & Persiani, *C. longispora* S. Hughes & W.B. Kendr., *C. unisetula* Morgan-Jones & E.G. Ingram, *Dictyochaeta gamundiae* Aramb. & Cabello, *D. taiwanensis* Matsush., and several species of *Dictyochaetopsis* might also belong to this group. However, they might also be the anamorphs of *Tainosphaeria* and need to be studied with molecular phylogenetic analysis when pure cultures are available (Hughes and Kendrick 1968; Morgan-Jones and Ingram 1976; Sutton 1980; Maggi and Persiani 1984; Arambarri et al. 1987a, b; Matsushima 1987; Crous et al. 2014; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2021e).

The living strains of many studied species were also studied on PDA (Figs. 119-120), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Codinaeella* (*Ca.*) and morphologically similar species known under *Codinaea* (*C.*), *Dictyochaeta* (*D.*) and *Tainosphaeria* (*T.*)

1. Conidiophores synnematosus	2
1. Conidiophores mononematous	5
2. Synnemata comprising up to 10 unbranched conidiophores; conidia 6-7 x 4-5 µm with a single setula 7-9 µm long	<i>C. delicata</i>
2. Synnemata comprising more than 10 conidiophores; conidia more than 10 µm long	3
3. Conidia 0-1-septate, 21-30 x 3-6 µm, setulae 7.5-12 µm long	<i>C. pindobacuensis</i>
3. Conidia 0-septate, less than 20 µm long	4
4. Synnemata comprising up to 45 individual unbranched conidiophores; conidia 17-21 x 5.4-6.2 µm with a single setula up to 6.4 µm long at each end	<i>C. obesispora</i>
4. Synnemata comprising up to 25 individual unbranched conidiophores; conidia 12.5-16 x 2.4-3.2 µm with a single setula up to 6 µm long at each end	<i>C. dendroidea</i>
5. Apex of setae sterile	6
5. Apex of setae always fertile	7
7. Setae with lateral phialides; conidia 12.5-15.5 x 2-2.5 µm; setulae 5-6 µm long	<i>Ca. sinensis</i>
7. Setae with or without lateral branches; conidia 14.5-17.5 x 2-2.5 µm; setulae 5-8 µm long	<i>Ca. filamentosa</i>
7. Conidia with only one setula 13-15 µm long; conidia 6-7 x 1 µm	<i>C. unisetula</i>
7. Conidia with setulae at both ends or multisetulate	8
8. Conidia broadly ellipsoidal, aseptate, one setula at either end, 6.5-10.5 x 6-8 µm; conidiophores up to 160 µm long, apex coarsely verrucose	<i>D. ciliata</i>
8. Conidia otherwise	9
9. One setula at each end of conidium	10
9. Number of setulae otherwise, or variable	29
10. Conidia reniform, both ends rounded, aseptate, 6-8.5 x 3-4.5 µm	<i>D. renispora</i>
10. Conidia fusiform, falcate, lunate, curved	11
11. Setulae not exceeding 5 µm long in average	12
11. Setulae exceeding 5 µm long in average	13
12. Conidia 11-17 x 2.5-3.1 µm; setulae 2-4 µm	<i>T. parva</i>
12. Conidia 17-23 x 2-2.7 µm; setulae 3-5 µm	<i>T. vulgaris</i>
13. Conidia less than 20 µm long	14
13 Conidia more than 20 µm long	28
14. Conidia more than 3 wide in average	15
14. Conidia less than 3 µm wide in average	16
15. Conidia 10.8-18 x 3.4-5 µm; setulae 4.5-9 µm	<i>C. coffeae</i>
15. Conidia lunate, 13.5-16.5 x 3.3-3.6 µm; setulae 5-5.5 µm long	<i>Ca. latisporea</i>
16. Conidia mostly 13-15 µm long	17

16. Conidia with broad range in length	23
17. Conidiogenous cells polyphialidic	18
17. Conidiogenous cells monophialidic	20
18. Conidia 10.5-13.5 x 2-2.5 (-3) µm	<i>Ca. parvilobata</i>
18. Conidia less than 2 µm wide	19
19. Conidiophores vary in length and septation; conidiogenous cells polyphialidic and geniculate; conidia fusiform, slightly curved, 13-14 x 1.5-2 µm; setulae 5-6.5 µm long	<i>Ca. paralambertiae</i>
19. Conidiophores 4-9-septate, 120-185 x 2.5-4 µm; conidiogenous cells polyphialidic, bearing many funnel-shaped collarettes; conidia falcate, 10-13 x 1.8-2 µm; setulae 5-7 µm long	<i>Ca. multisporuloca</i>
20. Conidia 13-15 x 2-3 (2.5) µm; setulae 8-9 µm long	<i>Cd. pini</i>
20. Conidial setulae less than 8 µm long	21
21. Conidia (13-) 14-15 (-18) x (2.5-) 3 µm; setulae 5-8 µm long	<i>Ca. lambertiae</i>
21. Conidia narrower and with shorter setulae	22
22. Conidiophores 0-2-septate, 20-40 µm x 2.8-3.5 µm; conidiogenous cells 13-16 x 3-3.5 µm, with a conspicuous collarette, 2-2.5 µm wide and 1-1.5 µm deep, occasionally with 1-2 percurrent proliferations; conidia naviculate to long fusiform, 12.5-15 x 2-2.5 µm; setulae 5-6 µm long	<i>Ca. cinnamomi</i>
22. Conidiophores 0-5-septate, 30-80 µm x 2.5-3.5 µm; conidiogenous cells 15-30 x 3-3.5 µm, with a conspicuous collarette, 2-3 µm wide and 1-2 µm deep, occasionally with 1-2 percurrent proliferations; Conidia naviculate to long fusiform, 12.5-14.5 x 2-2.5 µm; setulae 4-5.5 µm long	<i>Ca. brevissima</i>
23. Conidia 15-17 x 2.5-3.5 µm; setulae 6-7 µm long	<i>Ca. yunnanensis</i>
23. Conidia 2-3 µm wide	24
24. Conidiophores 1-6-septate, 40-150 x 3-4 µm; conidiogenous cells monophialidic, 30-55 x 3-4 µm; conidia (11-)16-18 (-20) x 2.5-3 (-3.5) µm; setulae 6-8 µm long	<i>Ca. mimusopis</i>
24. Conidiogenous cell polyphialidic, with several funnel-shaped collarettes	25
25. Conidiophores up to 60 µm long	26
25. Conidiophores up to 115 µm long	27
26. Conidiophores 5-septate, up to 115 µm long; conidiogenous cells polyphialidic, with up to 5 collarettes; collarette 3-4 µm wide, 2.5-3 µm deep; conidia 14-19 x 2.1-2.7 µm; setulae 6-8 µm long	<i>T. simplex</i>
26. Conidiophores 2-8-septate, 50-110 x 3.5-4.5 µm; conidiogenous cells polyphialidic, geniculate, 20-40 x 3.5-4.5 µm; collarette 3-3.5 µm wide, 1-2 µm deep; conidia falcate, curved, 15-20 x 2-2.7 µm; setulae 6-8 µm long	<i>Ca. kuthubutheenii</i>
27. Conidia 14-18 x 2-2.3 µm; setulae 5.5-7.5 µm long	<i>Ca. lutea</i> & <i>Cd. cannonii</i>
27. Conidia 14-16.2 x 2-2.5 µm; setulae 5.5-7.5 µm long	<i>Ca. minuta</i>
28. Conidiophores repeatedly geniculate; conidia 23-28 x 2.5-3 µm; setulae 8-10 µm long	<i>C. longispora</i>
28. Conidiophores not repeatedly geniculate; conidia 30-45 x 2.5-4 µm; setulae 5-12 µm long ...	<i>Ca. taiwanensis</i>
29. Conidia with 2-6 sub-basal setulae and 2-4 apical setulae; reniform, aseptate, 11-13 x 6-7 µm; conidiophores 120-450 µm long	<i>D. multifimbriata</i>
29. Conidia otherwise	30
30. Conidia with one apical setula and a fringe of basal setulae, broadly ellipsoidal, aseptate, 14-19.5 x 8-11 µm; conidiophores 310-550 µm long	<i>D. fimbriasporea</i>
30. Conidia with variable number of setulae at each end, irregularly ellipsoidal, aseptate, 14-18.5 x 5-6.5 µm; conidiophores 365-445 µm long	<i>D. multisetula</i>

Codinaeella brevissima W.P. Wu & Y.Z. Diao, sp. nov., Fig. 75, MycoBank MB841576

Etymology: refers to its short conidiophores.

Diagnosis: Similar to *Tainosphaeria simplex*, *Codinaeella lambertiae* and *Ca. coryli*, but differs in producing shorter conidiophores and smaller conidia.

Typification: China: Sichuan Province, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype Wu17241; ex-type strain CGMCC 3.20804 (= NN 77622)).

Saprobic on decaying leaves. Colonies effuse, hairy, greyish brown, shining, in groups. Mycelium immersed, consisting of greyish brown, branched, smooth hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, cylindrical, unbranched, percurrently growing, erect, straight, or slightly flexible, smooth, 0-5-septate, brown, paler towards the apex, smooth, 30-80 µm long, 2.5-3.5 µm wide. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, pale brown, thin- and smooth-walled, 15-30 x 3-3.5 µm, with a conspicuous collarette, 2-3 µm wide and 1-2 µm deep, occasionally with 1-2 percurrent proliferations. Conidia acrogenous, aggregating in a globose mucoid mass, naviculate to long fusiform, narrow at both of ends, 12.5-14.5 x 2-2.5 µm, bearing one setula at each end, 4-5.5 µm long.

On PDA, the colonies effuse, grey to dark brown, hairy, with both superficial and immersed hyphae; reverse blackish. Conidiophores directly formed from superficial hyphae, cylindrical, brown, thick-walled, smooth, up to

7-septate, up to 150 µm long, 2.5-3.5 µm wide. Conidiogenous cells monophialidic, terminal, integrated, cylindrical, lageniform, 20-30 x 3-3.8 µm, with a conspicuous collarette. Conidia naviculate to fusiform, symmetrical, or asymmetrical, 12-14 x 2-2.5 µm, base truncated, apex obtuse, both ends bearing a setula, 2-3.5 µm long.

Material examined: On dead leaves of unidentified tree, China: Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, 12 Nov. 2013, W.P. Wu (Wu13076, Wu13142); On dead leaves of unidentified tree, China: Guangdong Province, Shenzhen, Lianhuashan, 11 Nov. 2019, W.P. Wu (Wu17250); On dead leaves of *Acacia* sp., China: Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, 12 Nov. 2013, W.P. Wu (Wu13146); China: Sichuan Province, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype Wu17241). Living strains: ex-type strain 77622 (from Wu17241), 57422 (from Wu13076), 57452 (from Wu13142), 57468 (from Wu13146), 77701 (from Wu17250).

Ecology/Substrate/Host: Saprobes on dead leave of trees.

Geographical distribution: China.

Notes: *Codinaeella brevissima* is characterized by conidiophores in two layers, monophialidic conidiogenous cells bearing percurrent and sympodial extension, funnel-shaped collarettes, and naviculate to fusiform conidia in small size (12-14 x 2-2.5 µm) with one short setulae (4-5.5 µm) at each end. It is similar to two known species with smaller conidia, including *Codinaeella parvilobata* (conidia 12-15 x 2.5 µm, setulae 8-10 µm long) and *Ca. pini* (conidia 10.5-13.5 x 2-2.5 µm, setulae 6.5-9 µm long) (Kuthubutheen and Nawawi, 1991a; Whittton et al. 2000; Crous et al. 2014, 2018; Réblová et al. 2021e). The ITS sequences were obtained from several specimens and they also showed close phylogenetic relationship with other *Codinaeella* species.

***Codinaeella cannonii* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 76, MycoBank MB841577**

Etymology: named after the mycologist Paul Cannon from UK.

Diagnosis: Similar to several other species of the genus but differ in producing conidiophores with polyphialidic conidiogenous cells with geniculate proliferation and bearing funnel-shaped collarette and longer conidia.

Typification: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 18 June 2018, Yu Zhang (Holotype Wu15206; ex-type strain CGMCC 3.20728 = NN 76040).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight or slightly flexuous, 1-3-septate, pale brown to medium brown, thin- and smooth-walled, 40-60 x 3-4.5 µm, base with a swollen and lobbed cell up to 10 µm wide, percurrently proliferating 2-3 times and with a sympodial appearance. Conidiogenous cells integrated, terminal, monophialidic, percurrently proliferating 1-3 times, cylindrical to subcylindrical, 18-37 x 3-4.5 µm, pale brown, thin- and smooth-walled, terminating in a funnel-shaped collarette, collarette 2-3 µm wide, 1-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, 14-18 x 2-2.3 µm, aseptate, hyaline, smooth, with a setula of 5.5-7.5 µm long at each end.

Material examined: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 18 June 2018, Yu Zhang (Holotype Wu15206). Living strain: ex-type strain 76040 and 76041 (from Wu15206).

Ecology/Substrate/Host: Saprobes on dead leaves..

Geographical distribution: China.

Notes: *Codinaeella cannonii* W.P. Wu & Y.Z. Diao differs from all other species by its reduced conidiophores with 1-3 supporting cells, polyphialidic conidiogenous cells with sympodial and percurrent proliferations, and aseptate conidia with one setula at each end. Phylogenetically it belongs to the *Codinaeella* (Hughes and Kendrick 1976; Réblová et al. 2021e). *Codinaeella mimusopsis* also produces larger conidia (16-18 x 2.5-3 µm), but has much longer conidiophores (40-150 x 3-4 µm) than those in *Ca. cannonii* (Réblová et al. 2021e).

***Codinaeella cinnamomi* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 77, MycoBank MB841578**

Etymology: refers to the plant name *Cinnamomum* sp. from which the fungus was found.

Diagnosis: Similar to several other species in the genus but differs in shorter conidiophores, smaller conidia, and ITS sequences.

Typification: China: Sichuan Province, Ya An, Wanguan, Bifengxia, on dead leaves of *Cinnamomum* sp., 15 Dec. 2013, W.P. Wu (Holotype Wu13202; ex-type strain CGMCC 3.20717 = NN 57549).

Saprobic on decaying leaves. Colonies effuse, hairy, greyish brown, shining, in groups. Mycelium immersed, consisting of greyish brown, branched, smooth hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, cylindrical, unbranched, percurrently growing, erect, straight, or slightly flexuous, smooth, 0-2-septate, brown, paler towards the apex, smooth, 20-40 µm long, 2.8-3.5 µm wide. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, pale brown, thin- and smooth-walled, 13-16 x 3-3.5 µm, with a conspicuous collarette, 2-2.5 µm wide and 1-1.5 µm deep, occasionally with 1-2 percurrent

proliferations. Conidia acrogenous, aggregating in a globose mucoid mass, naviculate to long fusiform, narrow at both of ends, 12.5-15 x 2-2.5 µm, bearing one setula at each end, 5-6 µm long.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown in the middle, becoming paler towards margins, reverse dark yellow brown in the middle and yellow brown in the margin.

Material examined: On dead leaves of *Cinnamomum* sp., China: Sichuan Province, Ya An, Wuguan, Bifengxia, 15 Dec. 2013, W.P. Wu (Wu13201, Wu13202 Holotype). Living strain: ex-type strain 57549, 57550 (from Wu13201).

Ecology/Substrate/Host: Saprobes on dead leaves of plants, including *Cinnamomum* sp.

Geographical distribution: China.

Notes: *Codinaeella cinnamomi* W.P. Wu & Y.Z. Diao differs from all other species by its reduced conidiophores with 1-3 supporting cells, mono- or poly-phialidic conidiogenous cells with sympodial and percurrent proliferations, and aseptate small conidia with one short setula at each end. Its conidiophores are not two layered, which is different from most other known species. Phylogenetically it belongs to the *Codinaeella* (Hughes and Kendrick 1976; Réblová et al. 2021e). It is similar to two known species with smaller conidia, including *Codinaeella parvilobata* (conidia 12-15 x 2.5 µm, setulae 8-10 µm long) and *Ca. pini* (conidia 10.5-13.5 x 2-2.5 µm, setulae 6.5-9 µm long), but differs from them by shorter short conidiophores and shorter setulae (Kuthubutheen and Nawawi, 1991a; Whitton et al. 2000; Crous et al. 2014, 2018; Réblová et al. 2021e).

Codinaeella filamentosa (Onofri) Reblova & Hern.-Restr., J. Fungi 7 (12, no 1097): 46, 2021, Figs. 78-79.

≡ *Codinaea filamentosa* Onofri, Mycotaxon 14: 120, 1982.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Setae cylindrical, 5-7-septate, straight, or flexuous, brown, becoming paler towards the apex, smooth- and thick-walled, 195-300 µm long, 3-4 µm wide, tapering towards a rounded apex 1.5-1.7 µm wide, basal cell up to 5 µm wide. Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 1-3-septate, pale brown to medium brown, thin- and smooth-walled, 45-65 x 2.5-3.5 µm, base with a slightly swollen cell up to 6 µm wide. Conidiogenous cells integrated, terminal, monophialidic or occasionally polyphialidic, cylindrical to subcylindrical, 13-20 (-24) x 2.5-3.5 µm, pale brown, thin- and smooth-walled, terminating in a funnel-shaped collarette, collarette 2-3 µm wide, 1.5-1.8 µm deep. Conidia acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, 12.5-15 x 2.5-3 µm, aseptate, hyaline, smooth, with a setulae of 5-8 µm long at each end.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, reverse dark yellow brown to dark brown.

Material examined: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 11 June 2020, W.P. Wu (WuBJ141); On dead fruit of *Quercus* sp., China: Beijing, Huairou, Hongluosi, 11 July 2020, W.P. Wu (WuBJ142); On dead fruit of *Quercus* sp., China: Beijing, Huairou, Hongluosi, 29 July 2020, W.P. Wu (Wu17357, 17375, 17378). Living strain: CGMCC 3.20672 (=NN77422), 77423 (from WuBJ142), 77949 and 77950 (from Wu17357), 77998 and 77999 (from Wu17375), 78045 and 78046 (from 17378).

Ecology/Substrate/Host: Saprobes on dead fruit of *Quercus* sp.

Geographical distribution: China.

Notes: Phylogenetically *Codinaeella filamentosa* is closely related to other species of *Codinaeella* species, including *Codinaeella lambertiae*, *Ca. coryli* and *Ca. pini*. It can be distinguished from them by presence of flexuous and long sterile setae among conidiophores. The setae is among the conidiophores, but not clustered together with conidiophores at the base as seen in *Codinaea*. In the the original description of *Ca. filamentosa*, the setae are similar but with lateral branches as conidiophores, this is not found at all among the several specimens examined by us. It also resembles some member of *Menispora* but without incurved collarette. Several specimens were collected from the same locality and the variation on length of setae and conidiophores was observed, but they share the same ITS sequences. The conidia from the Chinese collection are slightly smaller than those from the type specimen (14.5-17.5 x 2-2.5 µm), however their ITS sequences are only with 1 bp difference (Réblová et al., 2021e).

Codinaeella kuthubutheenii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 80, MB841580

Etymology: named after the mycologist A.J. Kuthubutheen, who made significant contribution to taxonomy of *Dictyochoeta* and *Codinaea*.

Diagnosis: Similar to *Codinaea simplex* and related species, but differs in short conidiophores with percurrent proliferations and broader conidia.

Type: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead branches of unidentified tree, 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17529; ex-type strain CGMCC 3.20758 = NN 78279).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 μm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 2-8-septate, brown to dark brown at the lower part, becoming paler towards the apex, smooth, 50-110 x 3.5-4.5 μm , base with a swollen and lobbed cell up to 10 μm wide. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical to geniculate, 20-40 x 3.5-4.5 μm , pale brown, thin- and smooth-walled, collarete funnel-shaped 3-3.5 μm wide, 1-2 μm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, 15-20 x 2-2.7 μm , aseptate, hyaline, smooth, with a setula of 6-8 μm long at each end.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, freshly isolated culture often with purple brown color appearance, reverse pale brown to dark brown and with yellow margin.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of palm, 2 Jan. 1997, W.P. Wu (WU1311i); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of unidentified plant, 2 Jan. 1997, W.P. Wu; (Wu1319c); China: Guangxi Province, Damingshan, on dead leaves of ?*Magnolia* sp., 19 Dec 1997, W.P. Wu. (Wu1420b); China: Guangxi Province, Damingshan, on dead branches of unidentified plant, 19 Dec 1997, W.P. Wu (Wu1421b); China: Guangxi Province, Nangning, on dead leaves of *Quercus* sp., 3 Jan 1998, W.P. Wu (WU1613I); China: Guangxi Province, Nangning, on dead leaves of unidentified *Pinus* sp., on dead leaves of longyan, 3 Jan 1998, W.P. Wu (Wu1615b); China: Guangxi Province, Nangning, 3 Jan 1998, W.P. Wu (WU1617a); China: Guangdong Province, Zhaoqing, Dinghushan, on dead branches of unidentified plant, March 3 2012, W.P. Wu (Wu12095); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified plant, 2 March 2012, W.P. Wu (Wu 12101); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified plant, 3 March 2012, W.P. Wu (Wu12120); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead culm of grass, 3 March 2012, W.P. Wu (12146); China: Guangdong Province, Zhaoqing, Dinghushan, on dead culm of bamboo, 3 March 2012, W.P. Wu (Wu 12197); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leave of unidentified tree, 3 March 2012, W.P. Wu (Wu12201); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified plant, 3 March 2012, W.P. Wu (Wu12202, 12202b); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leave of unidentified tree, 2 March 2012, W.P. Wu (Wu12238); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12296); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Macadamia ternifolia*, 3 March 2012, W.P. Wu (Wu12316); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu 12331); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (12362); China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec 2012, W.P. Wu (Wu12461, Wu12481); China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec 2012, W.P. Wu (Wu12465); China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec 2012, W.P. Wu (Wu12479); China: Guangdong Province, Guangzhou, on dead leaves of unidentified tree, 10 Dec. 2013, W.P. Wu (Wu12603); China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 12 June, 2018, Yu Zhang (15208); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec 2018, W.P. Wu (Wu 16255); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead leaf of unidentified tree, 4 Oct 2019, W.P. Wu (Wu16910); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead bark of *Platanus occidentalis*, 16 Oct. 2019, W.P. Wu (Wu17013); China: Guangdong Province, Shenzhen, Lianhuashan, on decaying seed of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17117), China: Sichuan Province, Chengdu, Qingchengshan, on dead leaf of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17206); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of *Camellia* sp., 17 Oct. 2020, W.P. Wu (Wu17511); China: Hainan Province, Sanya, Yalongwan Park, on dead fruit of unidentified tree, 28 Dec. 2020, W.P. Wu (Wu17677); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead branches of unidentified tree, 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17529; ex-type strain NN 78279). Living strain: 42891 (from 1311i), 44502 (from 1615b), 42898 (from 1319c), 43775 (from 1420b), 43855 (from 1421b), 44410 (from Wu1613i), 44410 (Wu1617a), 54222 (from Wu12090), 54215 (from 12095), 54223 (from 12101), 54202 (from Wu12146), 54217 (from 12197), 54206 (from 12201), 54254 (from Wu12202), 54325 (from Wu12202b), 54200 (from 12238), 54224 (from 12120), 54385 (from Wu12296), 54389 (from Wu12331), 55324 (from 12461), 54355 (from 12362), 54388 (from 12362), 55341 (from Wu12479), 55326 (from 12465), 55342 (from 12481), 57583 (from 12603), 76042 (from Wu15208), Wu12316, 76585 (from Wu16255), 77270 (from Wu16910), 77336 (from Wu17013), 77527 (from Wu17117), 77576 (from Wu17206), 78266 (from Wu17511), ex-type strain 78279 (from Wu17529), 78400 (from Wu17576), 78499 (from Wu17677).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Notes: *Codinaeella kuthubutheenii* W.P. Wu & Y.Z. Diao differs from all other species by conidiophores in two layers, mono- or poly-phialidic conidiogenous cells with sympodial and percurrent proliferations, and aseptate long conidia with one setula at each end. *Codinaeella minusopis* also produces larger conidia (16-18 x 2.5-3 µm), but has more or less straight conidia and slightly longer conidiophores (Kuthubutheen and Nawawi, 1991a; Whitton et al. 2000; Crous et al. 2014, 2018; Réblová et al. 2021e).

Codinaeella latispora P. Wu & Y.Z. Diao, sp. nov., Fig. 81, MycoBank MB841581.

Etymology: refers to its lunate conidia.

Diagnosis: Setae absent; Conidiophores 2-4-septate, 50-85 x 3-4 µm, with terminal mono- or polyphialidic conidiogenous cell bearing funnel-shaped collarette; Conidia lunate, aseptate, 13.5-16.5 x 3.3-3.6 µm, setulae 5-5.5 µm.

Typification: China: Hunan Province, Mangshan, on dead leaves of unidentified tree, 12 April 2002, W.P. Wu (Holotype WFH Wu6015; ex-type strain CGMCC 3.20789 (= NN 47478)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, 2-4 septate, smooth, 50-85 x 3-4 µm, terminating with a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic, cylindrical or slightly clavate, 25-35 x 3-4 µm, pale brown to brown, thin-walled, ending in a flared collarette which is funnel-shaped, 2-2.3 µm wide, 1.5-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, allantoid, curved, aseptate, hyaline, smooth, 13.5-16.5 x 3.3-3.6 µm, both apex and base bear a rudimentary setula of 5-5.5 µm long.

Colonies on PDA effuse, colonies 0.5 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, yellow brown, reverse yellow brown.

Material examined: China: Hunan Province, Mangshan, on dead leaves of unidentified tree, 12 April 2002, W.P. Wu (Holotype Wu6015). Living strain: ex-type strain 47478.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Codinaeella latispora* W.P. Wu & Y.Z. Diao differs from other species in the genus in wider and lunate conidia, monophialidic conidiogenous cells, and conidiophores not formed in two layers (Réblová et al. 2021e). In addition, its ITS sequence is also significantly different from other species.

Codinaeella minuta (Tubaki) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 56, 2021. Fig. 82

≡ *Menispora minuta* Tubaki, J. Hattori bot. Lab. 20: 166. 1958.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight or slightly flexuous, 1-3-septate, pale brown to medium brown, thin- and smooth-walled, 40-60 x 3-4.5 µm, base with a swollen and lobbed cell up to 10 µm wide, percurrently proliferating 2-3 times and with a sympodial appearance. Conidiogenous cells integrated, terminal, monophialidic, percurrently proliferating 1-3 times, cylindrical to subcylindrical, 18-37 x 3-4.5 µm, pale brown, thin- and smooth-walled, terminating in a funnel-shaped collarette, collarette 2-3 µm wide, 1-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, 14-16.2 x 2-2.5 µm, aseptate, hyaline, smooth, with a setula of 5.5-7.5 µm long at each end.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse dark yellow brown to dark brown.

Material examined: China: Guangdong Province, on dead leaves of ?*Smilax* sp., 9 Oct. 1998, W.P. Wu (Wu2083f); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12162); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12186); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Nageia nagi*, 4 March 2012, W.P. Wu (Wu12286b); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of *Acacia* sp., 2 Jan. 1997, W.P. Wu (Wu1249e); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of *Smilax* sp., 2 Jan. 1997, W.P. Wu (Wu1284e); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Rhododendron* sp., 30 Dec 1997, W.P. Wu (Wu1546d); China: Guangxi Province, Damingshan, on dead leaves of *Cinnamomum* sp., 20 Dec 1997, W.P. Wu (Wu1474b); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Wu13321); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Wu13348); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Ginkgo biloba*, 12 June 2015, W.P. Wu (Wu13320, Wu13283a); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015,

W.P. Wu (Wu13323); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Wu13331); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16053, 16056, 16185 with slightly difference in ITS); China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 6 Dec. 2018, W.P. Wu (Wu15206); China: Yunnan Province, Gaoligongshan, on dead leaves of unidentified plant, 19 Sept. 2003, W.P. Wu (Wu7292); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 6 Dec. 2015, W.P. Wu (Holotype WFH Wu13331). Living strain: 47771 (from Wu7292), 54248 (from Wu12162), 54258 (from Wu12286b), 54225 (from Wu12186), 54258 (from Wu12286b), 59001 (from Wu13323), 59004 (from Wu13320), 59022 (from Wu13348a), 59033 (from Wu13323), 59058 (from Wu13283a), 59077 (from Wu13348), 58997 (from Wu13331), 76224 (from Wu16053), 76225 (from Wu16056), 76384 (from Wu16185), 58997 (from Wu13331).

Ecology/Substrate/Host: On dead material of plants including *Cinnamomum* sp., *Fagus* sp., *Ginkgo biloba*, *Nageia nagi*, *Quercus* spp., *Smilax* sp., *Rhododendron* sp.

Geographical distribution: China, Czech Republic, France, Italy, Japan, The Netherland, Slovak Republic, USA.

Description and illustration: Tubaki (1958); Réblová et al. (2021e).

Notes: *Codinaeella minuta* is characterized by dark brown and multiseptate conidiophores, mono- or polyphialidic conidiogenous cells with sympodial and percurrent proliferation, and fusiform and setose conidia (Réblová et al., 2021e). It was compared with *Codinaeella lutea* and *Tainosphaeria simplex*, two morphologically similar species, but differs from it by shorter setae, slightly wider conidia and producing yellow pigment in vitro. A total of 13 strains were studied by us and the ITS sequences from them are almost identical (with 5-6 bp difference) to the ex-type strain. It has broad distribution in central and south part of China.

Codinaeella multisporuloca W.P. Wu & Y.Z. Diao, sp. nov., Figs. 83-84, MycoBank MB841583.

Etymology: refers to its polyphialidic conidiogenous cells.

Diagnosis: Setae absent. Conidiophores 4-9-septate, 120-185 x 2.5-4 µm, terminated by a polyphialidic conidiogenous cells bearing many funnel-shaped collarettes. Conidia falcate, aseptate, 10-13 x 1.8-2 µm.

Typification: On dead fruits of *Quercus dentata*, China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, 25 Sept 2020, W.P. Wu (Holotype WFH Wu17413; ex-type strain CGMCC 3.20754 = NN 78175).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or 2-3 aggregated, simple, erect, straight or slightly flexuous, 4-9-septate, brown to dark brown, becoming paler in the upper part, thin- and smooth-walled, (80-) 120-185 x 2.5-4 µm, base with a swollen cell up to 10 µm wide. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical to subcylindrical, (15-) 18-26 x 2.8-3.2 µm, pale brown, thin- and smooth-walled, bearing several funnel-shaped to cylindrical collarettes, collarette 1.5-2.5 µm wide, 1-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, aseptate, hyaline, smooth, 10-13 x 1.8-2 µm, with a setula of 5-7 µm long at each end.

Colonies on PDA effuse, colonies up to 1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Beijing, Huairou, Hongluosi, on dead leaves of *Quercus* sp., 11 June 2020, W.P. Wu (WuBJ212, WuBJ213); China: Beijing, Huairou, Hongluosi, on dead leaves of *Quercus* sp., 29 July 2020, W.P. Wu (Wu17314); China: Beijing, Huairou, Hongluosi, on dead leaves of *Quercus* sp., 11 June 2020, W.P. Wu (WuBJ211); China: Beijing, Huairou, Hongluosi, on dead leaves of *Quercus* sp., 29 July 2020, W.P. Wu (Wu17317, Wu17345, Wu17363, Wu17364, Wu17365, Wu17366, Wu17368, Wu17376, Wu17379); China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, on dead fruits of *Quercus dentata*, 25 Sept 2020, W.P. Wu (Wu17407, Wu17410, Wu17413, Wu17417, Wu17421); China: Sichuan, Chengdu, Qingchengshan, on dead fruit of *Picea* sp., 9 Nov. 2019, W.P. Wu (Wu17242); China: Sichuan, Chengdu, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17158); China: Zhejiang, Huaian County, Qiandaohu, on dead bark of *Platanus occidentalis*, 16 Oct. 2019, W.P. Wu (Wu16014, Wu17015, Wu17021, Wu16017); China: Zhejiang, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16100, Wu16104); On dead fruits of *Quercus dentata*, China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, 25 Sept 2020, W.P. Wu (Holotype Wu17413; ex-type strain 78175); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead leaves of unidentified tree, 3 Oct. 2019, W.P. Wu (Wu16909). Living strain: Living strain: 76201 (from Wu16017), 76200, 76299, 76300, 76301 and 76302 (from Wu16014), 76230 (from Wu16100), 76359 (from Wu16104), 77269 (from Wu16909), 77302 and 77303 (from Wu17015), 77306 and 77378 (from 17021), 77588 (from Wu17158), 77661 and 77698 (from Wu17242a,b), 77283 (from WuBJ213), 77250 (from WuBJ212), 77429 (from WuBJ211), 77979 (from Wu17314), 78001 and 78002 (from Wu17317), 77988 and 77989 (from Wu17345), 78028, 78029, 78030 and 78034 (from Wu17363), 78035, 78036 and 78037 (from Wu17364), 78032 and 78033 (from Wu17365), 77940 and 77941 (from Wu17366), 77938 and 77939 (from Wu17368), 78044 (from Wu17376),

77995 (from Wu17379), 78133 and 78134 (from Wu17307), 78135, 78160 and 78170 (from Wu17410), 78142 and 78143 (from Wu17417), ex-type strain 78175, 78176 and 78178 (from Wu17413), 78287, 78186 and 78188 (from Wu17421a,b,c).

Ecology/Substrate/Host: Saprobes on dead fruit of *Quercus* sp.

Geographical distribution: China, Japan.

Notes: *Codinaeella multisporuloca* W.P. Wu & Y.Z. Diao is characterized in producing conidiophores in two layers, terminal polyphialidic conidiogenous cells with sympodial and percurrent proliferations, funnel-shaped collarettes, and smaller symmetrical conidia (10-13 x 1.8-2.2 µm) with one setula of 5-7 µm long at each end. *Codinaeella parvilobata* also produces small conidia (10.5-13.5 x 2-2.5 µm, setulae 4-8 µm long), and but differs from *Ca. multisporuloca* by wider conidia (Hughes and Kendrick 1976; Whitton et al. 2000; Réblová et al. 2021e). Based on both morphology and ITS sequences, many collections from China were identified as *C. multisporuloca*. Some variations were observed among these specimens, including presence of short conidiophores clustered with the long ones, length and septation of conidiophores.

***Codinaeella paralambertiae* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 85, MycoBank MB841584**

Etymology: refers to its similarity on morphology and close phylogenetic relationship with *Codinaea lambertiae*.

Diagnosis: Conidiophores vary in length and septation; conidiogenous cells polyphialidic with geniculate proliferation; conidia fusiform, slightly curved, 13-14 x 1.5-2 µm, with single appendage at each end, flexuous, unbranched, 5-6.5 µm long.

Type: UK: Scotland, Ayr, Ballantrae, Glenapp Castle garden, on dead leaves of *Rhododendron* sp., 6 July 2019, W.P. Wu (Holotype WFH Wu16511; ex-type strain CGMCC 3.20733 = NN 76781).

Mycelium consisting of hyaline, smooth, septate, branched, 1.5-3 µm diam hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or in small group, arising from creeping hyphae, erect, straight, or flexuous, 60-150 x 3-3.5 µm, 6-13-septate, thick-walled, smooth, becoming pale to medium brown in fertile region. Conidiogenous cells integrated, apical, subcylindrical, medium brown, smooth, thin-walled, 15-30 x 2.3-3.5 µm, phialidic with flared apical collarette, 1.5-2 µm wide and 1-1.5 µm deep, with 1-3 percurrent proliferations. Conidia solitary, aggregating in slimy mass, hyaline, smooth, aseptate, curved, fusoid-ellipsoid, apex subacutely rounded, base truncate, 13-14 x 1.5-2 µm, with single appendage at each end, flexuous, unbranched, 5-6.5 µm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: UK, Scotland, Ayr, Ballantrae, Glenapp Castle garden, on dead leaves of *Rhododendron* sp., 6 July 2019, W.P. Wu (Holotype Wu16511). Living strain: ex-type strain 76781.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: UK.

Notes: This fungus from the British collection Wu16511 on dead leaves of *Rhododendron* sp. has very variable morphology of conidiophores (septation, size) and fits well to the concept of *Codinaeella*. Its conidia are shorter and narrower than other known species (Réblová et al. 2021e). Phylogenetically, *Codinaeella paralambertiae* is clearly part of *Codinaeella*.

***Codinaeella pini* (Crous & M.J. Wingf.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 64, 2021.**

≡ *Codinaea pini* Crous & M.J. Wingf., Persoonia 33: 251, 2014.

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Pinus patula*.

Geographical distribution: Uganda.

Description and illustration: Crous et al., (2014b); Réblová et al. (2021e).

Notes: *Codinaeella pini* (Crous & M.J. Wingf.) differs from other species by shorter conidia and longer setulae (Hughes and Kendrick 1968; Crous et al. 2014b).

***Codinaeella sinensis* (D.W. Li, W.B. Kendr. & Jingyuan Chen) W.P. Wu & Y.Z. Diao, comb. nov. Figs. 86-87, MycoBank MB841715.**

≡ *Codinaea sinensis* D.W. Li, W.B. Kendr. & Jingyuan Chen, Mycological Progress 11: 900, 2011.

Mycelium partly superficial and partly immersed, composed of pale brown to brown, branches, smooth, thick-walled hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, erect, straight or flexuous, simple or branched, brown to dark brown, thick-walled, becoming paler and thin-walled at the apical part, 6-12 septate, 200-280 x 3.5-4.2 µm, basal cell swollen and up to 13 µm wide; terminal cell sterile and rounded, or fertile and with a monophialidic conidiogenous cell with funnel-shaped collarette; fertile in the lower part of the main stipe and with several lateral branches. Lateral branches 2-5 in the lower part of the setiform conidiophores, lageniform, originally right below the septa, 0-2 septate, lageniform, often with an enlarged base, developed through pores at septa in the lower part of the conidiophores, arranged in one side of the main stipe of the setiform conidiophores,

15-30 x 2.5-3 µm, pale brown, thin-walled, with a terminal phialide. Conidiogenous cells monophialidic, discrete, lateral, lageniform, obclavate, smooth, light brown, straight or slightly curved, 12-20 x 2.5-3 µm, with a funnel-shaped collarette up to 1.5 µm wide and 1.5 µm deep. Conidia in slimy masses, enteroblastic, aseptate, falcate, colorless, smooth- and thin-walled, 12.5-15.5 x 2-2.5 µm, with a single setula at each end, 5-6 µm long.

Typification: On leaf litter of *Quercus phillyraeoides*, China: Hubei Province, Wudang, Tianhufeng, 6 July 2010, Dewei Li, Bryce Kendrick, Jingyuan Chen (BPI882562, holotype).

Material examined: China: Zhejiang Province, Huaan County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct 2019, W.P. Wu (Wu16115); China: Zhejiang Province, Huaan County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct 2019, W.P. Wu (Wu16116, 16183, 16184); Japan: Mie Prefecture, Tsu, Tsukairaku Park, on dead fruit of *Cyclobalanopsis* sp., 2 Oct. 2019, W.P. Wu (Wu16960); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead leaves of unidentified tree, 2 Oct. 2019, W.P. Wu (Wu16915). Living strain: 76235 and 76364 (from Wu16115), 76236 (from Wu16116), 76382 (from Wu16183), 76383 (from Wu16184), 77317 (from 16915), 77288 (from Wu16960).

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Cyclobalanopsis* sp.

Geographical distribution: China, Japan.

Description and illustration: Li et al. (2011).

Notes: *Codinaeella sinensis*, originally described from leaf litter from China, is similar to several closely related species such as *Codinaea filamentosa* Onofri (conidia 14-16 x 2-2.5 µm), *Codinaea intermedia* Rambelli (conidia 16-18 x 3.5-4.5 µm), *Dictyochaeta menisporoides* Hol.-Jech. (conidia 13-19 x 1.8-2.5 µm) and *D. pahangensis* Kuthub. & Nawawi (conidia 18-23 x 2-3 µm) in having aseptate and falcate conidia with a single setula at each end. However, *C. sinensis* differs from them by its very smaller conidia (9.5-11 x 2-2.5 µm) (Holubová-Jechová 1984; Kuthubutheen and Nawawi 1990; Li et al. 2011a). Based on the setiform conidiophores, lateral phialides, and hyaline, aseptate, falcate to fusiform conidia with one setula at each end, several specimens collected in China can be easily identified to *C. sinensis*. A large variation was observed among different collections, for example in the specimen Wu16915, the setiform conidiophores are branched, with sterile or fertile apex, and the conidia are in broad range from 13-15.5 µm long; while in the specimen Wu16960, the setiform conidiophores are uniformly sterile and with fertile region limited to the lower part of the setae, and the conidia are smaller (12-13.5 µm long). The ITS sequences were also obtained from several specimens and they showed close phylogenetic relationship with *Codinaea simplex* and related species without setae and producing aseptate and setose conidia. This is the only species with setiform conidiophores under the new genus *Codinaeella*.

Except for *Codinaeella filamentosa*, *Ca. sinensis* represents the second species under the morphotype CA2 in the genus recognized by Réblová et al. (2021e). It is characterized by single, branched conidiophores with a sterile setiform extension and lower fertile part, and they are accompanied by shorter, unbranched conidiophores. Conidiogenous cells are monophialidic, discrete, lateral and also integrated, terminal on stalks or short phialide-bearing branches and shorter conidiophores

Codinaeella taiwanensis (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841716.

≡ *Dictyochaeta taiwanensis* Matsush., Matsush. Mycol. Mem. 5: 12, 1987.

Colony on CMA effuse, brown. Conidiophores macronematous, aggregated or solitary, simple, brown, cylindrical, septate, 90-300 µm long, 4.5-6 µm wide, terminated in a conidiogenous cells. Conidiogenous cells terminal, intercalary, polyphialidic with sympodial proliferation, pale brown to brown, with funnel-shaped collarettes. Conidia hyaline, aseptate, falcate, (23-) 30-45 x (2-)2.5-4 (-5) µm, produced in wet spore mass; setulae simple, one at each end, 5-12 µm.

Typification: Isolated from rotten leave of *Bambusa multiplicis*, China: Taiwan, Chi Tou, 4 April 1986 (MFC6T776).

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Bambusa multiplicis*.

Geographical distribution: China.

Description and illustration: Matsushima (1987).

Notes: *Codinaeella taiwanensis* was originally described from rotten bamboo leaf collected in Taiwan and it is characterized by absence of setae, simple conidiophores with terminal or intercalary conidiogenous cells, phialidic conidiogenous cells with funnel-shaped collarettes and sympodial proliferations, and longer conidia (Matsushima (1987). No specimen was examined by us and the above description is based on the original description.

Codinaeella yunnanensis (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 66, 2021. Fig. 88

≡ *Codinaea yunnanensis* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99:590, 2019.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-3 µm wide. Setae absent. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, single or loosely aggregated, simple, erect, straight or slightly flexuous, 7-9

septate, dark brown but becoming paler towards the apex, thick- and smooth-walled, 80-150 x 3.5-4.2 μm ; basal cell dark brown, swollen, up to 12 μm wide; apex terminating with a polyblastic conidiogenous cell. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 20-25 x 3-3.5 μm , pale brown, smooth- and thin-walled, ending in a flared collarette which is funnel-shaped, 1.5-2 μm wide, 1.5-2 μm deep, with percurrent proliferation. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate but asymmetrical, slightly curved, attenuated towards both ends, 14-17.5 x 2.3-2.5 μm , aseptate, hyaline, smooth, guttulate, with setulae at each end of the conidium, 4.5-6.5 μm .

Colonies on PDA effuse, colonies 1-1.7 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Manglietia pachyphylla*, 28 Feb. 2016, W.P. Wu (Wu12743); China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 15 Oct. 1998, W.P. Wu (WU2014a); China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 15 Oct. 1998, W.P. Wu (Wu2028a); China: Guangdong Province, Guangzhou, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12082, Wu12085; Wu12093); China: Guangdong Province, Guangzhou, Zhaoqing, Dinghushan, on dead leaves of *Camelia japonica*, 3 March 2012, W.P. Wu (Wu12346); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Manglietia pachyphylla*, 28 Feb. 2016, W.P. Wu (Wu12742, 12744, 12746); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on wood of unidentified plant, 2 Jan. 1997, W.P. Wu (WU1253); China: Guangxi Province, Nanning, on dead leaves of *Quercus* sp., 3 Jan 1998, W.P. Wu (Wu1613i); China: Guangxi Province, Nanning, on dead leaves of longyan, 3 Jan 1998, W.P. Wu (Wu1617b); China: Guangxi Province, Nanning, on dead culm of *Arundo donax*, 3 Jan 1998, W.P. Wu (WU1667a); China: Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, on dead leaves of unidentified tree, 15 Nov. 2013, W.P. Wu (Wu13076, 13142); China: Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, on dead leaves of *Acacia* sp., 15 Nov. 2013, W.P. Wu (Wu13146); China: Guangxi, on dead branches of unidentified plant, 23 Dec. 1997, W.P. Wu (Wu2084a); China: Guangxi, on dead branches of tree, 23 Dec. 1997, W.P. Wu (Wu2101b); China: Hubei Province, Shengnongjia, on dead leaves of unidentified tree, 20 Sept. 2004, W.P. Wu (Wu8182, Wu8282, Wu8284, Wu8289); China: Hubei Province, Yichang, on dead leaves of unidentified tree, 12 Aug. 2017, W.P. Wu (Wu13466); China: Hunan Province, Zhangjiajie, on dead leaves of unidentified tree, Oct 15 2010, W.P. Wu (Wu11024); China: Jiangsu Province, Wuxi, Wuxi Forest Park, on decaying fruit of *Liquidambar formosana*, 25 Aug. 2019, W.P. (Wu16797); China: Jiangsu Province, Wuxi, Wuxi Forest Park, on dead leaves of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. (Wu16797, 16845, 16852, 16872); China: Sichuan Province, Chengdu, Qingchengshan, on dead leaves of palm, 9 Nov. 2019, W.P. Wu (Wu17128, Wu17129, Wu17159, Wu17202, Wu17204, Wu17205); China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 12 June, 2018, Yu Zhang (Wu15206, YN004); China: Yunnan Province, Kunming, on dead leaves of unidentified plant, 12 Sept. 1995, W.P. Wu (Wu961a); China: Yunnan Province, Xishuangbanna, on dead bark, 6 Oct. 1999, W.P. Wu & Yan Huang (Wu2840); China: Yunnan Province, Xishuangbanna, on rotten wood, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2880b); On rotten leaves, China: Yunnan Province, Xishuangbanna, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2887b); China: Yunnan Province, Xishuangbanna, on rotten leaves, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2888b); China: Yunnan Province, Xishuangbanna, on rotten wood, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2947q); China: Yunnan Province, Xishuangbanna, on rotten wood, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2973b); China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on dead fruit of *Quercus* sp., 15 Oct. 2003, W.P. Wu (Wu7246b); China: Zhejiang Province, Deqing, Moganshan, on dead leaf of *Ficus* sp., 16 Oct. 2019, W.P. Wu (Wu16996); China: Zhejiang Province, Hangzhou, Longjing, on dead leaves of *Cinnamomum* sp., 30 Sept. 2013, W.P. Wu (Wu13012); On dead leaves of *Quercus* sp., China: Zhejiang Province, Hangzhou, Longjing, 30 Sept. 2013, W.P. Wu (Wu13013); China: Sichuan Province, Ya An, Yu Cheng, Bifengxia, on dead leaves of *Cinnamomum* sp., 15 Dec. 2013, W.P. Wu (Wu13201, Wu13202); On dead leaves of *Cyclobalanopsis glauca*, China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, 12 June 2015, W.P. Wu (Wu13272a); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Cinnamomum* sp., 12 June 2015, W.P. Wu (Wu13318); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of unidentified tree, 12 June 2015, W.P. Wu (Wu13334); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Castanopsis* sp., 12 June 2015, W.P. Wu (Wu13272, Wu13347); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaves and fruit of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16088, Wu16118, Wu16155, Wu16171, Wu16174, Wu16179; Wu16180, Wu16193); Japan: Mie Prefecture, Tsu, Mie Center of the Arts, on decaying fruit of unidentified tree, 3 Oct. 2019, W.P. Wu (Wu16915); UK: Scotland, Ayrshire, Ballantrae, Glenappa Castle, on dead leaves of *Rhododendron* sp., 6 July 2019, W.P. Wu (Wu16504). Living strain: 12346, 44495 (from Wu1613i) 47754 (from Wu7246b), 48056 (from Wu8182), 50644 (from Wu8284), 50650 (from Wu8289), 53372 (from Wu11024), 54204 (from Wu12085), 54207 (from Wu12093), 54204 (from Wu12085), 54249 (from Wu12082), 57323 (from Wu13012), 57324 (from Wu13013), 54325 (from Wu12202a), 57422 (from Wu13076), 57452 (from Wu13142), 57468 (from Wu13146), 57549 (from Wu13202), 57550 (Wu13201), 58993 (from Wu13334), 59006 (from

Wu13318), 59020 and 59023 (from Wu13347), 59060 (from Wu13272a), 72568 (from Wu12742), 72569 (from Wu12743), 72570 (from Wu12744), 75822 and 75823 (from YN004), 75844 and 75845 (from Wu13466), 76040 and 76041 (from Wu15206ab), 76228 (from Wu16088), 76344 and 76345 (from Wu16155), 76378 (from Wu16171), 76379 (from Wu16174), 76380 (from Wu16180), 76381 (from Wu16118), 76387 (from Wu16193), 76414 (from Wu16179), 76778 and 76779 (from Wu16504), 77115 (from Wu16797), 77128 (from Wu16852), 77142 (from Wu16839), 77145 (from Wu16845), 77207 (from Wu16872), 77317 (from Wu16915), 77462 (from Wu16996), 77531 and 77532 (from Wu17128), 77533 and 77534 (from Wu17129), 77562 (from Wu17202), 77564 (from Wu17204), 77589 (from Wu17159), 77605 (from Wu17205).

Ecology/Substrate/Host: Saprobies on dead leaves, branches, rotten wood and found on many different plant species.

Geographical distribution: Broadly recorded in the world.

Description and illustration: Luo et al. (2019).

Notes: *Codinaeella yunnanensis* resembles *Ca. pini* in having mononematous, unbranched, septate conidiophores, terminal conidiogenous cells, aseptate, hyaline, setulate conidia aggregating in a globose mucoid mass (Crous et al. 2014b; Luo et al. 2019). It differs from *C. pini* by its poly-enteroblastic conidiogenous cells and larger conidia. *C. pini* has mono- to rarely polyphialidic conidiogenous cells. Phylogenetic analysis also shows that *Codinaea yunnanensis* is distinct from *C. pini*. Based on both morphology and ITS sequences, many specimens collected from different parts of China are identified to this species. Some morphological variations were observed, especially on length, septation and proliferation of conidiophores, and also conidia. However, they all share the similar characters including absence of setae, well-developed conidiophores with up to 10 septa, terminal polyphialidic conidiogenous cells with up to 10 funnel-shaped collarete, and fusiform, falcate, aseptate and small conidia (10-13 x 1.8-2.2 µm) with short setulae less than 8 µm long.

Other related *Codinaea*/*Dictyochaeta* species:

The following species were not observed but morphologically best fits into the genus concept of *Codinaeella* in terminal mono- or poly-phialidic conidiogenous cells with funnel-shaped collarete, and hyaline aseptate conidia with one or several setulae at each end. Several species are phylogenetically confirmed with available DNA sequences, and thus transferred to the new genus.

Dictyochaeta ciliata (Onofri & Rambelli) Bhat & W.B. Kendr., Mycotaxon 49: 43, 1993.

≡ *Xenokylindria ciliata* Onofri & Rambelli, Trans. Brit. Mycol. Soc. 88: 397, 1987.

Geographical distribution: India.

Description and illustration: Rambelli and Onofri (1987); Bhat and Kendrick (1993); Bhat (2010).

Notes: *Dictyochaeta ciliata* differs from other species in producing monophialidic conidiogenous cells with cylindrical collarettes, and ellipsoid broad conidia (6-11 x 6-8 µm) with one setula 5-8 µm long at each end.

Codinaea delicata R.F. Castañeda, Granados & O. Castro, Mycotaxon 127: 116, 2014.

Typification: Costa Rica, Cartago Province, Orosi, Rio Macho, 9°45'N 83°51'W, on decaying leaves of unidentified plant, 12 July 2012, coll. M. Granados, V. Vargas, G. Arroyo & I. Castro (Holotype: USJ 83283).

Geographical distribution: Costa Rica.

Description and illustration: Granados et al. (2014).

Dictyochaeta dendroidea Kuthub., Trans. Br. Mycol. Soc. 89: 411, 1987.

≡ *Codinaea dendroidea* (Kuthub.) R.F. Castañeda, W.B. Kendr. & Minter, Mycotaxon 127: 119, 2014.

Typification: On dead leaves, Negeri Sembilan, Pasuh Forest Reserve, October 1986, A. J. Kuthubutheen (IMI 312358 holotypus).

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen (1987).

Dictyochaeta fimbriaspora Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 138, 2000.

Setae absent. Conidiophores cylindrical, 7-15-septate, 310-550 x 6-8 µm, percurrently proliferating. Conidiogenous cells terminal, ampulliform, with flared collarete. Conidia broadly ellipsoid, aseptate, hyaline, 14-9.5 x 8-11.5 µm; apical setulae straight, solitary, 1-8 µm long; base with a fringe of setulae, often curved upwards, simple 5-10 µm long.

Geographical distribution: Philippines.

Description and illustration: Whitton et al. (2000).

Notes: *Dictyochaeta fimbriaspora* differs from other species by long conidiophores with percurrent proliferation, terminal and monophialidic conidiogenous cells with funnel-shaped collarete, and hyaline, ellipsoid conidia with one apical setula and several basal setulae.

- Codinaea longispora** S. Hughes & W.B. Kendr., New Zealand J. Bot. 6: 349, 1968.
 ≡ *Dictyochoaeta longispora* (S. Hughes & W.B. Kendr.) Aramb. & Cabello, Mycotaxon 34: 682, 1989.
 ≡ *Dictyochoaeta longispora* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 140, 2000.
 Geographical distribution: Malaysia, New Zealand.
 Description and illustration: Hughes & Kendrick (1968).
 Notes: *Codinaea longispora* S. Hughes & W.B. Kendr. fits well to the generic concept of *Codinaeella* and differs from other species by longer and narrower conidia (23-28 x 2.5-3 µm; setulae 8-10 µm long).
- Codinaeella mimusopis** (Crous & W.J. Wing.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 55, 2021.
 ≡ *Dictyochoaeta mimusopis* Crous & M.J. Wing., Fung. Syst. & Evol. 1: 185, 2018.
 Geographical distribution: South Africa.
 Description and illustration: Crous et al. (2018).
 Notes: *Dictyochoaeta mimusopis* Crous & W.J. Wing. is similar with *Codinaea simplex* complex.
- Dictyochoaeta multisetula** Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 143, 2000.
 Geographical distribution: Australia.
 Description and illustration: Whitton et al. (2000).
 Notes: *Dictyochoaeta multisetula* differs from other species by long conidiophores, terminal and monophialidic conidiogenous cells with funnel-shaped collarettes, and ellipsoid, aseptate conidia with more than 1 setulae 6-12 µm long at each end. It also resembles members of *Nimesporella* but differs from them by monophialidic conidiogenous cells and conidia with more than 1 setulae.
- Codinaea obesispora** S. Hughes & W.B. Kendr., New Zealand J. Bot. 6: 351, 1968.
 ≡ *Dictyochoaeta obesispora* (S. Hughes & W.B. Kendr.) Aramb. & Cabello, Mycotaxon 34 (2): 682 (1989)
 ≡ *Dictyochoaeta obesispora* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 145, 2000.
 Typification: On *Muehlenbeckia australis*, New Zealand: Auckland Prov., Whangapoua Saddle, Coromandel Peninsula, S.IX.t963, I.M.D., POD 21494 (DAOM J14734a, holotype).
 Geographical distribution: Brazil, New Zealand.
 Description and illustration: Hughes and Kendrick (1968); Cruz et al. (2008).
- Codinaea pindobacuensis** D.A.C. Almeida & Gusmão, Nova Hedwigia 98: 435, 2014.
 Typification: Brazil, Bahia, Pindobaçu, Serra da Fumaça, on submerged decaying leaf of an unidentified dicotyledonous plant, 16 Dec 2008, leg. D.A.C. Almeida (HUEFS 155077, holotype).
 Geographical distribution: Cuba.
 Description and illustration: Almeida et al. (2014).
- Dictyochoaeta renispora** Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 146, 2000.
 Geographical distribution: Australia.
 Description and illustration: Whitton et al. (2000).
 Notes: *Dictyochoaeta renispora* differs from other relevant species by terminal monophialidic conidiogenous cells with percurrent proliferation, and reniform-shaped conidia in smaller size (6-8.5 x 3-4.5 µm) and with relatively longer setulae (6-12 µm).
- Dictyochoaeta tropicalis** Bhat & W.B. Kendr., Mycotaxon 49:45, 1993.
 Colony effuse. Conidiophores solitary, cylindrical, straight to slightly flexuous, simple, 5-6-septate, 90-130 x 5-6 µm, terminating in a polyphialide. Conidiogenous cells terminal, monophialidic, 15-25 x 6-8 µm, the monophialidic bears 1 persistent remain of the collarettes. Collarettes funnel shaped. Conidia hyaline, smooth, aseptate, ellipsoidal, to drop-shaped, 7-10 x 3-5 µm, with a single, simple setulae 2-3 µm long at each end.
 Geographical distribution: India.
 Description and illustration: Bhat and Kendrick (1993); Bhat (2010).
 Notes: *Dictyochoaeta tropicalis* Bhat & W.B. Kendr. fits well to the concept of *Codinaeella* on absence of setae, terminal phialidic conidiogenous cell with funnel-shaped collarettes, and ellipsoidal conidia with 1 setula at each end. It differs from other relevant species by smaller conidia with very short setulae (Kuthubutheen and Nawawi 1991; Bhat and Kendrick 1993; Oliveira et al. 2015; Barbosa1 et al. 2016).
- Codinaea unisetula** Morgan-Jones & E.G. Ingram, Mycotaxon 4: 507, 1976.

≡ *Dictyochaeta unisetula* (Morgan-Jones & E.G. Ingram) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 150, 2000.

Geographical distribution: USA.

Description and illustration: Morgan-Jones and Ingram (1976).

Notes: *Codinaea unisetula* is unique in producing conidia with only apical appendages (Morgan-Jones & Ingram, 1976).

Menispora Link ex Pers., Mycol. Europ. 1: 32, 1822.

Colonies spreading, inconspicuous to conspicuous, irregular in outline, light green to greyish, comprising a dense carpet of independent conidiophores superficially resembling a sporodochium, with a tacky mass of slimy conidia surmounted by setae that terminate the conidiophores. Teleomorph: Ascomata perithecia, solitary or gregarious, dark brown to black, opaque, smooth to slightly roughened, superficial, globose to subglobose, not collapsing when dry, papillate; ostiole periphysate. Perithecial wall fragile, two-layered; outer wall textura angularis, composed of brown, thin-walled, polyhedral cells with opaque walls; and inner layer of thinner-walled, subhyaline to hyaline elongated and compressed cells. Paraphyses persistent, septate, copious, not constricted at the septa, branched, anastomosing, longer than the asci. Asci unitunicate, 8-spored, cylindrical-fusiform, rounded to obtuse at the apex, shortly stipitate, apical annulus distinct, shallow, non-amyloid. Ascospores fusiform, hyaline, septate, smooth, 2-seriate in the ascus. Anamorph: Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Conidiophores macronematous, mononematous, simple or loosely branched, sometimes anastomosing, crowded, setiform, erect, straight, or slightly flexuous, septate, brown, the upper part often sterile and setiform. Conidiogenous cells occasionally integrated, terminal, monophialidic, cylindrical, lageniform, in most species recurved at the tip with rather inconspicuous collarettes, pale brown, thin walled. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, cylindrical with rounded ends, falcate, fusiform, aseptate or septate, hyaline, smooth, with or without setulae.

Type species: *Menispora glauca* Link ex Pers.

Ecology/Substrate/Host: Saprobe on decaying plant material, especially common on rotten wood.

Geographical distribution: Broadly distributed.

Description and illustration: Hughes and Kendrick (1963, 1968); Ellis (1971, 1976); Holubová-Jechová (1973); Seifert et al. (2011).

Notes: The genus *Menispora* Link ex. Pers., typified by *M. glauca* Link ex Pers., is a dematiaceous, phialidic hyphomycete genus forming conspicuous hairy colonies on decayed wood, the inner side of bark or on decayed leaves and fruit (Tubaki 1958; Hughes and Kendrick 1963, 1968; Ellis 1971, 1976; Holubová-Jechová 1973; Matsushima 1975; Sutton 1978; Kirk 1985; Arambarri and Godeas 1994; Arambarri and Cabello 1995; Taylor and Hyde 2003; Réblová 2000, 2004; Réblová et al. 2006; Réblová & Seifert. 2009; Seifert et al. 2011). A historical review to the genus and species were provided by Hughes and Kendrick (1963, 1968), Holubová-Jechová (1973a, b) and Réblová (2006, 2008). Eleven morphological species, distinguished by morphology of setae, setiform conidiophores, conidiogenous cells and conidia, are accepted under the genus and the identification key was provided by Réblová (2006): *M. apicalis* Berk & Curt., *M. britannica* (M.B. Ellis) P.M. Kirk, *M. caesia* Preuss, *M. ciliata* Corda, *M. convoluta* Lunghini, *M. fuegiana* Arambarri & Godeas, *M. gamsii* Hol.-Jech., *M. gamundiae* Aramb. & Godeas, *M. glauca* Link ex Pers., *M. manitobaensis* B. Sutton and *M. uncinata* S. Hughes & W.B. Kendr.

Morphologically the genus is characterized by the dark brown sterile setae or fertile setiform conidiophores formed in densely aggregated colony, terminal or rarely lateral phialidic conidiogenous cells with a tapering, strongly recurved apex, inconspicuous sporulating aperture with indistinct shallow collarette, and hyaline, 0-3 septate, falcate or fusiform conidia with or without polar setulae. Réblová and Seifert (2008) recognized two morphological patterns of conidiophores and setae among the 11 known species: a) lacking setae that grow independently of conidiophores; the conidiophores terminate in sterile, whip-like extensions that branch laterally in their lower part; phialides borne on short setulae along the main axis of the conidiophore or its branches; phialides arise singly or in groups, terminally or laterally, including *M. caesia*, *M. ciliata*, *M. convoluta*, *M. gamsii*, *M. glauca*, *M. manitobaensis*, *M. tortuosa*; or b) with setae occurring independently of conidiophores; the conidiophores terminating in a mono- or polyphialide; phialides are rarely lateral; including *M. britannica*, *M. fuegiana*, *M. gamundiae* and *M. uncinata*. A *Phialophora*-like synanamorph (produced *in vitro*) was experimentally proven for *Menispora glauca* Link ex Pers. (= *Chaetosphaeria ovoidea* (anamorph: and *Ch. pulviscula* (Curr.) C. Booth (anamorph: *Menispora caesia* Preuss) (Réblová 1998b).

The anamorph and teleomorph connections were found for a few species where all belong to the Chaetosphaeriaceae: *M. caesia* is the anamorph of *Chaetosphaeria pulviscula* (= *Zignoëlla pulviscula*); *M. ciliata* is the anamorph of *C. ciliata* Réblová & Seifert, *M. glauca* is the anamorph of *C. ovoidea* (Fr.) Constant., K. Holm & L. Holm (= *Zignoëlla ovoidea*, = *Chaetosphaeria glauca*), *M. tortuosa* is the anamorph of *C. tortuosa*

(Booth 1957; Holubová-Jechová 1973; Constantinescu et al. 1995; Réblová 2000, 2004; Réblová et al. 2006; Réblová and Seifert 2008; Seifert et al. 2011). Recent phylogenetic analysis using the rLSU and ITS showed all sampled species including *M. caesia*, *M. ciliata*, *M. glauca*, *M. manitobaensis* and *M. tortuosa* formed a well-supported monophyletic clade which is distinct from *Chaetosphaeria* based on *C. innumera* (Fernández et al. 2006; Réblová et al. 2006; Réblová and Seifert 2009). Our phylogenetic analysis with inclusion of additional species also supports this (Fig. 3, Figs. 89 and 90). Under the one fungus one name and supported by the molecular phylogenetic analysis, the genus name *Menispora* Pers. was recommended for use against the sexual name *Zignoëlla* Sacc. for the lack of characterization of *Zignoëlla*, the greater use of *Menispora*, and following the principle of priority (Réblová et al. 2016).

Key to accepted species in *Menispora* (Revised after Réblová, Seifert & White, 2006)

1. Setae independent of conidiophores absent or rarely present; setiform conidiophores terminating in a sterile, whip-like extension and with lateral branches in their lower part; phialides borne on short metulae along the main axis of the conidiophore or its branches, singly or in groups, terminally or laterally. 2
1. Setae independent of conidiophores regularly present; conidiophores arising from the substratum and developing a shorter layer around setae, terminating in a mono- or poly-phialide; phialides terminal rarely lateral, with one terminal or additional lateral aperture 10
2. Conidia with subterminally inserted setulum on each polar cell 3
2. Conidia without setulae 9
3. Conidia 3-septate 4
3. Conidia aseptate 6
4. Phialides arising singly, terminal on 1–3-septate metulae; phialide apex strongly curved downwards away from the main stipe; conidia 16–26 x 3–4.5 µm. *M. glauca*
4. Phialide arising singly or in clusters, apex straight or curved very gently 5
5. Phialides arising singly, terminal on 0–2-septate metulae; conidia 15–25 x 4–5 µm. *M. paratortuosa*
5. Phialides arising in groups of 2–9 with a digitate appearance, terminal or lateral on short, branched, or unbranched metulae; conidia 18–25 x 3.5–4 µm *M. tortuosa*
6. Apex of the phialide strongly curved downwards towards the main stalk 7
6. Apex of the phialide straight or slightly curved downwards towards the main stalk 8
7. Setiform conidiophores branched in the upper part; conidia 15.5–17.5 x 2.8–3 µm *M. paraciliata*
7. Setiform conidiophores unbranched in the upper part; conidia 11.5–21 x 2.5–3.5 µm *M. ciliata*
8. Conidia 14–16 x 3–3.5 µm *M. gamsii*
8. Conidia 17–23 x 3.5–4 µm *M. convoluta*
9. Conidia 3-septate, 17–21.5 x 4–4.5 µm *M. manitobaensis*
9. Conidia aseptate, 15.5–21.5 x 3–3.5 µm; Phialophora-like synanamorph; ascospores fusiform, 1-septate later 3-septate, 19–23(–25) x 3–3.5(–4) µm; asci 90–115 x 7–8.5 µm *M. caesia*
10. Conidia aseptate, with subterminally inserted setulum at each end cell 11
10. Conidia 1-septate, lacking setulae. 12
11. Setae sinuous, sometimes coiled apically, rounded at the apex; conidia 18.5–23.5!4–5 µm, setulae 2–3 mm long *M. uncinata*
11. Setae straight, not coiled, acute at the apex; conidia 15–18 x 2–2.5 µm *M. britannica*
12. Setae straight to sinuous; conidia 22–27 x 2–2.5 µm *M. fuegiana*
12. Setae sinuous and coiled above; conidia 23–26 x 2.5–3 µm *M. gamundiae*

Menispora ciliata Corda, Icon. Fun. 1: 16, 1837.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, branched in the lower part, crowded, setiform, erect, straight or slightly flexuous, up to 20-septate, brown, up to 550 µm long, 3–4.5 µm wide, smooth, the upper part often sterile and setiform, twisted or loosely coiled; branches pale brown, smooth-walled. Conidiogenous cells occasionally integrated, terminal, monophialidic, cylindrical, lageniform, slightly recurved at the tip with rather inconspicuous collarettes, pale brown, thin-walled, 15–20 x 4–5 µm. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, cylindrical with rounded ends, fusiform, aseptate, 16–18 x 3.5–4 µm, hyaline, smooth, with or without setulae of 5–8 µm long.

Material examined: China: Hunan Province, Muang Shan, on dead branches, April 2002, W.P. Wu (Wu4644a). Living strain: 46591 (from Wu4644a).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan, Czechoslovakia, New Zealand, UK, USA, and Canada.

Description and illustration: Tubaki (1958); Hughes and Kendrick (1963, 1968); Ellis (1971); Holubová-Jechová (1973); Réblová and Seifert (2008).

Notes: *Menispora ciliata* resembles *Menispora* state of *Chaetosphaeria pulviscula* in having aseptate conidia, but can be distinguished by aseptate conidia in *C. pulviscula* (Hughes and Kendrick 1963, 1968; Ellis 1971, 1976; Holubová-Jechová 1973; Sutton 1973b). Réblová and Seifert (2008) established its teleomorph connection to *Chaetosphaeria ciliata* Réblová & Seifert.

Menispora gamsii Hol.-Jech., Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 76: 298, 1973.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Setae distinct from conidiophores, straight below, sinuous and sometimes more or less coiled above, unbranched, scattered or in groups, arising from repent hyphae, pale to dark brown at the base, paler toward the apex, thick-walled in the lower part, thin-walled in the upper part, smooth, multiseptate, up to 250 µm long, 3-3.5 µm wide at the base, 2.3-3 µm wide in the middle, tapering toward the rounded apex and up to 2 µm wide. Conidiophores macronematous, mononematous, branched, crowded, erect, straight, or slightly flexuous, septate, brown, 110-130 µm long, 3-3.5 µm wide, smooth; branches pale brown, smooth-walled, 2-3 septate, clavate, cylindrical, 40-60 µm long, 2.5-4.5 µm wide. Conidiogenous cells terminal, monophialidic, cylindrical, lageniform, strongly recurved at the tip with rather inconspicuous collarettes, pale brown, thin-walled, 27-32 x 3.5-4.5 µm. Conidia acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, 11.5-15 x 2.5-3 µm, hyaline, aseptate, asymmetrical, slightly tapered and pointed at the basal end and obtuse at the other, each end with a single straight or slightly curved setulum, 6-8 µm long, subterminally or terminally inserted on the concave side.

Colonies on PDA effuse, colonies 1-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, central part slightly grey, reverse pale brown.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten seed pod of unidentified Leguminosae, 16 Oct 2019, W.P. Wu (Wu17009). Living strain: 77463 (from Wu17009), 77475 (from Wu17009a), 77635 (from Wu17009b).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Netherland.

Description and illustration: Holubová-Jechová (1973).

Notes: *Menispora gamsii* Hol.-Jech. is characterized by presence of independent unbranched setae with coiled apex, branched conidiophores, and aseptate, falcate and asymmetrical conidia with 1 setulum at each end. It resembles *M. ciliata* Preuss ex Mussat, *M. convoluta* Lunghini (conidia 17-23 x 3.5-4.2 µm), *C. gamsii* Hol.-Jech. and *M. uncinata* S. Hughes & W.B. Kendr. (conidia 18.7-23.4 x 3.9-5.0 µm) (Hughes and Kendrick 1968; Ellis 1971, 1976; Holubová-Jechová 1973; Sutton 1973b; Lunghini 1994; Réblová et al. 2006; Réblová and Seifert, 2008). *Menispora gamsii* differs from all these species by smaller conidia. In addition, *M. ciliata* does not produce independent sterile setae from conidiophores; *M. uncinata* produce unbranched conidiophores and the larger conidia with shorter setulae (2.1-2.9 µm).

The ITS sequences were obtained from several strains, isolated from fresh specimen, and studied phylogenetically. Phylogenetically, on a megablast search using the ITS sequence from the type specimen Wu17009, the closest matches in NCBI's GenBank nucleotide database were members of *Menispora*, *Zignoëlla*, *Codinaeopsis*, *Dictyochaeta* in *Chaetosphaeriaceae*, including *Chaetosphaeria ciliata* (GeneBank MH863180, identities 427/449 (95%), 0 gap (0%)), *Menispora ciliata* (GeneBank EU488736, identities 427/448 (95%), 0 gap (0%)).

Menispora glauca Link ex Pers., Mycol. Europ. 1: 32, 1822.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, branched in the lower part, crowded, setiform, erect, straight or slightly flexuous, up to 20-septate, brown, up to 450 µm long, 3-5 µm wide, smooth, the upper part often sterile and setiform, twisted or loosely coiled; branches pale brown, smooth-walled. Conidiogenous cells occasionally integrated, terminal, monophialidic, cylindrical, lageniform, slightly recurved at the tip with rather inconspicuous collarettes, pale brown, thin-walled, 15-20 x 3.5-4.5 µm. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, cylindrical with rounded ends, fusiform, 3-septate, 18-30 x 3.5-4 µm, hyaline, smooth, with or without setulae of 5-8 µm long.

Material examined: China: Jilin Province, Dunhua, on dead branches, 14 Aug. 2000, W.P. Wu & Yang Huang (Wu4563).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Belgium, Canada, China, Czechoslovakia, England, Germany, Italy, Poland, Scotland, Sweden, USA.

Description and illustration: Hughes and Kendrick (1963); Ellis (1971); Holubová-Jechová (1973); Xia et al. (2016).

Notes: *Menispora glauca* Link ex Pers. is characterized by absence of independent setae, setiform conidiophores terminating in sterile, whip-like extension with lateral branches in their lower part, clustered phialides borne on short metulae along the main axis of the conidiophores or its branches, 3-septate conidia with 1 setulum at each end (Réblová et al. 2006). *M. glauca* Link ex Pers. resembles *M. tortuosa* and *M. manitobaensis* Corda by having 3-septate conidia, but can be distinguished by strongly incurved collarette in *M. glauca* and aseptate conidia in *M. manitobaensis* (Hughes and Kendrick 1963, 1968; Ellis, 1971, 1976; Holubová-Jechová 1973; Sutton 1973b; Xia et al. 2016). Its occurrence in China was reported by Xia et al. (2016).

Menispora manitobaensis B. Sutton, Mycol. Papers 132: 75, 1973. Figs. 91-92

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, multiseptate, brown, paler towards the apex, thick-walled, smooth, 330-450 µm long, 3.5-4.5 µm wide at the base, unbranched and straight in the lower part, upper part unbranched and sterile, strongly flexuous or irregularly coiled, terminating in a sterile subhyaline rounded cell ca. 2.8-3.2 µm wide; fertile region only in the lower part of the main stipes, with a 1-2-septate and 1-3 times branched stalks and up to 10 terminal phialides aggregated in dense groups that often appear digitate, arising from short, septate, pale brown metulae below the septa, the branches with phialides are directed upwards, 22-30 x 3.5-4.5 µm. Phialides develop in the lower part of the main axis of the conidiophore or its lateral branches, cylindrical with a narrowing straight apex, 13-16.5 x 4-4.5 µm, subhyaline becoming hyaline towards the conidiogenous aperture; conidiogenous aperture 1-1.2 µm wide; collarette shallow, indistinct. Conidia falcate, rounded at each end, 19-21 x 3.5-4.5 µm, 3-septate, hyaline, each polar cell with a single straight or slightly curved setulum, 15-17 µm long, subterminally inserted on the concave side.

Material examined: China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, on dead fruit of *Quercus* sp., 25 Sept 2020, W.P. Wu (Wu17408, Wu17409). Living strain: 76164 and 76165 (from Wu17408), 78166, 78167 and 78168 (from Wu17409).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Canada.

Description and illustration: Sutton (1973); Holubová-Jechová (1973b); Ellis (1976); Réblová, Siefert & White (2005).

Notes: *Menispora manitobaensis* B. Sutton is characterized by absence of independent setae, setiform conidiophores with strongly flexuous or irregularly coiled upper part terminating in a sterile and obtuse apex, fertile regional with lateral branches in lower part of the main stipes, monophialidic borne laterally along the main stipe of the main stipe, and 3-septate, falcate to fusiform conidia with one setulum at each end. In the original description of *M. manitobaensis* B. Sutton (conidia 17-21.5 x 4-4.5 µm, without setulae), no setulae was reported (Sutton 1973b). Morphologically it resembles *M. glauca* Link ex. Pers. (conidia 16-26 x 3-4.5 µm, setulae 6-11 µm) in absence of independent sterile setae, fertile region with lateral branches in the lower part of the main stipes, and 3-septate falcate conidia without or with one setulum at each end (Hughes and Kendrick 1968; Ellis 1971, 1976; Holubová-Jechová 1973a, b; Sutton 1973b; Lunghini 1994; Réblová et al. 2005; Réblová and Seifert, 2008). *M. glauca* produces unbranched lateral branches terminating in a conidiogenous cell with a strongly recurved apex toward the main stipe.

Menispora paraciliata W.P. Wu & Y.Z. Diao, sp. nov., Figs. 93-94, MycoBank MB841613.

Etymology: refers to its morphological similarity with *Menispora ciliata*.

Diagnosis: It resembles *M. uncinata*, *M. ciliata*, *M. convoluta* and *C. gamsii*; but differs from all these species in multibranching in the upper part of the stipes

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead cone of *Pinus* sp., 16 Oct 2019, W.P. Wu (Holotype WFH Wu17033b; ex-type strains CGMCC 3.20742 = NN 77465).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, branched in the upper part with sterile setae, and branched in the lower part as fertile region, crowded, setiform, erect, straight or flexuous, up to 20-septate, brown, up to 600 µm long, basal cell swollen and 7-10 µm wide, 3-4 µm wide in the middle part, smooth, the upper part sterile and setiform, straight or flexuous; branches pale brown, smooth-walled, tapering gradually towards the rounded apex, 1.5-2 µm wide. Fertile region only in the lower part of the main stipes of the setiform conidiophores, with lateral branches, branches 0-2 septate, often in one side of the setiform conidiophores, unbranched with one terminal conidiogenous cell or occasionally branched with 2 terminal conidiogenous cells, strongly curved towards the main stipes, pale brown, thin-walled, smooth, 38-45 x 2.8-3.5 µm. Conidiogenous cells terminal, monophialidic, cylindrical, lageniform, recurved at the tip with rather inconspicuous collarettes, pale brown, thin-walled, 25-35 x 2.5-3.5 µm, tapering gradually towards the apex. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, 15.5-17.5 x 2.8-3 µm, hyaline, aseptate, asymmetrical, slightly tapered and pointed

at the basal end and obtuse at the other, each end with a single straight or slightly curved setulum, 5-10 µm long, subterminally or terminally inserted on the concave side.

Colonies on PDA effuse, colonies 0.8-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, central part grey, reverse pale brown.

Material examined: China, Zhejiang Province, Deqing, Moganshan, Luhadang, on dead cone of *Pinus* sp., 16 Oct 2019, W.P. Wu (Holotype WFH Wu17033). Living strains: ex-type strains NN 77465 (from Wu17033b), 77466 (from Wu17033d), 77477 (from Wu17033a), 77478 (from Wu17033c).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Menispora paraciliata* W.P. Wu & Y.Z. Diao is characterized by absence of independent setae, setiform conidiophores with several branches in the upper part and fertile region only at the lower part of the main stipes as whip-like extension with lateral branches, single or occasionally 2 terminal phialides borne on short branches, aseptate conidia with 1 setulum at each end. It resembles *M. uncinata* S. Hughes & W.B. Kendrick, *M. ciliata* Preuss ex Mussat, *M. convoluta* Lunghini and *C. gamsii* Hol-Jech. (Hughes and Kendrick 1968; Ellis 1971, 1976; Holubová-Jechová 1973a, b; Sutton 1973b; Lunghini 1994; Réblová et al. 2005, 2006; Réblová and Seifert, 2008). *Menispora paraciliata* differs from all these species by multibranching in the upper part of the stipes. In addition, *M. gamsii* and *M. uncinata* produce independent sterile setae and conidiophores; *M. convoluta* has larger conidia (17-23 x 3.5-4.2 µm) than those in *M. paraciliata*, thus they can be easily distinguished from *M. paraciliata*. *M. ciliata* is very similar to *M. paraciliata* in setiform conidiophores, strongly recurved conidiogenous cells towards the main stipes, and shape and size of the conidia, they differ in both branching characters of setiform conidiophores and also the ITS sequences.

The ITS sequences were obtained from several strains, isolated from fresh specimen, and studied phylogenetically. Phylogenetically, on a megablast search using the ITS sequence from the type specimen Wu17033, the closest matches in NCBI's GenBank nucleotide database were members of *Menispora*, *Zignoëlla*, *Codinaeopsis*, *Dictyochaeta* in *Chaetosphaeriaceae*, including *Menispora ciliata* (GeneBank MH860017, identities 523/537 (97%), 1 gap (0%)), *Chaetosphaeria ciliata* (GeneBank MH863181, identities 500/514 (97%), 2 gaps (0%)), *Menispora glauca* (GeneBank MH859920, identities 500/535 (93%), 5 gaps (0%)), *Menispora tortuosa* (GeneBank AF178558, identities 469/503 (93%), 5 gaps (0%)).

***Menispora paratortuosa* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 95-96, MycoBank MB841614.**

Etymology: refers to its morphological and phylogenetic similarity with *Menispora tortuosa*.

Diagnosis: Similar to *M. glauca*, *M. manitobaensis* and *M. tortuosa* in absence of independent sterile setae, fertile region with lateral branches in the lower part of the main stipes, and 3-septate falcate conidia with one setulum at each end, but differs from these species by unbranched lateral branches and ITS sequences.

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead fruit of *Platanus occidentalis*, 16 Oct 2019, W.P. Wu (Holotype WFH Wu17005; ex-type strains CGMCC 3.20748 = NN 77625).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, crowded, setiform, cylindrical, straight in the lower part with fertile branches, strongly flexuous or twisted or loosely coiled and sterile in the upper part, up to 15-septate, thick-walled, smooth, brown to dark brown, up to 450 µm long, 3.5-4.5 µm wide, slightly swollen at the basal cell, only slightly tapering toward the apex and terminating in a sterile pale brown apex and 3-3.5 µm wide; Fertile region only in the lower part of the main stipes of the setiform conidiophores, with lateral branches, branches 1-3-septate, in both sides of the setiform conidiophores, unbranched with one terminal conidiogenous cell, cylindrical, straight, smooth, thick-walled and brown at the lower part and becoming pale brown and thin-walled in the upper part, 15-25 x 4-5 µm. Conidiogenous cells terminal, monophialidic, cylindrical, lageniform, not recurved at the tip and with rather inconspicuous collarettes, pale brown, thin-walled, 11-15 x 4-5 µm, tapering gradually towards the apex. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, fusiform, 18.5-24.5 x 3.5-4 µm, hyaline, 3-septate, symmetrical, obtuse at both ends, each polar cell with a single straight or slightly curved setulum, 8-9 µm long, subterminally or terminally inserted on the concave side.

Colonies on PDA effuse, colonies 1-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, reverse pale brown to soil brown.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead fruit of *Platanus occidentalis*, Oct 16, 2019, W.P. Wu (Holotype WFH Wu17005). Living strain: ex-type strains NN 77625), 77473 and 77474).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Menispora paratortuosa* W.P. Wu & Y.Z. Diao is characterized by absence of independent setae, setiform conidiophores with strongly flexuous or irregularly coiled upper part terminating in a sterile and obtuse apex, fertile regional with lateral branches in lower part of the main stipes, monophialidic borne on short metulae

along the main stipe of the main stipe, and 3-septate, falcate to fusiform conidia with one setulum at each end. Morphologically it resembles *M. glauca* Link ex. Pers. (conidia 16-26 x 3-4.5 µm, setulae 6-11 µm), *M. manitobaensis* B. Sutton (conidia 17-21.5 x 4-4.5 µm, without setulae), *M. tortuosa* Corda (conidia 18-25 x 3.5-4.5 µm, setulae 8-12 µm) in absence of independent sterile setae, fertile region with lateral branches in the lower part of the main stipes, and 3-septate falcate conidia with one setulum at each end (Hughes and Kendrick 1968; Ellis 1971, 1976; Holubová-Jechová 1973a, b; Sutton 1973b; Lunghini 1994; Réblová et al. 2005, 2006; Réblová and Seifert, 2008). *M. paratortuosa* differs from these species by unbranched lateral branches and ITS sequences. In addition, *M. glauca* produces unbranched lateral branches terminating in a conidiogenous cell with a strongly recurved apex toward the main stipe; *M. manitobaensis* produces aetose conidia, thus they can easily be distinguished from *M. paratortuosa*. In *M. tortuosa*, the lateral fertile branches are heavily branched with 2-3 secondary branches and several conidiogenous cells in clusters. The ITS sequences were obtained from several strains, isolated from fresh specimen, and phylogenetically, on a megablast search using the ITS sequence from the type specimen Wu17005, the closest matches in NCBI's GenBank nucleotide database were *Menispora tortuosa* (GeneBank KT225527, identities 439/447 (98%), *Menispora manitobaensis* (GeneBank EU488738, identities 439/449 (98%), 3 gaps (0%)), *Menispora glauca* (GeneBank MH859920, identities 437/447 (97%), 1 gap (0%)), *Menispora tortuosa* (GeneBank AF178558, identities 434/447 (97%), 2 gaps (0%)), *Chaetosphaeria ciliata* (GeneBank MH863180, identities 409/449 (91%), 4 gaps (0%)).

Multiguttulispora C.G. Lin & J.K. Liu, Mycosphere 10: 681, 2019

Saprobic on decaying plant. Asexual morph: Colonies on plant substrate effuse, scattered, white to pale brown. Mycelium partly immersed, composed of brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores mononematous, macronematous, erect, straight, or flexuous, unbranched, septate, smooth, dark brown at the base becoming light brown towards the apex, cylindrical. Conidiogenous cells polyblastic, integrated, terminal, sympodial, pale brown, cylindrical. Conidia aggregated in slimy mass at the apex of the conidiophores, acrogenous, smooth, hyaline, septate, with guttulates, cylindrical, oblong with an appendage at each end. Sexual morph: Undetermined.

Type species: *Multiguttulispora dimorpha* (Toyaz & Udagawa) Réblová & Hern.-Restr. (= *Multiguttulispora sympodialis* C.G. Lin & J.K. Liu).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Japan, Malaysia, Peru and Thailand.

Description and illustration: Lin et al. (2019).

Notes: In a phylogenetic study of hyaline-spored chaetosphaeriaceous fungi, Lin et al. (2019) found that *Multiguttulispora sympodialis* C.G. Lin & J.K. Liu phylogenetically formed a separate clade within the family Chaetosphaeriaceae on the tree generated based on the combined LSU and ITS sequence data. Therefore, the new genus *Multiguttulispora* was introduced to accommodate this distinct fungus. Morphologically this genus is characterized by absence of setae, macronematous or mononematous conidiophores terminated in a polyblastic and sympodial conidiogenous cells, and ellipsoidal to oblong to ellipsoidal-fusiform, hyaline, 3-septate and multiguttulate conidia with a basal hilum and a gently curved setula at each end.

More recently Réblová et al. (2021b) showed that in the phylogeny, the genus forms a monophyletic lineage containing two species, *Codinaea dimorpha* and *C. triseptata*. Furthermore, the comparison of morphological characters and DNA sequences revealed *M. sympodialis* conspecific with *Codinaea dimorpha*. Based on these both *Codinaea* species were transferred to *Multiguttulispora*, and *M. sympodialis* was reduced to the synonymy of *M. dimorpha*.

In our phylogenetic analysis (Fig. 97), the three *Multiguttulispora* species, *Multiguttulispora dimorpha*, *M. triseptata* and an undescribed species are grouped together and form a well-supported distinct clade. This analysis further supports the generic delimitation of *Multiguttulispora*. In our study to several specimens of *Multiguttulispora* collected from China, we constantly observed the breaking-off of the collarettes from conidiogenous cells and carried away by the conidia, and this make the conidiogenous cells with a sympodial appearance without collarettes. This was also shown in their illustration of *D. triseptata* by Crous et al. (2015).

Key to species of *Multiguttulispora*

1. Conidiophores and conidia dimorphic; conidiophores of two types: polyphialidic and monophialidic; conidia from polyphialides 3-septate, 22-28 x 7-8 µm, with setulae 5-6 µm long; conidia from monophialidic 0-septate, 10-18 x 1-2 µm, non-setulae *M. dimorpha*
1. Conidiophore and conidia monomorphic, only macroconidia produced; conidiophores solitary or in clusters; 2
2. Conidia 21-30 x 6-7.5 µm; setulae 3-6 µm long *M. triseptata*
2. Conidia 20-22 x 5.5-7 µm; setulae up to 6 µm long *M. paratriseptata*

Multiguttulispora dimorpha (Toyaz & Udagawa) Réblová & Hern.-Restr., J. Fungi 7 (6, no. 438): 20, 2021.

≡ *Codinaea dimorpha* Toyaz & Udagawa, Mycotaxon 13: 451, 1981.

≡ *Dictyochaeta dimorpha* (Toyaz & Udagawa) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

≡ *Dictyochaeta dimorpha* (Toyaz & Udagawa) Aramb. & Cabello, Mycotaxon 34: 681, 1989.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, setiform, simple, erect, straight, or slightly flexuous, 6-13-septate, dark brown to blackish brown and thick-walled in the lower part, becoming paler towards the apex, smooth, 200-300 x 6.5-7.5 µm, with a few percurrent proliferation through collarettes. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 20-35 x 4-7 µm, pale brown, thin- and smooth-walled, with up to 10 sporulating loci, without conspicuously collarette. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, cylindrical, straight or curved, obtuse at both ends, 17-22 x 6.5-8 µm, 3-septate, hyaline, smooth, both apex and base with a setula 5-9 µm long.

Colonies on PDA effuse, colonies 10-14 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, pale brown, reverse of the same color.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead material of palm, 3 March 2012, W.P. Wu (Wu12160); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead material of palm, 2 March 2012, W.P. Wu (Wu12209); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leaves of unidentified tree, 2 March 2012, W.P. Wu (Wu12243, with a few bases difference from other strains); China: Guangxi Province, Nanning, on dead leaves of *Podocarpus* sp., 3 Jan. 1998, W.P. Wu (Wu1666e); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Rhododendron* sp., 30 Dec. 1997, W.P. Wu (Wu1554e); China: Guangxi Province, Shiwandashan, on dead branches of unidentified plant, 28 Dec. 1997, W.P. Wu (Wu1497); China: Guangxi Province, Damingshan, on dead leaves of unidentified plant, 20 Dec. 1997, W.P. Wu (Wu1453a); China: Sichuan Province, Dujiangyan, Qingcheng Shan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17233); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead petiole of palm, 12 June 2015, W.P. Wu (Wu13351; Wu13356); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Ginkgo biloba*, 12 June 2015, W.P. Wu (Wu13283). Living strain: 54255 (from Wu12160), 54203 (from Wu12243), 54226 (from Wu12204), 59026 (from Wu13356a), 59027 (from Wu13351b), 59037 (from Wu13351a), 59042 (from Wu13356b), 59057 (from Wu13283).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan, Malaysia, Peru and Thailand.

Description and illustration: Toyaz and Udagawa (1981); Réblová et al. (2021b).

Notes: *Codinaea dimorpha* Toyaz & Udagawa (Mycotaxon 13(3): 451, issued July 1st, 1981) and *Codinaea triseptata* Matsush. (Matsushima Mycological Memoir 2: 4, issued Sept. 1981) are very similar on clustered conidiophores, terminal polyphialidic conidiogenous cells with funnel-shaped collarettes with sympodial proliferations, and allantoid, ellipsoid to oblong, 3-septate conidia in similar size (*C. dimorpha*: conidia 22-28 x 7-8 µm, setulae 5-6 µm; *C. triseptata*: conidia 21-30 x 6-7.5 µm, setulae 3-6 µm). The only difference seems to be production of both 3-septate macroconidia and also aseptate and cylindrical microconidia (10-18 x 1-2 µm) from the monophialidic conidiogenous cells in *C. dimorpha*. However, the aseptate and fusoid-ellipsoidal microconidia (7-12 x 2 µm) was also reported from pure culture of *C. triseptata* (Crous et al. 2015).

Multiguttulispora dimorpha (Toyaz & Udagawa) Réblová & Hern.-Restr., has broad variation on morphology of conidiophores, conidiogenous cells and conidia. The conidia from the Chinese collections are slightly smaller than those in original description (21-30 x 6-7.5 µm). Phylogenetically the ITS sequences from these Chinese collections are identical to those reported from Malaysia (Crous et al., 2015) and Thailand. This species seems to be a subtropical and tropical species and has been collected from several different locations in subtropical and tropical areas in China.

Multiguttulispora paratriseptata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 98. MycoBank MB841571

Etymology: refers to its 3-septate conidia and also morphological similarity to *M. triseptata*.

Diagnosis: Similar to *Multiguttulispora triseptata* and *M. dimorpha*, but differs in ITS sequences.

Typification: China: Guangdong, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Holotype WFH Wu12457; ex-type strain CGMCC 3.20796 (= 55338).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, setiform, simple, erect, straight, or slightly flexuous, 6-13-septate, dark brown to blackish brown and thick-walled in the lower part, becoming paler towards the apex, smooth, 200-350 x 6-8 µm, with a few percurrent proliferation through collarettes. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 35-45 x 5-6 µm, pale brown, thin- and smooth-walled, with up to 10 sporulating loci, without conspicuously collarette. Conidia holoblastic, acrogenous, solitary, formed in droplet

surrounding the tips of conidiogenous cells, cylindrical, straight or curved, obtuse at both ends, 20-22 x 5.5-7 µm, 3-septate, hyaline, smooth, both apex and base with a setula up to 6 µm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire or regular, aerial mycelium well-developed, grey to grey brown, reverse pale brown to brown.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead material of palm, 3 March 2012, W.P. Wu (Wu12099); China: Guangdong Province, Zhaoqing, Dinghushan, on dead material of palm, 3 March 2012, W.P. Wu (Wu12118); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12169); China: Guangdong Province, Zhaoqing, Dinghushan, on dead material of palm, 3 March 2012, W.P. Wu (Wu12194); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead material of palm, 2 March 2012, W.P. Wu (Wu12211); China: Yunnan Province, Simao, on dead branches of unidentified plant, 13 Oct. 1999, W.P. Wu & Yan Huang (Wu2812a); China: Guangdong, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Holotype WFH Wu12457). Living strain: 54209 (from Wu12118), 54199 (from Wu12099), 54253 (from Wu12169), 54205 (from Wu12194), 54201 (from Wu12211), ex-type strain 55338 (from Wu12457).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Multiguttulispora paratriseptata* W.P. Wu & Y.Z. Diao is morphologically very close to *M. dimorpha* (Matsushima 1981; Toyaz and Udagawa, 1981), but phylogenetically differs from each other. This species seems to be also a subtropical and tropical species and has been collected from several locations in subtropical and tropical areas in China.

Neotainosphaeria W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841527.

Etymology: refers to its phylogenetic relationship with the genus *Tainosphaeria*.

Diagnosis: Setae absent. Conidiophores simple, cylindrical with terminal monophialidic conidiogenous cells bearing inconspicuous collarettes. Conidia globose to subglobose, thick- and rough-walled, hyaline, aseptate, bearing 2-3 setulae. Similar to *Codinaeella* and *Tainosphaeria*, but differs in producing monophialidic conidiogenous cell with inconspicuous collarette, and globose to subglobose, rough- and thick-walled conidia bearing 2 setulae.

Type species: *Neotainosphaeria microsperma* W.P. Wu & Y.Z. Diao.

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight or slightly flexuous, dark brown to reddish brown, 4-6-septate, smooth-walled in the lower part, becoming strongly verruculose in the upper part and with irregularly arranged striate, thick-walled, with a swollen basal cell, terminating in a conidiogenous cell, proliferating percurrently through collarette. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, dark brown, apex pale brown, with a narrow sporulating locus, collarette indistinct. Conidia holoblastic, monoblastic, acrogenous, solitary, globose to subglobose, hyaline, smooth, thick-walled, with 2-3 slender appendages, accumulating in a head at the tips of the conidiogenous cells.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China

Notes: Morphologically *Neotainosphaeria* is similar to *Codinaeella* and *Tainosphaeria*, but differs in producing monophialidic conidiogenous cell with inconspicuous collarette, and globose to subglobose, rough- and thick-walled conidia bearing 2 setulae. It also resembles *Calceispora* Matsush. and *Bahusutrabeeja* Subraman. & Bhat, but can be distinguished by monophialidic conidiogenous cells bearing narrower sporulating loci with inconspicuous collarette, rough- and thick-walled conidia with both terminal and lateral setulae (Matsushima 1975; Subramanian and Bhat 1977; Seifert et al. 2011). Furthermore, phylogenetically they are also very different.

Neotainosphaeria microsperma W.P. Wu & Y.Z. Diao, sp. nov., Fig. 99, MycoBank MB841572

Etymology: refers to its small conidia.

Diagnosis: Setae absent; Conidiophore 200-500 x 7-8 µm, with one terminal monophialidic conidiogenous cell bearing inconspicuous collarette; Conidia globose to subglobose, thick- and rough-walled, 11-13 µm diam, with 2-3 setulae up to 5 µm long.

Typification: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu1928a; ex-type strain CGMCC 3.20789 (= NN 44779).

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight or slightly flexuous, dark brown to reddish brown, 4-6-septate, smooth-walled in the lower part, becoming strongly verruculose in the upper part and with irregularly arranged striate, thick-walled, 200-500 x 7-8 µm, with a swollen basal cell up to 15 µm wide, terminating in a conidiogenous cell,

proliferating percurrently through collarette. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, dark brown, apex pale brown, 25-32 x 6-8 µm, with a narrow sporulating locus of up to 2 µm wide, collarette indistinct. Conidia holoblastic, monoblastic, acrogenous, solitary, globose to subglobose, hyaline, rough- and thick-walled, 11-13 µm diam, with 2-3 slender appendages, up to 5 µm long, accumulating in a head at the tips of the conidiogenous cells.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu1928a). Living strain; ex-type strain 44779.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Known distribution: China.

Notes: *Neotainosphaeria microsperma* W.P. Wu & Y.Z. Diao differs from all other known fungal species by a combination of characters: verruculose conidiogenous cells with narrow sporulating loci; globose to subglobose, thick-walled conidia of 11-13 µm diam and with 2-3 setulae appendages up to 5 µm long. *N. microsperma* morphologically resembles *Bahusutrabeeja dwaya*, *Bahusutrabeeja globosa* Bhat & W. Kendr. and *Bahusutrabeeja bunyensis*, but can be distinguished by smooth-walled conidiogenous cell with a broad sporulating loci and multiappendaged conidia in *B. dwaya* and *B. globosa*; by smaller conidia (7-10 µm diam) in *B. bunyensis* (Subramanian and Bhat 1977; Rao and de Hoog 1986; Bhat and Kendrick 1993; Bhat 1994; McKenzie 1997). Both LSU and ITS sequences were obtained from the single spore isolate of the type specimen and its affinity to other members of Chaetosphaeriaceae was confirmed by phylogenetic analysis.

Nimesporella Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 66, 2021.

Colonies effuse, brown, composed of conidiophores, mycelium immersed. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, single or in groups, erect, straight or flexuous to geniculate in the upper part, unbranched, septate, smooth, brown, paler toward the apex. Conidiogenous cells integrated, terminal, polyphialidic, extending sympodially, paler than the conidiophore, often with persistent remnants of the collarettes; collarettes flared, soon evanescent. Conidia ellipsoidal, fusiform, rounded at the apical end, papillate at the basal end, aseptate, hyaline, with a straight or gently curved setula at each end, basal setulae positioned ventrally, conidia accumulate in slimy whitish fascicles.

Type species: *Nimesporella capillacea* Réblová & Hern.-Restr.

Ecology/Substrate/Host: Saprobe on decaying plant material.

Geographical distribution: China, Asia, South American, New Zealand.

Description and illustration: Réblová et al. (2021e).

Notes: The genus *Nimesporella* Réblová & Hern.-Restr., typified by *N. capillacea*, is characterized by absence of setae, septate conidiophores bearing terminal polyphialidic conidiogenous cells with sympodially extending and flared collarettes, and hyaline, aseptate, ellipsoidal to fusiform conidia with setulae at both ends (Réblová et al. 2021e). Phylogenetic analysis with 3 additional species show that members of this genus formed a distinct clade from other known *Codinaea* and *Dictyochoeta* species.

Apart from the three species studied by us, several published species with similar morphology as *N. capillacea* are also assigned to the genus, including *Dictyochoeta aliformis* Kuthub. & Nawawi, *Codinaea aquatica* R.F. Castañeda, M.S. Oliveira & Malosso, *Codinaea leomaiae* M.A. Barbosa, Malosso & R.F. Castañeda, *D. tumidospora* Kuthub. & Nawawi and *Hyphodiscosia queenslandica* Matsush. (Hughes and Kendrick 1968; Holubová-Jechová 1984; Kuthubutheen and Nawawi 1991b, e; Bhat and Kendrick 1993; Whitton et al. 2000; Seifert et al. 2011; Oliveira et al. 2015; Barbosa et al. 2016; Arias et al. 2018).

Key to all accepted species in *Nimesporella*:

1. Conidia 8-11.5 x 4.5-5 µm; setulae 2-3.5 µm long *N. capillacea*
1. Conidia more than 10 µm long 2
2. Conidia less than 5 µm wide 3
2. Conidia >5 µm wide 4
3. Conidia 10-15.5 x 3.5-5 µm, setulae 3-5 µm long *N. daphnioides*
3. Conidia 13-15 x 4.5-5 µm, setulae 6-9 µm long *N. aunstrupii*
4. Conidia more than 20 µm in average 5
4. Conidia less than 20 µm long in average 6
5. Conidia 20-28.5 x 7-9.5 µm, setulae 8-10.5 µm long *N. tumidospora*
5. Conidia 25-28 x 10-12 µm, setulae 4.5-8 µm long *N. aquatica*
6. Conidia 16-22 x 4-5 µm, setulae 18-22 µm long *N. aliformis*
6. Conidial setulae less than 15 µm long 7
7. Conidia 17-20 x 6.5-7.5 µm, setulae 7-10 µm long *N. riisgaardii*
7. Conidia 10-18 x 8.5-9.5 µm, setulae <6 µm long *N. leomaiae*

Nimesporella aliformis (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841704
≡ *Dictyochoaeta aliformis* Kuthub. & Nawawi, Mycol. Res. 95: 104, 1991.

Colony effuse. Conidiophores solitary, cylindrical, straight to slightly flexuous, simple, septate, up to 960 µm long, 4.5-6 µm wide at the base, tapering to 3.5-4 µm wide at the apex, terminating in a polyphialide. Conidiogenous cells terminal, polyphialidic, up to 80 µm long, with up to 9 successive proliferations and the polyphialide bears the persistent remains of the collarettes. Collarettes tubular to somewhat cylindrical, 1-1.5 µm wide, 1-1.5 µm deep. Conidia hyaline, smooth, aseptate, ellipsoidal, papillate, guttulate, 16-22 x 4-5 µm, with a single, simple setulae 18-22 µm long at each end.

Typification: Malaysia: Kedah, Gunong Jerai, on decaying plant, Feb. 1989, A.J. Kuthubutheen, IMI335262.

Ecology/Substrate/Host: Saprobe on decaying plant.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991b).

Notes: *Dictyochoaeta aliformis* Kuthub. & Nawawi was described from Malaysia. Although no DNA sequence data is available for phylogenetic analysis, morphologically it fits well to the concept of *Nimesporella* in absence of setae, terminal polyphialidic conidiogenous cell with sympodial extensions, and ellipsoidal, papillate conidia with 1 setula at each end (Kuthubutheen and Nawawi, 1991b). It differs from other accepted species by longer setulae (18-22 µm).

Nimesporella aquatica (R.F. Castañeda, M.S. Oliveira & Malosso) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841705.

≡ *Codinaea aquatica* R.F. Castañeda, M.S. Oliveira & Malosso, Mycotaxon 130:1046, 2015

Colony effuse. Conidiophores solitary, cylindrical, straight to slightly flexuous, simple, septate, 200-350 x 4-6 µm, terminating in a polyphialide. Conidiogenous cells terminal, polyphialidic, 40-60 x 6-7 µm, bearing 1-2 persistent remains of the collarettes; collarettes funnel-shaped, 2.5-4 µm deep. Conidia hyaline, smooth, aseptate, ellipsoidal, papillate, guttulate, 25-28 x 10-12 µm, with a single, simple setulae 4.5-8 µm long at each end.

Typification: Brazil, Pernambuco, Cabo de Santo Agostinho, Refúgio de Vida Silvestre, Matas do Sistema Gurjaú, on submerged decaying branches of unidentified plant in a river, 12.V.2015, coll. M.S. Oliveira (Holotype, URM 87707).

Ecology/Substrate/Host: Saprobe on submerged decaying branches.

Geographical distribution: Brazil.

Description and illustration: Oliveira et al. (2015).

Notes: *Codinaea aquatica* R.F. Castañeda, M.S. Oliveira & Malosso is a recently described species from Brazil and it fits well to the concept of *Nimesporella* on absence of setae, terminal polyphialidic conidiogenous cell with sympodial proliferation, and ellipsoidal, papillate conidia with 1 setula at each end. It differs from other relevant species by larger conidia with relatively short setulae (Kuthubutheen and Nawawi 1991; Oliveira et al. 2015; Barbosa1 et al. 2016).

Nimesporella aunstrupii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 100, MycoBank MB841569

Etymology: named after the former President of Novozymes in China, Knud Aunstrup, from whom one of the authors received strong support and encouragement.

Diagnosis: Setae absent. Conidiophores 60-85 x 3-4.5 µm, with terminal polyphialidic conidiogenous cells bearing funnel-shaped collarettes; Conidia ellipsoid, guttulate, 13-15 x 4.5-5.5 µm, setulae 6-9 µm long.

Typification: On dead leaves of unidentified tree, China: Guangdong Province, Zhaoqing, Dinghushan, 3 March 2012, W.P. Wu (Holotype WFH Wu12202a; ex-type strain CGMCC 3.20648 (=54329)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, separated or aggregated in cluster, erect, straight or slightly flexuous, brown to dark brown in the basal part, becoming paler towards the apex, cylindrical, 3-4 septate, wall thick and slightly verruculose, 60-85 x 3-4.5 µm, with a swollen basal cell of 10-13 µm wide. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical, 30-38 x 3.5-4 µm, pale brown to brown, thin-walled, collarette funnel-shaped and easily break off from the conidiogenous and attached to the conidial bases, 2-2.5 µm wide, 1.5-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, broad fusiform, ellipsoid, straight or slightly curved, 13-15 x 4.5-5.5 µm, aseptate, hyaline to pale brown, smooth, apex acute to rounded, with one setula at each end, 6-9 µm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, reverse brown to dark brown.

Material examined: On dead leaves of unidentified tree, China: Guangdong Province, Zhaoqing, Dinghushan, 3 March 2012, W.P. Wu (Holotype WFH Wu1220; ex-type strain 54329); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1327b, with long conidiophores); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of unidentified plant,

2 Jan. 1997, W.P. Wu (Wu1319a, with basal frill). Living strain: ex-type strain CGMCC 3.20648 (=NN54329) (from Wu1220), 43124 (from Wu1319a), 43202 (from Wu1327b).

Ecology/Substrate/Host: Saprobe on dead leave of plant.

Geographical distribution: China.

Notes: *Nimesporella aunstrupii* W.P. Wu & Y.Z. Diao resembles *Dictyochaeta aliformis* Kuthub. & Nawawi, *D. daphnioides* Kuthub. & Nawawi, *D. tumidospora* Kuthub. & Nawawi and *K. riisgaardii*, in absence of fertile/sterile setae, ellipsoidal and papillate conidia bearing one setula in each end (Kuthubutheen and Nawawi, 1991b; Whitton et al. 2000). Among them, *D. aliformis* (conidia fusiform, papillate at both ends, 16-22 x 4-5 µm, setulae 18-22 µm long), *K. riisgaardii* (conidia 17-20 x 6.5-7.5, setulae 6.5-8 µm long) and *D. tumidospora* (conidia 20-28.5 x 7-9.5 µm, setulae 8-10.5 µm long) have significantly larger conidia than those in *D. aunstrupii*; furthermore *D. aliformis* has more or less fusiform conidia which are papillate at both ends, narrower (16-22 x 4-5 µm) and with much longer setulae (18-22 µm) than those in *K. aunstrupii*. *D. tropicalis* (conidia 7.5-9.5 x 3-5 µm, setulae 2.5-3.5 µm long) has much smaller conidia with shorter setulae than those in *K. aunstrupii*. *D. daphnioides* (conidia 10-15.5 x 3.5-5.5 µm, setulae 2.7-5 µm long) and *D. aunstrupii* (conidia 13-15 x 4.5-5.5 µm, setulae 6-9 µm long) have similar sized conidia, however in the latter species, the conidial setulae are much longer and the conidiophores (up to 85 µm long) are much shorter than those in *D. daphnioides* (conidiophores up to 250 µm long). The recently described species *Nimesporella capillacea* Réblová & Hern.-Restr. (conidia 8-11.5 x 4.5-5 µm, setulae 2-3.5 µm long) is also similar with *N. aunstrupii*, but differs by smaller conidia and shorter setulae (Réblová et al. 2021e). The ITS sequences from these two species are with high identity.

Nimesporella daphnioides (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 101. MycoBank MB841706

≡ *Dictyochaeta daphnioides* Kuthub. & Nawawi, Mycol. Res. 95: 105, 1991.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 4-7-septate, medium brown to dark brown at the lower part, becoming paler towards the apex, smooth, 120-160 x 3-4.5 µm, base with a swollen and lobbed cell up to 10 µm wide. Conidiogenous cells integrated, terminal, polyphialidic with up to 6 collarettes, cylindrical, up to 60 µm long, 3.5-4.5 µm wide, pale brown, thin- and smooth-walled, collarette tubular to somewhat cylindrical, 1-1.5 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, ellipsoidal, papillate at the basal end, straight or slightly curved, obtuse at the apex, 12-13.5 x 4.5-6 µm, aseptate, hyaline, smooth, with a setula of 4-6 µm long at each end.

Material examined: China: Guangxi Province, Shangs County, on dead leaves of unidentified plant, 31 Dec. 1997, W.P. Wu (Wu1686b); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of *Smilax* sp., 3 March 2012, W.P. Wu (Wu12150). Living strain: 54326 (from Wu12150).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991b); Zucconi et al. (1994).

Notes: *Dictyochaeta daphnioides* Kuthub. & Nawawi differs from other related species by its conidiogenous cells with tubular to somewhat cylindrical collarette, and smaller size of conidia and shorter setulae (Kuthubutheen and Nawawi, 1991b; Whitton et al. 2000). It resembles *Nimesporella capillacea* (conidia 8-11.5 x 4.5-5 µm; setulae 2-3.5 µm long) in small sized ellipsoidal-shaped conidia, but differs from it by slightly longer setulae (Réblová et al. 2021e).

Nimesporella leomaiae (M.A. Barbosa, Malosso & R.F. Castañeda) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841707.

≡ *Codinaea leomaiae* M.A. Barbosa, Malosso & R.F. Castañeda, Mycotaxon 131: 424, 2016.

Colony effuse. Setae absent. Conidiophores solitary, cylindrical, straight to slightly flexuous, simple, 10-14-septate, 260-300 x 7-9 µm, terminating in a polyphialide. Teleomorph: Unknown. Anamorph: Conidiogenous cells terminal, polyphialidic, 40-50 x 4-5 µm, with a few sympodial extensions and the polyphialide bears 3-6 persistent remains of the collarettes. Collarettes tubular to somewhat cylindrical, 3.5-5 µm wide, 2-5 µm deep. Conidia hyaline, smooth, aseptate, broadly fusiform to eye-shaped, slightly papillate, guttulate, 10-18 x 8.5-9.5 µm, with a single, simple setulae 3.5-6 µm long at each end.

Typification: Brazil, Pernambuco, Tamandare, REBIO Salinho, 8°43'S 35°11'W, alt. 85 m., on decaying leaf of an unidentified plant, 9.XI.2015, coll. M.A. Barbosa (Holotype URM 88249).

Ecology/Substrate/Host: Saprobe on decaying leaves.

Geographical distribution: Brazil.

Description and illustration: Barbosa et al. (2016).

Notes: *Dictyochaeta leomaiae* M.A. Barbosa, Malosso & R.F. Castañeda is a recently described species and very characteristic in producing broadly fusiform or eye-shaped and guttulate conidia with one setulae at each end. It differs from other similar species by size of conidiophores, conidia, and setulae (Barbosa et al. 2016).

Nimesporella queenslandica (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841708.

≡ *Hyphodiscosia queenslandica* Matsush., Matsush. Mycol. Mem. 6: 24, 1989.

Geographical distribution: Australia.

Description and illustration: Matsushima (1989).

Notes: *Hyphodiscosia queenslandica* Matsush. fits well to the generic concept of *Nimesporella* on both conidiogenous cells and conidia, thus it is officially transferred into the genus.

Nimesporella riisgaardii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 102-103, MycoBank MB841570

Etymology: named after the former CEO of Novozymes, Mr. Steen Risgaard, who made significant contribution to sustainability and also gave strong support to this work.

Diagnosis: Setae absent. Conidiophore 25-53 x 4.5-5.5 µm, with terminal polyphialidic conidiogenous cell bearing funnel-shaped collarette; Conidia ellipsoidal, slightly papillate at the base, 17-20 x 6.5-7.5 µm, setulae 7-10 µm.

Typification: China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead petiole of palm, 12 June 2015, W.P. Wu (Holotype WFH Wu13349; ex-type strain NN 59021).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 8-12-septate, medium brown to dark brown at the lower part, becoming paler towards the apex, smooth, 150-230 x 5-7 µm, base with a swollen and lobbed cell up to 18 µm wide. Conidiogenous cells integrated, terminal, polyphialidic with up to 6 collarettes, cylindrical, 25-53 x 4.5-5.5 µm, pale brown, thin- and smooth-walled, collarette tubular to somewhat cylindrical, 1-1.5 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, ellipsoidal, slightly papillate at the basal end, straight or slightly curved, obtuse at the apex, 17-20 x 6.5-7.5 µm, aseptate, hyaline, smooth to slightly verruculose, with a setula of 7-10 µm long at each end.

Colonies on PDA effuse, colonies up to 25 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, white, grey in the central part, reverse pale brown to brown.

Material examined: China: Guangdong Province, on dead leaves of ?*Smilax* sp., 9 Oct. 1998, W.P. Wu (Wu2083j); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1931); China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 15 Oct. 1998, W.P. Wu (Wu2017); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1271g); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead petiole of palm, 12 June 2015, W.P. Wu (Holotype WFH Wu13349) Living strain: 44781 (from Wu1931), 45186 (from Wu2017), 42864 (from Wu1271g), ex-type strain 59021 59062, 59003 and 59081 (from Wu13349).

Ecology/Substrate/Host: Saprobe on dead leaves and branches of plants including ?*Smilax* sp.

Geographical distribution: China.

Notes: *Nimesporella riisgaardii* W.P. Wu & Y.Z. Diao resembles *Dictyochaeta aliformis* Kuthub. & Nawawi, *D. daphnioides* Kuthub. & Nawawi, *D. tropicalis* Bhat & W.B. Kendr. and *D. tumidospora* Kuthub. & Nawawi, in absence of fertile/sterile setae and producing ellipsoidal and papillate conidia bearing one setula in each end (Kuthubthdeen and Nawawi 1991b; Whitton et al. 2000). Among them, *D. daphnioides* (conidia 10-15.5 x 3.5-5.5 µm, setulae 2.7-5 µm long) and *D. tropicalis* (conidia 7.5-9.5 x 3-5 µm, setulae 2.5-3.5 µm long) have much smaller conidia with shorter setulae than those in *K. riisgaardii*; *D. tumidospora* (conidia 20-28.5 x 7-9.5 µm, setulae 8-10.5 µm long) has significantly larger conidia than those in *P. riisgaardii*; while *D. aliformis* has more or less fusiform conidia which are papillate at both ends, narrower (16-22 x 4-5 µm) and with much longer (18-22 µm) setulae than those in *P. riisgaardii*.

Nimesporella tumidospora (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841709.

≡ *Dictyochaeta tumidospora* Kuthub. & Nawawi, Mycol. Res. 95: 106, 1991.

Colony effuse. Teleomorph: Unknown. Anamorph: Conidiophores solitary, cylindrical, straight to slightly flexuous, simple, septate, up to 400 µm long, 6-7.5 µm wide at the base, tapering to 5-7 µm wide at the apex, terminating in a polyphialide. Conidiogenous cells terminal, polyphialidic, up to 40 µm long, with up to 4 successive proliferations and the polyphialide bears the persistent remains of the lateral collarettes. Collarettes funnel-shaped, 3-5 µm wide, 3-5 µm deep. Conidia hyaline, smooth, aseptate, ellipsoidal, papillate, guttulate, 20-28.6 x 7-9.5 µm, with a single, simple setulae 8-10.5 µm long at each end.

Typification: Malaysia: Pahang, Bukit Rengit Forest Reserve, on decaying plant, Oct. 1989, A.J. Kuthubutheen, IMI335263.

Ecology/Substrate/Host: Saprobe on decaying plant.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991b).

Notes: *Dictyochaeta tumidospora* Kuthub. & Nawawi was also described from Malaysia and it fits well to the concept of *Nimesporella* on absence of setae, terminal polyphialidic conidiogenous cell, and ellipsoidal, papillate conidia with 1 setula at each end (Kuthubutheen and Nawawi 1991b).

Oxenbollia W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841528.

Etymology: named after the former mycologist Karen Oxenboll, who gave strong support to this work.

Diagnosis: Similar to *Codinaeella* and *Tainosphaeria* in morphology of conidiophores, conidiogenous cells and conidia, but differs phylogenetically.

Type species: *Oxenbollia lunatospora* W.P. Wu & Y.Z. Diao.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, septate, smooth, terminating with a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic with sympodial proliferation, clavate, cylindrical, pale brown to brown, thin-walled, ending in a flared collarete which is funnel-shaped. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, lunate, fusiform, curved, aseptate, hyaline, smooth, guttulate, both apex and base bear a rudimentary setula.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Notes: Phylogenetic analysis indicates that *Tainosphaeria* is a polyphyletic genus and the monophyletic generic concept was proposed with 5 lineages that correspond to particular morphologies (Réblová et al., 2021b). One strains obtained from China is grouped together with *Tainosphaeria* and related genera, but forms a distinct subclade and the new genus *Oxenbollia* is introduced for it. The absence of sterile/fertile setae, unbranched conidiophores, terminal mono- or phialidic conidiogenous cells with funnel-shaped collarete, and aseptate conidia with simple setulae are the main diagnostic characteristics of this newly established genus. Morphologically it is very similar with member of *Codinaeella* and *Tainosphaeria s. str.*

Oxenbollia lunatospora W.P. Wu & Y.Z. Diao, sp. nov., Figs. 104, MycoBank MB841573

Etymology: refers to its lunate conidia.

Diagnosis: Setae absent. Conidiophores 35-60 x 3-5 µm. Conidiogenous cells 30-40 x 3-3.5 µm, mono- or polyphialidic, with funnel-shaped collarete. Conidia falcate, 15-17 x 2.5-3 µm. Very similar to *T. sivanesanii* but differs in longer conidiogenous cells and slightly wider conidia.

Typification: China: Hubei Province, Shengnongjia, on rotten wood of unidentified plant, 14 Sept. 2004, W.P. Wu (Holotype WFH Wu6065; ex-type strain CGMCC 3.20641 = NN 47501).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, scattered or rarely aggregated, simple, cylindrical to clavate, erect, straight or slightly flexuous, 1-2-septate then up to 8 septate due to percurrent proliferation and growth, medium brown to dark brown, becoming paler toward apex, wall thick, verrucose at the base, 35-60 (-115) x 3-5 µm, base with a swollen and lobbed cell up to 12 µm wide. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, proliferate, geniculate, cylindrical, subcylindrical to clavate, 30-40 x 3-3.5 µm, pale brown, thin- and smooth-walled, terminating in a funnel-shaped collarete, collarete 2-2.5 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, acute at the base, 15-17 x 2.5-3 µm, aseptate, hyaline, smooth, with a setula of 6-7 µm long at each end.

Colonies on PDA effuse, colonies 0.5-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, brown to dark brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Hubei Province, Shengnongjia, on rotten wood of unidentified plant, 14 Sept. 2004, W.P. Wu (Wu6065, holotype). Living strain: ex-type strain NN 47501.

Ecology/Substrate/Host: Saprobe on rotten wood.

Geographical distribution: China.

Notes: *Oxenbollia lunatospora* W.P. Wu & Y.Z. Diao is characterized by absence of setae, simple conidiophores with percurrent proliferation, polyphialidic conidiogenous cells with funnel-shaped collarettes, and hyaline and aseptate conidia (15-17 x 2.5-3 µm) with one setula (6-7 µm long) at each end. Among the known species in *Dictyochaeta*, *Codinaeella* and *Tainosphaeria*, several species resemble to *O. lunatospora* in a similar

combination of morphological characters and they are *Codinaea acaciae* Crous & M.J. Wingf., *C. pini* Crous & M.J. Wingf., *Dictyochaeta australiensis* (B.C. Sutton) Whitton, McKenzie & K.D. Hyde, *D. coffee* (Magqi & Persiani) Whitton, McKenzie & K.D. Hyde, *D. longispora* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, *D. parva* (S. Hughes & W.B. Kendr.) Hol.-Jech., *D. simplex* (S. Hughes & W.B. Kendr.) Hol.-Jech., *D. taiwanensis* Matsush., *D. vulgaris* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, *Tainosphaeria jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde and *T. siamensis* J. Yang, K.D. Hyde & J.K. Liu (Hughes and Kendrick 1968; Matsushima 1981; Holubová-Jechová 1984,1988; Arambarri et al. 1987; Arambarri and Cabello 1990; Kuthubutheen and Nawawi 1991a; Whitton et al. 2000; Crous et al. 2014, 2015; Liu et al. 2016). Among them, *D. australiensis*, *D. longispora*, *D. taiwanensis* and *D. vulgaris* produce significant larger conidia (>17 µm long in average); *D. parva* and *D. vulgaris* produce conidia with shorter (<5 µm long) setulae; *D. coffee* produces broader conidia (10.8-18 x 3.4-5 µm); *C. pini* produces slightly smaller conidia (13-15 x 2-3 µm); *C. acaciae* produces similar sized conidia but with much longer setulae (conidia 16-19 (-23) x 3-4 µm; setulae 10-13 µm long), thus can easily be distinguished from each other. Morphologically *D. simplex*, *T. jonesii* and *T. siamensis* are hardly distinguished from *O. lunatospora*, however their ITS sequences are very different.

Parabahusutrabeeja W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841529

Etymology: refers to its similarity on morphology to the genus *Bahusutrabeeja*.

Diagnosis: Similar to *Codinaeella* and *Bahusutrabeeja*, but differs in conidiogenous cells with cylindrical collarettes and producing globose conidia with one short setulae.

Type species: *Parabahusutrabeeja minima* W.P. Wu & Y.Z. Diao sp. nov.

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, or slightly flexuous, dark brown, septate, smooth-walled in the lower part, becoming strongly verruculose in the upper part, thick-walled, with a swollen basal cell, terminating in a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, dark brown, apex medium brown, with a narrow sporulating loci, collarette indistinct. Conidia holoblastic, monoblastic, acrogenous, solitary, globose to subglobose, hyaline, smooth, with 1 slender appendage, produced in chains or accumulating in a head at the tips of the conidiogenous cells.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China

Notes: Morphologically *Parabahusutrabeeja* resembles some species of *Bahusutrabeeja*, especially *B. bunyensis*, but differs by monoblastic phialides with a narrow and cylindrical collarette and conidia with only one short setulae (Seifert et al., 2011). In addition, the conidia in *Parabahusutrabeeja* are usually formed in chain or loosely aggregated around the tips of the conidiogenous cells. Phylogenetic analysis based on the 28S rDNA and ITS sequences also confirms they are different genera.

Parabahusutrabeeja minima W.P. Wu & Y.Z. Diao, sp. nov., Figs. 105, MycoBank MB841574

Etymology: refers to its small conidia.

Diagnosis: Setae absent. Conidiophores septate, solitary, with terminal monophialidic conidiogenous cells bearing inconspicuous collarette; Conidia globose, hyaline, aseptate, in chain or ahead, 7-8 µm diam, bearing one short setulae up to 3 µm long.

Typification: China: Guangxi Province, Shiwandashan, on dead leaves of *Cinnamomum* sp., 30 Dec 1997, W.P. Wu (Holotype Wu1559a; ex-type strain CGMCC 3.20654 =NN 43967).

Colonies effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of pale brown to brown, branched and septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight or slightly flexuous, dark brown, 4-5-septate, smooth-walled in the lower part, becoming strongly verruculose in the upper part, thick-walled, 100-150 x 5-7 µm, with a swollen basal cell up to 20 µm wide, terminating in a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, dark brown, apex medium brown, 35-40 x 5-6 µm, with a narrow sporulating loci of 1-1.5 µm wide, collarette indistinct. Conidia holoblastic, monoblastic, acrogenous, solitary, globose to subglobose, hyaline, smooth, 7-8 µm diam, with 1 slender appendage of up to 3 µm long, produced in chains or accumulating in a head at the tips of the conidiogenous cells.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec 2012, W.P. Wu (Wu12260); China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Wu12456, Wu12460, Wu12466); China: Guangxi Province, on dead leaves, 23 Dec. 1997, W.P. Wu (Wu2095); China: Guangxi Province, Shiwandashan, on dead leaves of

Cinnamomum sp., 30 Dec 1997, W.P. Wu (Holotype Wu1559a). Living strains: ex-type strain CGMCC 3.20654 (=NN 43967) (from Wu1559a), 55337 (from 12456), 55339 (from 12460), 55327 (from Wu12466).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China

Notes: *Parabhusutrabeeja minima* W.P. Wu & Y.Z. Diao is characterized by verrucose conidiophores, terminal conidiogenous cell with a narrower sporulating loci, and globose conidia in smaller size with one very short setula. Among the known fungal species, *Bahusutrabeeja bunyensis* McKenzie (conidia 7-10 µm diam, with 2-3 appendages in 5-9 µm long) is the only species with similar conidiophores, conidiogenous cells and conidial morphology, but it differs from *P. minima* by conidia with 2-3 setulae which are much longer than those in the latter species (McKenzie 1997). Both LSU and ITS sequences were obtained from the single spore isolate of the type specimen and several other specimens, and its affinity to other members of Chaetosphaeriaceae was confirmed by phylogenetic analysis.

Paracodinaea W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841530.

Etymology: Para- and *Codinaea*, refers to its similarity to *Codinaea* in absence of setae and hyaline aseptate conidia with setulae at both ends.

Diagnosis: Similar to *Codinaea* but differs in producing allantoid conidia and phylogeny.

Type species: *Paracodinaea japonica* W.P. Wu & Y.Z. Diao

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Setae absent. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, septate, smooth, terminating with a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic with sympodial proliferation, clavate, cylindrical, pale brown to brown, thin-walled, ending in a flared collarete which is funnel-shaped. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, allantoid, curved, aseptate, hyaline, smooth, both apex and base bear a rudimentary setula.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Japan.

Notes: Phylogenetic analysis indicates that *Tainosphaeria* is a polyphyletic genus and the monophyletic generic concepts was proposed with 5 lineages that correspond to particular morphologies (Réblová et al., 2021b). Several strains obtained from Japan are grouped together with *Tainosphaeria* and related genera, but forms a distinct subclade and a new genus *Paracodinaea* is introduced here. The absence of setae, unbranched conidiophores, terminal mono- or phialidic conidiogenous cells with funnel-shaped collarete, and aseptate allantoid conidia with simple setulae are the main diagnostic characteristics of this newly established genus. Morphologically it is very similar with member of *Codinaeella* and *Tainosphaeria* s. str..

Paracodinaea japonica W.P. Wu & Y.Z. Diao, sp. nov., Fig. 106, MycoBank MB841575

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Setae absent; Conidiophores 45-80 x 3-4 µm, with terminal mono- or polyphialidic conidiogenous cell bearing funnel-shaped collarete; Conidia allantoid, aseptate, 13-16 x 2.2-2.6 µm, setulae 6.5-8 µm.

Typification: Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead fruit of unidentified tree, 3 Oct. 2019, W.P. Wu (Holotype, Wu16913, ex-type strain CGMCC 3.20663 (=77392)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, 3-7 septate, smooth, 45-80 x 3-4 µm, terminating with a conidiogenous cell. Conidiogenous cells integrated, terminal, monophialidic with sympodial proliferation, clavate, cylindrical, 16-20 x 3-4 µm, pale brown to brown, thin-walled, ending in a flared collarete which is funnel-shaped, 3-4 µm wide, 2-2.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, allantoid, curved, aseptate, hyaline, smooth, 13-16 x 2.2-2.6 µm, both apex and base bear a rudimentary setula of 6.5-8 µm long.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium poorly developed, white, then grey to grey brown, with pale colored margin, reverse of the same color or slightly darker.

Material examined: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead seed pods of *Acacia* sp., 11 Nov. 2019, W.P. Wu (Wu17141); China: Guangdong Province, Shenzhen, Yangtaishan Forestry Park, on dead seed pods of *Acacia* sp., 17 Oct 2020, W.P. Wu (Wu17581); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17259); China: Jiangsu, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp. 25 Aug. 2019, W.P. Wu (Wu16794, Wu16804,

Wu16815, Wu16859, Wu16861); China: Zhejiang, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16118); : Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead fruit of unidentified tree, 3 Oct. 2019, W.P. Wu (Holotype, Wu16913). Living strains: ex-type strain CGMCC 3.20663 (NN 77392, from Wu16913), 76395 and 76396 (from Wu16118), 77137 (from Wu16794), 77156 (from Wu16804), 77170 (from Wu16808), 77172 (from Wu16815), 77205 (from Wu16859), 77185 (from Wu16861), 77537 (from Wu17141), 77750 (from Wu17259), 78401 (from Wu17581).

Ecology/Substrate/Host: Saprobe on dead material of plant, including *Acacia* sp. and *Cyclobalanopsis* sp.

Geographical distribution: China, Japan.

Notes: *Paracodinaea japonica* W.P. Wu & Y.Z. Diao differs from other related species in *Codinaeella* and *Tainosphaeria* s. str. by its allantoid conidia with rounded apex and truncate base. In addition, the ITS sequence is also very different from others.

Stilbochaeta Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 68, 2021.

Colonies effuse, hairy, brown, composed of setae and conidiophores, occasionally ascomata, mycelium immersed or semi-immersed. Teleomorph: Ascomata perithecial, non-stromatic, superficial, globose to subglobose, papillate, dark brown, setose; setae sterile, rounded at the apex. Ostiole periphysate. Ascomatal wall fragile, carbonaceous, two-layered. Paraphyses disappearing with age, septate, tapering, longer than the asci. Asci unitunicate, cylindrical-clavate, shortly-stipitate, apically rounded, ascal apex with a non-amyloid apical annulus. Ascospores fusiform, hyaline, transversely septate, without gelatinous sheath or appendages. Anamorph: Setae grow singly or in groups from stromatic cells or knots of hyphal cells, erect, straight or flexuous, septate, brown, paler toward the apex, unbranched, apex sterile, bluntly rounded, sometimes with a terminal or several lateral phialidic openings. Conidiophores macronematous, mononematous, single or grow in fascicles from stromatic cells or knots of hyphal cells around the base of the setae, erect, straight or flexuous to slightly undulating, unbranched, septate, smooth, brown, paler toward the apex. Conidiogenous cells integrated, terminal, mono- or polyphialidic, extending percurrently and sympodially, paler than the conidiophores; collarettes flared, funnel-shaped, often slightly stipitate or tubular near the base. Conidia falcate, oblong-falcate, ellipsoidal-fusiform, curved, tapering toward both ends, slightly truncate at the base, with an inconspicuous basal scar, 0–1(–3)-septate, hyaline, with a straight or gently curved setula at each end, setulae simple, bifid or trifid, inserted terminally at the apex and subterminally at the base, conidia accumulate in slimy fascicles (Adapted from Réblová et al. 2021e).

Type species: *Stilbochaeta malaysiana* (Kuthub.) Réblová & Hern.-Restr.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Ecological distribution: Africa, Asia, the Caribbean and South America.

Description and illustration: Réblová et al. (2021e).

Notes: *Stilbochaeta* Réblová & Hern.-Restr. is a recently established genus for eight *Codinaea*-like fungi with conidiophores in clusters with setae, and septate conidia with simple or branched setulae (Réblová et al. 2021e). The accepted species are *Stilbochaeta aquatica* (W. Dong & H. Zhang) Réblová & Hern.-Restr., *S. brevisetula* (S. Hughes & W.B. Kendr.) Réblová & Hern.-Restr., *S. cangshanensis* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., *S. malaysiana* (Kuthub.) Réblová & Hern.-Restr., *S. novae-guineensis* (Matsush.) Réblová & Hern.-Restr., *S. ramulosestula* Réblová & Hern.-Restr., *S. septata* (B. Sutton & Hodges) Réblová & Hern.-Restr. and *S. submersa* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr.

In our phylogenetic analysis (Fig. 3 and Fig 107), a total of 10 species formed the strongly supported clade, including *Stilbochaeta aquatica*, *S. cangshanensis*, *S. septata* and *S. submersa* and 6 undescribed species. All these species share morphology similarity as the type species of *Stilbochaeta*, such as presence of fertile or sterile setae (except for one undescribed species), short conidiophores clustered with setae, terminal monophialidic or polyphialidic conidiogenous cell with funnel-shaped collarette, and hyaline, septate falcate to fusiform conidia bearing setulae. None of these species is known with teleomorph. Phylogenetically this group is very distinct from other genera, the recently established genus *Stilbochaeta* Réblová & Hern.-Restr. is adapted to accommodate them. Morphologically it is closely related to some *Codinaea* species with clustered setae and conidiophores, but differs from it by septate conidia. Apart from the eight accepted species, here we add another five new species with ITS barcodes to the genus.

Several known species with septate conidia bearing setose might well belong to this genus, including *Codinaea jingenglingensis* J.W. Xia & X.G. Zhang, *Codinaea matsushimae* Hewings & J.L. Crane, *Dictyoachaeta caatingae* A.C. Cruz & Gusmão, *D. macrospora* Kuthub. & Nawawi, *D. variabilis* Kuthub. & Nawawi, *Codinaea* state of *Chaetosphaeria dingleyae* S. Hughes, W.B. Kendr. & Shoemaker (Hughes and Kendrick 1968; Matsushima 1971; Hewings and Crane 1981; Kuthubutheen 1987; Crous et al. 1990; Kuthubutheen and Nawawi 1991, 1992; Whitton et al. 2000; Xia et al. 2015; Cruz et al. 2008; Réblová et al. 2021e).

The living strains of many studied species were also studied on PDA (Fig. 108), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Stilbochaeta* (S.) and other known *Codinaea* (C.) and *Dictyochaeta* (D.) species which might belong to *Stilbochaeta*:

1. Conidia 1-septate; setulae branched, bifid at one end and trifid at the other, up to 18.5 μm long *S. ramulosestula*
1. Conidia 1-3-septate; setulae simple 2
2. Conidial septa variable between 1-3 3
2. Conidia consistently 1- or 3- septate 5
3. Setula <3.0 μm long; conidia 1 (rarely 2-3) septate, 21-24.5 x 3-3.7 μm ; setae sterile *S. brevisetula*
3. Setula >3.0 μm long 4
4. Conidia 1-2 septate, 17-23 x 2 μm ; setulae 5.5-10 μm *S. septata*
4. Conidia 1-3 septate, 31-38 x 4.4-5.7 μm ; setulae 17-23 μm *D. variabilis*
5. Conidia consistently 3-septate 6
5. Conidia consistently 1-septate; setae present 10
6. Sterile setae present 7
6. Sterile setae absent 8
7. Conidia 27-35.5 x 3.3-5.5 μm ; setulae 1 or 2 at each end, 0.5-2.5 μm long *D. caatingae*
7. Conidia 20-27 x 3.3-5.4 μm ; setulae 5.5-7.8 μm long *D. matsushimae*
8. Conidia 28-47 x 5-7 μm ; setulae 22-30 μm *D. macrospora*
8. Conidia 22-32 μm long; setulae less than 15 μm long 9
9. Conidia fusiform to lunate, 22-30 x 4-6 μm ; setulae 7.5-11 long *S. jianfenglingensis*
9. Conidia fusiform, 30-32 x 4-4.5 μm ; setulae 5-12.5 μm long *S. ejneri*
10. Setae loosely coiled and tortuous towards apices, apex sterile; conidiophores up to 6-fasciculate; conidia 11.5 x 1.5 μm ; setulae 5-7.5 μm long *C. tortuosa*
10. Setae straight, apex sterile or fertile 11
11. Conidia 20-22 μm long 12
11. Conidia less than 20 μm long 13
12. Setae sterile; conidia subcylindrical, fusiform, slightly curved, 21.2-24 x 3-3.5 μm ; setulae 10-13 μm long *S. lingnanensis*
12. Setae sterile or fertile; conidia 24-32 x 3-4 μm ; setulae up to 18 μm long *S. malaysiana*
13. Conidial setulae less than 10 μm long in average 14
13. Conidial setulae more than 10 μm long in average 16
14. Setae sterile; conidiogenous cell monophialidic; conidia fusiform or subcylindrical, only slightly curved; 14.5-17 x 1.8-2 μm ; setulae 7-10 μm long *S. minteri*
14. Setae sterile; Conidial setulae 4-8 μm long 15
15. Conidiogenous cells obclavate; Conidia 13-17 x 2-2.5 μm ; setulae 4-8 μm long *S. sinensis*
15. Conidiogenous cells cylindrical; Conidia 12.5-15 x 1.8-2 μm ; setulae 5-7 μm long *S. lunata*
16. Conidia 13-20 x 2.5-3.5 μm ; setulae 9-16 μm long *S. novae-guineensis*
16. Conidia and setulae slightly shorter 17
17. Conidia 1-septate, falcate to fusiform, 12-16 x 2 μm ; setulae 7-13 μm *S. cangshanensis*
17. Conidia 0-1-septate, 2-3.5 μm wide 18
18. Conidia 0-1-septate, oblong to allantoid, 14-18 x 2-3 μm ; setulae 9-12 μm long *S. aquatica*
18. Conidia 0-1-septate, fusiform, 13.5-16.5 x 2.5-3.5 μm ; setulae 10-13 μm long *S. submersa*

Stilbochaeta aquatica (W. Dong & H. Zhang) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 69, 2021.

≡ *Dictyochaeta aquatica* W. Dong & H. Zhang, Phytotaxa 362: 193, 2018

Colonies on natural substrate, effuse, hairy, brown, with white, glistening conidial mass. Teleomorph: Unknown. Anamorph: Setae cylindrical, erect, slightly curved, septate, unbranched, smooth, 11-15-septate, sterile, dark brown and robust at the base, fading towards the apex, apical cell with a round end, surrounded by 2-5 short conidiophores, 180-210 x 5-6 μm . Conidiophores mononematous, macronematous, brown at the base, fading to pale brown towards the apex, 4-5(-10)-septate, unbranched, cylindrical, 30-50 (-100) x 2.5-3 μm , erect, straight or slightly curved, thin-walled, smooth, arising in groups from the bases of setae. Conidiogenous cells mono- or poly-phialidic integrated, terminal, determinate, clavate, ellipsoidal, 14.5-23 x 3.5-4 μm , collarette funnel-shaped, up to 3 μm wide, and 1.5 μm deep. Conidia 12-13 x 2 μm , acrogenous, usually aggregated in slimy mass at the apex of setae, hyaline, 1-septate, oblong to allantoid, slightly curved, rounded at ends, smooth, with 8-11 μm long hair-like appendages at both ends

Material examined: China: Guangdong Province, Guangzhou, South China Agriculture University, on dead fruit of *Dimocarpus longan*, 3 Dec. 2018, W.P. Wu (16337).

Living strain: 76652 and 76653 (from Wu16337).

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Dimocarpus longan*.

Geographical distribution: China, Philippine and Thailand.

Description and illustration: Wei et al. (2018); Réblová et al. (2021e).

Notes: *Dictyochaeta aquatica* W. Dong & H. Zhang was introduced by Wei et al. (2018) and it is characterized by presence of sterile setae, 2-4 cylindrical and septate conidiophores clustered together with 1 setae, terminal monophialidic conidiogenous cells, and hyaline, 0-1 septate, fusiform conidia 14-18 x 2-3 µm with 1 setulae 8-13 µm long at each end (Wei et al. 2018). One of our collections was identified as this species and the identical ITS sequence to the one from the ex-type strain was also obtained from the specimen Wu16337. The conidia (12-13 x 2 µm) from our collection are smaller than those in the original description, however it has the identical ITS sequence with the ex-type strain of this species. It was found that the two ITS sequences registered under *Dictyochaeta aquatica* and *D. curvispora* in NCBI GeneBank are identical, however they are rather different fungi.

Stilbochaeta cangshanensis (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 76, 2021.

≡ *Dictyochaeta cangshanensis* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99:592, 2019.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4 µm wide. Teleomorph: Unknown. Anamorph: Setae simple, cylindrical, erect, straight, dark brown at the base, paler towards the apex, 7-10-septate, thick-walled, smooth, 97-168 x 3-5 µm, basal cell swollen and up to 10 µm wide, apical cell thin-walled, pale brown, with a rounded apex. Conidiophores macronematous, mononematous, simple, 5-8 in cluster surrounded the base of a setae, erect, straight, or slightly flexuous, dark brown and becoming paler towards the apex, 4-6-septate, smooth- and thick-walled, 50-70 x 3-3.5 µm, proliferation percurrent. Conidiogenous cells integrated, terminal, polyphialidic with up to 6 collarettes, subcylindrical, 15-18 x 3.5-4 µm, collarette funnel- or cup-shaped, 2-3 µm wide, 1-1.5 µm deep, proliferating percurrently through the collarette. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate or fusiform, curvate, 1-septate, hyaline, smooth, 12-16 x 2 µm, apex obtuse, with one setula at each end, setulae 7-13 µm long.

Typification: On submerged decaying wood in a freshwater stream, China: Yunnan Province, Cangshan Mountain, July 2016, H.Y. Su, S-829 (MFLU 18-1614, holotype), ex-type living culture MFLUCC 17-2214.

Material examined: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 16 Aug 2020, W.P. Wu (Wu17344); On dead branches of unidentified tree, China: Beijing, Huairou, 12 Sept. 2002, W.P. Wu (Wu01). Living strain: 47608 (from Wu01), 77987 (from Wu17344).

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Quercus* sp.

Geographical distribution: China.

Description and illustration: Luo et al. (2019); Réblová et al. (2021e).

Notes: *Stilbochaeta cangshanensis* is characterized by absence of setae, macronematous conidiophores, polyblastic conidiogenous cells with funnel-shaped collarettes, fusiform and 1-septate conidia with one setula at each end. It differs from other similar species by a combination of morphological characters of setae, conidiophores, and conidia (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1990, 1991a; Whitton et al. 2000; Liu et al. 2016; Luo et al. 2019). The two specimens from our collections bear the fungus well aligned with the original description (Setae 125-175 µm long, 4.5-6.5 µm wide; Conidiophores 39-53 µm long, 3.5-4.5 µm wide; Conidia 15-18 x 2.5-3.5 µm wide) (Luo et al. 2019). Although the conidia from the type specimen was described with aseptate, but at least one 1-septate conidium was showed in the illustration. Except for the 1-septate and slightly narrower conidia in the collections studied by us, other morphological characters fit well to *S. cangshanensis*. It resembles *S. aquatica* and *S. siamensis* in having setae, clustered conidiophores, and setae, and 0 or 1 septate, cylindrical, or long fusiform, hyaline conidia with setulae at both ends (Wei et al. 2018). However, phylogenetic analysis shows that *S. cangshanensis* is distinct from *S. aquatica*. *Stilbochaeta cangshanensis* differs from *Codinaea siamensis* in having 1-septate conidia (Liu et al. 2016).

Stilbochaeta ejneri W.P. Wu & Y.Z. Diao, sp. nov., Figs. 109, MycoBank MB841585.

Etymology: named after the senior employee Ejner Bech Jensen, with whom one of the authors (Wu) worked together for long time and who also supported this work during last many years.

Diagnosis: Setae absent. Conidia 3-septate, 30-32 x 4-4.5 µm, setulae 5-12.5 µm long. Similar to *Dictyochaeta aciculata*, *D. caatingae*, *Codinaea jianfenglingensis*, *D. macrospora*, *D. matsushimae*, *D. triseptata* and *D. variabilis*, but differs in absence of setae and shape and size of conidia.

Typification: China: Sichuan Province, Ya A, Wan Guan, Bi Feng Xia, On dead branches of unidentified tree, 15 Dec. 2013, W.P. Wu (Holotype WFH Wu13224; ex-type strains CGMCC 3.20716 = NN 57536)

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or rarely aggregated, simple, erect, straight, or slightly flexuous, 10-14 septate, medium brown to dark brown at the lower part, becoming paler towards the apex, smooth, 180-285 x

4-7 µm, base with a swollen cell up to 15 µm wide. Conidiogenous cells integrated, terminal, polyphialidic with up to 3 collarettes, cylindrical, 25-35 x 4-5 µm, pale brown, thin- and smooth-walled, collarette cup-shaped, 3-4 µm wide, 2-3 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, curved, obtuse at both ends, 30-32 x 4-4.5 µm, 3-septate, hyaline, smooth, with a setula of 5-12.5 µm long at each end.

Colonies on PDA effuse, colonies 0.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Sichuan Province, Ya A, Wan Guan, Bi Feng Xia, On dead branches of unidentified tree, 15 Dec. 2013, W.P. Wu (Holotype Wu13224). Living strains: ex-type strains 57536, 57537 and 57538 (from Wu13224).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: Of the many *Codinaea* and *Dictyochaeta* described, only *Dictyochaeta aciculata* S.S. Silva & Gusmão, *D. caatingae* A.C. Cruz & Gusmão, *Codinaea jianfenglingensis* J.W. Xia & X.G. Zhang, *D. macrospora* Kuthub. & Nawawi, *D. matsushimae* (Hewings & Crane) Whitton, McKenzie & K.D. Hyde, *D. triseptata* (Matsushima) Castañeda and *D. variabilis* Kuthub. & Nawawi produce 3-septate conidia with or without a setula at each end (Hewings & Crane 1981; Castañeda-Ruiz 1986b; Kuthubutheen and Nawawi 1991a, d; Cruz and Guesmao 2009; Silva and Gusmão 2013; Xia and Zhang 2015). Presence of setae among conidiophores in *D. aciculata*, *D. caatingae*, *C. jianfenglingensis* and *D. matsushimae* easily distinguish them from *Stilbochaeta ejneri*. In addition, the conidia in *D. aciculata* are obclavate and without setulae; in *D. caatingae* and *D. matsushimae* (conidia 20-27 x 3.3-5.4 µm, setulae 5.5-7.8 µm long), the conidia are worm-shaped and with very short setulae.

In *Stilbochaeta ejneri*, *Dictyochaeta macrospora*, *D. triseptata* and *D. variabilis*, setae are absent, and these species can be separated from each other based on their conidial morphology (Kuthubutheen and Nawawi, 1991a, d; Whitton et al., 2000). *D. triseptata* can be easily distinguished from the other three species by its ellipsoidal-shaped conidia. The other three species with fusiform conidia can be distinguished by size of conidia and setulae: *D. macrospora* (conidia constantly 3-septate, 38-47 x 5-7 µm, setulae 22-30 µm long) and *D. variabilis* (conidia 1-3 septate, 30-40 x 4.5-5.7 µm, setulae 17-23 µm long) have significantly larger conidia and longer setulae than those in *S. ejnerii* (conidia 30-32 x 4-4.5 µm, setulae 5-12.5 µm long).

Stilbochaeta jianfenglingensis (J.W. Xia & X.G. Zhang) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841722.

≡ *Codinaea jianfenglingensis* J.W. Xia & X.G. Zhang, Mycotaxon 130: 835, 2015.

Teleomorph: Unknown. Anamorph: Setae solitary, erect, straight or flexuous, 3-5-septate, smooth, brown, 100-130 x 3.4-4.5 µm. Conidiophores distinct, single, erect, straight or slightly flexuous, cylindrical, smooth, thick-walled, brown, 4-7-septate, 120-200 x 4.5-5 µm. Conidiogenous cells monophialidic, integrated, cylindrical, subhyaline to pale brown, 28-50 x 4.5-5 µm; collarette, 3.5-4.5 x 2.5-3.5 µm. Conidia fusiform to lunate, 3-septate, smooth, subhyaline, 22-30 x 4-6 µm, with a filiform setula, 7.5-11.5 µm long, at each end.

Material examined: China: Hainan Province, Jianfengling, on dead stems of unidentified broadleaf tree, 22 Apr. 2014, J.W. Xia (Isotype, HMAS 245589).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Xia et al. (2015).

Notes: *Stilbochaeta jianfenglingensis* is morphologically similar to *Dictyochaeta caatingae* A.C. Cruz & Gusmão, *D. macrospora* Kuthub. & Nawawi, *D. matsushimae* (Hewings & J.L. Crane) Whitton, McKenzie & K.D. Hyde, and *D. triseptata* (Matsush.) R.F. Castañeda in having 3-septate conidia, but differs in conidial size.

Stilbochaeta lingnanensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 110-111, MycoBank MB841586.

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Setae sterile. Conidiogenous cells monophialidic. Conidia subcylindrical, fusiform, slightly curved, 21.2-24 x 3-3.5 µm, with hair-like appendages at both ends, 10-13 µm long.

Typification: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16279; ex-type strain CGMCC 3.20666 (= NN 76748)).

Colonies on substrate effuse, gregarious, brown, shining. Mycelium mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, erect, or slightly flexuous, dark brown at the base, paler towards the apex, 6-10-septate, acrose to subacrose, unbranched, smooth, 180-235 x 4-6 µm, tapering toward the apex, the upper part 3-4 µm wide. Conidiophores macronematous, mononematous, 3-5 in groups from the mycelial knots from the bases of setae, brown, straight, or slightly flexuous, 3-4 (-8)-septate, unbranched, cylindrical, smooth, 60-100 (-140) µm long, 3-5 µm wide, with sympodial proliferation. Conidiogenous cells determinate, terminal, monophialidic, cylindrical, pale brown, thin-walled, smooth, 20-30 x 3-3.7 µm, with flared collarette 3.5-4.2 µm wide and 2-2.5 µm deep. Conidia, acrogenous,

solitary, aggregating in a globose mass at apex of conidiophore, 1-septate, subcylindrical, fusiform, slightly curved, 21.2-24 x 3-3.5 μm , with hair-like appendages at both ends, 10-13 μm long.

Colonies on PDA effuse, colonies 1.2-2.5 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, white to soil brown, with pale colored margin, reverse dark yellow brown, slightly paler towards the margins.

Material examined: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16288); China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype Wu16279). Living strain: 76749 (from Wu16288b), CGMCC 3.20665 (=NN76617, from Wu16288a). ex-type strain CGMCC 3.20666 (=NN76748) and 76751 (from Wu16279).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: *Stilbochaeta lingnanensis* W.P. Wu & Y.Z. Diao differs from other known species by a combination of longer conidia (21.2-24 x 3-3.5 μm) and setulae (10-13 μm) (Réblová et al., 2021e). *S. brevisetula* (conidia 21-24.5 x 3-3.3.7 μm , setulae 1.4-2.7 μm) and *S. septata* (conidia 17.5-23 x 2 μm , setulae 5.5-10 μm) produce conidia with similar size as *S. lingnanensis*, but differs from it by shorter setulae.

***Stilbochaeta lunata* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 112-113, MycoBank MB841587.**

Etymology: refers to the lunate-shaped conidia.

Diagnosis: Similar to *Stilbochaeta sinensis* in producing setae with sterile and swollen apex, and 1-septate conidia; but differs in producing smaller conidia.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan, on dead leaves of unidentified board leaf tree, 17 Oct. 2020, W.P. Wu (Wu17536, holotype; ex-type strain CGMCC 3.20806 (= NN 78288)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 μm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight, or flexuous, cylindrical, smooth- and thick-walled, 80-135 μm long, 3-3.5 μm wide in the upper part, 5-7 μm wide above the swollen base, 4-5-septate, dark brown in the lower part, becoming paler towards the apex; apex swollen, up to 5 μm wide, rounded and sterile. Conidiophores macronematous, mononematous, simple, crowded, up to 10 around the base of 1-2 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 2-3-septate, thin- and smooth-walled, 36-45 x 2.5-3.2 μm . Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 22-28 x 2.8-3.2 μm , pale brown, thin-walled; collarette funnel-shaped, 3-3.5 μm wide, 2.5-3 μm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 12.5-15 x 1.8-2 μm , uniseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 5-7 μm long.

Colonies on PDA effuse, colonies 1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white to pale yellow brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan, on dead leaves of unidentified board leaf tree, 17 Oct. 2020, W.P. Wu (Wu17536, holotype); China: Guangdong Province, Shenzhen, Yangtaishan, on dead leaves of unidentified board leaf tree, 17 Oct. 2020, W.P. Wu (Wu17478, Wu17480); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Yu Zhang (Wu15172). Living strains: ex-type strain NN 78288 (from Wu17536), 76002 and 76007 (from Wu15172), 78238 (from Wu17478), 78240 (from Wu17480).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: *Stilbochaeta lunata* is characterized by presence of sterile setae with a swollen apex, mono- or polyphialidic conidiogenous cells with funnel-shaped collarette, and fusiform, slightly curved, 1-septate conidia (12.5-15 x 1.8-2 μm) with a setulae of 5-7 μm . Morphologically it is similar to *S. aquatica* (conidia 14-18 x 2-3 μm , setulae 8-13 μm), *S. sinensis* (conidia 13-17 x 2-2.5 μm , setulae 4-8 μm) and *S. submersa* (conidia 13.5-16.5 x 2.5-3.5 μm ; setulae 8-13 μm), but differs from them by a combination of different characters of conidiophores, conidiogenous cells and conidia (Réblová et al. 2021e). It differs from *S. aquatica* by slightly smaller conidia and shorter setulae, differs from *S. sinensis* by narrower conidia, and differs from *S. submersa* by shorter setulae.

***Stilbochaeta minteri* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 114-115, MycoBank MB841588.**

Etymology: named after the former IMI mycologist David Minter.

Diagnosis: Setae sterile. Conidiophores with terminal monophialidic conidiogenous cells. Conidia fusiform or subcylindrical and only slightly curved conidia (14.5-17 x 1.8-2 μm) with a simple setulae of 7-10 μm long.

Typification: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16270; ex-type strain CGMCC 3.20732 = NN 76642).

Colonies on substrate effuse, gregarious, brown. Mycelium mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. Teleomorph: Unknown. Anamorph: Setae 150-175 μm long, 4-5.5 μm wide,

erect, dark brown at the base, paler towards the apex, 7–10-septate, acerose to subacerose, unbranched, smooth, basal cell swollen and 10–13 µm wide, tapering toward a rounded sterile apex of 3–3.5 µm wide. Conidiophores macronematous, mononematous, 60–80 µm long, 3–3.5 µm wide, 3–7 in group from the mycelial knots from the bases of setae, short, brown, straight, or slightly flexuous, 3–6-septate, unbranched, cylindrical, smooth, terminating with a monophialidic conidiogenous cell. Conidiogenous cell monophialidic, determinate, terminal, pale brown, smooth- and thin-walled, with a flared collarette of up to 1.5 µm wide and 2–2.5 µm deep. Conidia acrogenous, solitary, aggregating in a globose mass at apex of conidiophore, cylindrical or fusiform, 1-septate, slightly curved, 14.5–17 x 1.8–2 µm, with a slightly truncate base and a rounded apex, bearing one unbranched setulae at each end, 7–10 µm long.

Colonies on PDA effuse, colonies 0.8 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, yellow to soil brown, reverse brown to dark brown.

Material examined: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype Wu16270). Living strain: ex-type strain 76642.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: *Stilbochaeta minteri* W.P. Wu & Y.Z. Diao is characterized by sterile setae, monophialidic conidiogenous cells, and fusiform or subcylindrical and only slightly curved conidia (14.5–17 x 1.8–2 µm) with a simple setulae of 7–10 µm long. Morphologically it resembles *S. aquatica* (conidia 14–18 x 2–3 µm, setulae 8–13 µm), *S. sinensis* (conidia 13–17 x 2–2.5 µm, setulae 4–8 µm) and *S. submersa* (conidia 13.5–16.5 x 2.5–3.5 µm; setulae 8–13 µm), but differs from them by a combination of different characters of conidiophores, conidiogenous cells and conidia (Réblová et al. 2021e). It differs from *S. aquatica* and *S. sinensis* by narrower conidia and longer setulae, and differs from *S. submersa* by narrower conidia with shorter setulae (Kuthubutheen and Nawawi 1991a; Whitton et al. 2000; Wei et al. 2018; Luo et al. 2019; Réblová et al. 2021e).

Stilbochaeta sinensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 116–117, MycoBank MB841589.

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: Similar to several other species with 1-septate conidia in the genus but differs in a combination of conidial shape/size and length of setulae.

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12195; ex-type strain CGMCC 3.20713 = NN 54257).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3–5 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, arising mostly single, erect, straight, or flexuous, cylindrical, smooth- and thick-walled, 60–150 µm long, 4–4.5 µm wide above the swollen base, 7–10-septate, dark brown in the lower part, becoming paler towards the apex, apex swollen, rounded and sterile. Conidiophores macronematous, mononematous, simple, crowded, up to 4 around the base of 1 setae, erect, straight, or slightly flexuous, brown in the basal part, becoming paler towards the apex, 2–3-septate, thin- and smooth-walled, 30–60 x 3–4 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, clavate, cylindrical, 20–28 x 3.5–4.5 µm, pale brown, thin-walled, collarette funnel-shaped, 3–3.5 µm wide, 2.5–3.55 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, slightly curved, 13–17 x 2–2.5 µm, uniseptate, hyaline, smooth, apex rounded, base slightly truncate to rounded, with one setula at each end, 4–8 µm long.

Colonies on PDA effuse, colonies 1–1.5 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, dark soil brown, with pale colored margin, reverse yellow brown.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12195; ex-type strain NN 54257); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead fruit of unidentified tree, 28 Feb. 2016, W.P. Wu (Wu16236); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16263, Wu16267, Wu16272, Wu16278); China Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, On dead fruit of palm tree, 15 Nov. 2013, W.P. Wu (Wu13079); China Guangxi Province, Nanning, Nanning Subtropical Botanical Garden, on dead leaves of unidentified tree, 15 Nov. 2013, W.P. Wu (Wu13144); China: Guangxi Province, Shiwandashan, On dead branches of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1593a, Wu1594g, Wu1602f); China: Guangdong Province, Guangzhou, Orchard Garden, on dead leaves of *Eucalyptus* sp., Dec 29 2012, W.P. Wu (Wu12435a, 12435b); China: Hubei province, Shengnongjia, on dead leaves of unidentified plant, 17 Sept. 2004, W.P. Wu (Wu8286b); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. Wu (Wu16806, Wu16810, Wu16811, Wu16871); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. (Wu16099, Wu16101, Wu16102); China: Zhejiang Province, Huaian County, Qiandaohu, on dead pod of Leguminosae, 18 Oct. 2018, W.P. Wu (Wu16162); Living strain: 43750 (from Wu1593a), ex-type strain 54257 (from Wu12195), 55322 and 55280 (from Wu12435), 57391 (from Wu13079), 57446 (from Wu13144), 76325 (from Wu16099), 76326 (from Wu16101), 76356 (from 16102), 76374 (from Wu16162), 76571 (from

Wu16236), 76590 (from Wu16263), 76692 (from Wu16267), 76599 (from Wu16272), 77230 (from Wu16806), 77158 (from Wu16810), 77231 (from Wu16811), 77238 (from Wu167= 871), 76394 (from Wu16101a), 76426 (from Wu16102a), 76462 (from Wu16102a1), 76375 (from Wu16162a), 76607 and 76608 (from Wu16278), 77230 (from Wu16806),.

Ecology/Substrate/Host: Saprobe on dead material of plants, including leaves, seed and branches of *Cyclobalanopsis* sp. and *Eucalyptus* sp.

Geographical distribution: China.

Notes: *Stilbochaeta sinensis* W.P. Wu & Y.Z. Diao morphologically resembles *Dictyochaeta* anamorph of *Chaetosphaeria dingleyae* S. Hughes, W.B. Kendr. & Shoemaker, *Stilbochaeta novae-guineensis*, *S. malaysiana* and *S. brevisetula*. All of them have sterile setae and 1-septate conidia bearing one single setulae at each end (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991a; Whitton et al. 2000; Réblová et al. 2021e). Among them, *S. brevisetula* (conidia 21–24 x 3–3.7 µm, setulae less than 3 µm long), *S. novae-guineensis* (conidia 13–20 x 2.5–3.5 µm, setulae 5–10 µm long) and *S. malaysiana* (conidia 24–32 x 3–4 µm, setulae up to 18 µm long) have significantly larger conidia, thus can be easily distinguished from *S. sinensis*. *Dictyochaeta* anamorph of *Chaetosphaeria dingleyae* also has smaller conidia (14–17 x 1.8–2.7 µm, setulae 11–13 µm), but the conidia in this species have much longer setulae than those in *S. sinensis* (Hughes and Kendrick 1968; Matsushima 1971; Kuthubutheen 1987c).

Stilbochaeta submersa (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 84, 2021.

≡ *Dictyochaeta submersa* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99: 597, 2019.

Saprobic on submerged decaying wood. Asexual morph Colonies on the substratum superficial, effuse, greyish brown, shining. Mycelium partly immersed, partly superficial, consisting of branched, septate, brown, smooth hyphae. Teleomorph: Unknown. Anamorph: Setae erect, cylindrical, straight, septate, unbranched, pale brown to brown. Conidiophores 62–122(–152) µm long, 3–5 µm wide, macronematous, mononematous, erect, solitary or in small groups, unbranched, cylindrical, 4–6-septate, straight, or slightly flexuous, pale brown, smooth. Conidiogenous cells monophialidic, terminal, determinate, subhyaline, narrowing below the collarette. Conidia 13.5–16.5 µm long, 2.5–3.5 µm wide, acrogenous, solitary, aggregating in a globose mass at apex of conidiophore, fusiform, curved, rounded and narrow at both ends, with polar appendages, aseptate, hyaline, smooth-walled; setulae 8–13 µm long.

Material examined: China: Hubei Province, Shengnongjia, on dead leaves of unidentified tree, Sept 2004, W.P. Wu (Wu8101); China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on dead branches of unidentified tree, 15 Oct 2003, W.P. Wu (Wu7302). Living strain: 47791 (from Wu7302), 47996 (from Wu8101).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Luo et al. (2019); Réblová et al. (2021e).

Notes: *Dictyochaeta submersa* Z.L. Luo, K.D. Hyde & H.Y. Su is characterized by setiform colonies, presence of sterile setae with rounded apex, well-developed conidiophores, monophialidic conidiogenous cells with funnel-shaped collarette, and falcate and 1-septate conidia with setulae at both ends. *D. submersa* differs from several morphologically similar species including *D. malysiana* Kuthub. and *D. novae-guineensis* Matsush. by its smaller conidia. (Hughes and Kendrick 1968; Matsushima 1975; Kuthubutheen 1987c; Kuthubutheen and Nawawi 1991a, b, d, e; Whitton et al. 2000; Liu et al. 2016; Wei et al. 2018).

The following *Stilbochaeta* and *Codinaea/Dictyochaeta* species were not examined by us, but morphologically fits into the generic concept of *Stilbochaeta* in producing sterile or fertile setae, clustered conidiophores with setae, terminal mono- or polyphialidic conidiogenous cells with funnel-shaped collarette, and hyaline and septate conidia with one setula at each end.

Stilbochaeta brevisetula Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 71, 2021.

≡ *Codinaea brevisetula* S. Hughes & W.B. Kendr., New Zealand J. Bot. 6: 338, 1968.

≡ *Dictyochaeta brevisetula* (S. Hughes & W.B. Kendr.) Aramb. & Cabello, Mycotaxon 34: 681, 1989

≡ *Dictyochaeta brevisetula* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

Geographical distribution: New Zealand.

Description and illustration: Hughes and Kendrick (1968); Réblová et al. (2021e).

Notes: *Codinaea brevisetula* S. Hughes & W.B. Kendr. is characterized by presence of sterile setae, clustered conidiophores with setae, terminal and polyphialidic conidiogenous cells, and fusiform, symmetrical, 1-septate conidia (21–24.5 x 3–3.7 µm) with a short setula 1.4–2.7 µm at each end. It can be easily distinguished from other species with septate conidia by relatively longer and broader conidia and very short setulae.

Dictyochaeta caatingae A.C. Cruz & Gusmão, Mycotaxon 106: 16, 2008.

Geographical distribution: Brazil.

Description and illustration: Cruz et al. (2008).

Notes: *Dictyochaeta caatingae* differs from other *Codinaea*/*Dictyochaeta* species by sterile setae with acute apex, monophialidic conidiogenous cells, and fusiform, 3-septate conidia (27-35.5 x 3.3-5.5 µm) with very short setulae (0.5-2.5 µm long).

Dictyochaeta macrospora Kuthub. & Nawawi, Mycol. Res. 95: 248, 1991.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991d).

Notes: *Dictyochaeta macrospora* Kuthub. & Nawawi is characterized by sympodially proliferating conidiophores, terminal and polyphialidic conidiogenous cells with funnel-shaped collarette, and hyaline, falcate, 3-septate conidia (38-47 x 5-7 µm) with a setula 22-30 µm at each end.

Stilbochaeta malaysiana (Kuthub.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 76, 2021.

≡ *Dictyochaeta malaysiana* Kuthub., Trans. Br. Mycol. Soc. 89: 356, 1987.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen (1987c); Réblová et al. (2021e).

Notes: *Dictyochaeta malaysiana* Kuthub. is characterized by presence of sterile or fertile setae, clustered conidiophores with setae, terminal and monophialidic conidiogenous cells with funnel-shaped collarette, and falcate, 1-septate conidia (24-32 x 3-4 µm) with a setula up to 18 µm long at each end. It is similar with several other 1-septate conidia but can be distinguished from them by monophialidic conidiogenous cells, and longer conidia and setulae.

Codinaea matsushimae Hewings & J.L. Crane, Mycotaxon 13: 423, 1981.

≡ *Dictyochaeta matsushimae* (Hewings & J.L. Crane) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

≡ *Dictyochaeta matsushimae* (Hewings & J.L. Crane) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 140, 2000.

Setae cylindrical, up to 20-septate, dark brown, pale brown to subhyaline at bluntly rounded apex, up to 340 µm. Conidiophores cylindrical, associated with setae, septate. Conidiogenous cells terminal, mono- or polyphialidic, 14-27 x 3-6 µm; collarette funnel-shaped, with sympodial proliferations. Conidia fusiform, symmetrical, 3-septate, rarely 1- or 2-septate, 20-27 x 3.3-5.4 µm; setulae 5.5-7.8 µm.

Geographical distribution: USA.

Description and illustration: Hewings and Crane (1981).

Notes: *Codinaea matsushimae* differs from other *Codinaea*/*Dictyochaeta* species with 3-septate conidia by size of conidia and setulae.

Stilbochaeta novae-guineensis (Matsush.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 78, 2021.

≡ *Codinaea novae-guineensis* Matsush., Microfungi of the Solomon Islands & Papua-New Guinea :14, 1971.

≡ *Dictyochaeta novae-guineensis* (Matsush.) A.I. Romero, Bol. Soc. Arg. Bot. 22: 76, 1983.

Setae cylindrical, septate, dark brown, pale brown to subhyaline at bluntly rounded apex, 100-250 x 4-5 µm. Conidiophores cylindrical, 2-6 clustered and associated with setae, septate 40-85 x 3-4 µm. Conidiogenous cells terminal, mono-phialidic; collarette funnel-shaped, with sympodial proliferations. Conidia falcate, symmetrical, 1-septate, 13-20 x 2.5-3.5 µm; setulae 9-16 µm.

Geographical distribution: Papua-New Guinea.

Description and illustration: Matsushima (1971); Romero (1983); Réblová et al. (2021e).

Stilbochaeta ramulosestula (Kuthub.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 81, 2021.

≡ *Dictyochaeta ramulosestula* Kuthub., Trans. Br. Mycol. Soc. 89: 353, 1987.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen (1987c).

Notes: *Dictyochaeta ramulosestula* Kuthub. differs from other *Codinaea* and *Dictyochaeta* species with 1-septate conidia by producing sterile setae, monophialidic conidiogenous cells with funnel-shaped collarette, and falcate conidia (12-22 x 3-4 µm) with longer setulae (up to 18 µm long).

Stilbochaeta septata (B. Sutton & Hodges) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 83, 2021.

≡ *Codinaea septata* B. Sutton & Hodges, Nova Hedw. 26: 520. 1975.

≡ *Dictyochaeta septata* (B. Sutton & Hodges) Aramb. & Cabello, Mycotaxon 34: 682. 1989. (Nom. inval., Art. 41.4).

≡ *Dictyochaeta septata* (B. Sutton & Hodges) Whitton, McKenzie & K.D. Hyde, Fungal Divers. 4: 148. 2000.

Geographical distribution: Australia, Brazil, Chile, South Africa.

Description and illustration: Sutton and Hodge (1975); Réblová et al. (2021e).

Codinaea tortuosa B. Sutton, Proc. Royal Soc. Queensland 91: 16, 1980.

≡ *Dictyochaeta tortuosa* (B. Sutton) Whitton, McKenzie & K.D. Hyde, Fungal Diversity 4:150, 2000.

Geographical distribution: Australia.

Description and illustration: Sutton (1980).

Notes: In this species the setae are simple and loosely coiled and tortuous towards the sterile apex, the conidiophores are up to 6-fasciculate with setae, and the conidia are 11.5 x 1.5 µm and with a 5-7.5 µm long setula at each end.

Dictyochaeta variabilis Kuthub. & Nawawi, Mycol. Res. 95: 1216, 1991.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen & Nawawi (1991e).

Notes: *Dictyochaeta variabilis* Kuthub. & Nawawi differs from other species by absence of setae, cylindrical and septate conidiophores with percurrent proliferations, and falcate, 3-septate conidia (30-40 x 4.5-5.7 µm) with a setula 17-23 µm long at each end.

Tainosphaeria F.A. Fernández & Huhndorf, Fung. Div. 18: 2005

Colony effuse, brown to dark brown. Mycelium composed of partly immersed and partly superficial, hyaline to pale brown, septate, erect hyphae with glistening conidial masses at their apices. Teleomorph: Ascomata subglobose to ovoid. Paraphyses simple, septate, hyaline. Asci unitunicate, cylindrical, stipitate, with an apical ring. Ascospores hyaline, septate. Anamorph: Asexual morph Conidiophores superficial, macronematous, mononematous, erect, unbranched, brown to dark brown below half, pale brown towards the apex, septate, smooth-walled. Conidiogenous cells monophialidic, integrated, terminal, determinate. Conidia fusiform or cylindrical, aseptate, gently curved, rarely straight, hair-like appendages at both ends, hyaline, smooth, thin-walled.

Type species: *Tainosphaeria crassiparies* F.A. Fernández & Huhndorf.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Ecological distribution: Broadly distributed.

Description and illustration: Fernández and Huhndorf (2005).

Notes: The genus *Tainosphaeria* F.A. Fernández & Huhndorf was created to accommodate *T. crassiparies* F.A. Fernández & Huhndorf found on *Hymenia* pod and on erumpent stromata of overmatured ascomycetes from Puerto Rico (Fernández and Huhndorf, 2005). It is characterized by subglobose to ovoid ascomata, simple, septate, hyaline paraphyses, unitunicate, cylindrical, pedicellate asci, with an apical ring, and hyaline, septate ascospores. Apart from the teleomorph state, the anamorph state similar to *Codinaea/Dictyochaeta* was also described for the type species in the original description (Fernández and Huhndorf 2005; Liu et al. 2016; Lin et al. 2019; Luo et al. 2019). Since then 8 more species, *T. aquatica* X.D. Yu, C.X. Li & H. Zhang, *T. aseptata* C.G. Lin & J.K. Liu, *T. jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde, *T. lunata* Z.L. Luo, K.D. Hyde & H.Y. Su, *T. monophialidica* C.G. Lin & J.K. Liu, *T. obclavata* D.F. Bao, Z.L. Luo, K.D. Hyde & H. Su, *T. siamensis* J. Yang, K.D. Hyde & J.K. Liu, and *Tainosphaeria thailandensis* W. Dong, C.X. Li & H. Zhang, have been added into the genus. All these species were described with only anamorphic states with cylindrical conidiophores, terminal phialidic conidiogenous cells, and hyaline, aseptate, setose or non-setose conidia in various shapes.

Recent phylogenetic analysis showed that the genus *Tainosphaeria* is polyphyletic (Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Li et al. 2021; Réblová et al. 2021b, 2021e). In a recent papers, Réblová et al. (2021b, e) accepted 6 monophyletic genera in the *Tainosphaeria* clades on the phylogenetic tree generated by using the integrated ITS and LSU data: *Anacacumisporium*, *Flectospora*, *Tainosphaeria* s. str., *Phialogeniculata*, *Phialoturbella*, and *Tainosphaeriella*. Each of these genera is also morphologically distinct from each other. Under this concept, *Tainosphaeria* was separated into three monophyletic genera: *Tainosphaeria* s. str. for *Tainosphaeria crassiparies* (the type species), *T. cecropiae*, *T. jonesii*, *T. monophialidica*, *T. parva*, *T. siamensis*, *T. simplex* and *T. vulgaris* with macronematous, solitary, simple conidiophores, usually monophialidic conidiogenous cells and falcate, setulate conidia; *Phialoturbella* for *Tainosphaeria aseptata* and *T. lunata*, characterized by macronematous, solitary or crowded, simple conidiophores with mono- occasionally polyphialidic conidiogenous cells and aseptate, falcate to lunate conidia without setulae; *Phialogeniculata* for *Tainosphaeria obclavata*, characterized by conidiogenous cells with sympodial proliferations, and obclavate and septate conidia without setulae; and *Tainosphaeriella* for *Tainosphaeria aquatica* and *T. thailandensis*, characterized by 1-3-septate conidia with one setulae at each end. Our phylogenetic analysis (Fig. 3 and Fig. 118) support this treatment. In addition, several genera are added into this clade from our study, including

Calceisporiella W.P. Wu & Y.Z. Diao, *Parabuhusutrabejia* W.P. Wu & Y.Z. Diao, and *Paracodinaea* W.P. Wu & Y.Z. Diao.

Species of *Tainosphaeria* s. str., are reported as saprobic on decaying or submerged wood (Fernández & Huhndorf 2005, Liu et al. 2016). Among the accepted species, only *T. jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde, is known from China (Lu et al. 2016; Luo et al. 2019). Addition five species are added into the genus from this study.

The living strains of many studied species were also studied on PDA (Fig. 119), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Tainosphaeria*

1. Conidiophores verruculose; conidiogenous cells monophialidic; conidia falcate, fusiform, straight or slightly curved, 10–14 x 2–2.5 µm; setula of 2.5–5 µm long *T. verrucophora*
1. Conidiophores smooth 2
2. Conidia falcate, tapering towards both ends, slightly truncate at the basal hilum; two kinds: conidia without setulae 15.5–21 x 2.5–3.5 µm, conidia with setulae 16–19 x 2.5–3 µm, setulae straight or gently curved 6.5–8.5 µm long *T. cecropiae*
2. Conidia one kind, always with setulae at both ends 3
3. Conidia longer than 15 µm long 4
3. Conidia less than 15 µm long 9
4. Conidiophores 5–6.4 µm wide; conidia naviculate to fusiform or cylindrical, 17.5–20.5 x 3.2–3.4 µm; setulae 7.8–9.1 µm long *T. jonesii*
4. Conidiophores less than 5 µm wide; conidia slightly shorter 5
5. Conidial setulae 2–5 µm long 6
5. Conidial setulae longer than 5 µm in average 7
6. Conidia 17–23 x 2–2.7 µm; setulae 3–5 µm long *T. vulgaris*
6. Conidia 11–17 x 2.5–3.1 µm; setulae 2–4 µm *T. parva*
7. Conidia 14–19 x 2.5–3 µm; setulae 6–8 µm long *T. simplex* and *T. sivanesanii*
7. Conidial setulae up to 10 µm long 8
8. Conidiophores 33–102 x 2.7–4.8 µm; conidiogenous cells 20–46 x 2.7–4.3 µm; conidia ellipsoidal, long fusiform, 14–19 x 2.3–3.5 µm; setulae 7–10 µm long *T. monophialidica*
8. Conidiophores 40–86 x 2.5–4 µm; conidia cylindrical or long fusiform, straight or slightly curved, 13.5–19 x 2–3.5 µm; setulae 3.6–10 µm long *T. siamensis*
9. Conidiophores 50–105 x 2–3 µm, with both sympodial and percurrent proliferations. Conidiogenous cells monophialidic or polyphialidic, cylindrical, 25–30 x 2.5–3 µm; Conidia fusiform, 9–13.5 x 2.5–2.8 µm; setulae 3–4 µm long *T. microsperma*
9. Conidia slightly larger; setulae longer than 5 µm 7
10. Conidiophores 87–121 x 2.7–4.5 µm; conidiogenous cells cylindrical, monophialidic, with percurrent proliferations, 27–35 x 2.5–3.5 µm; Conidia falcate, 10.5–14.8 x 2–3; setulae 4–8.5 long *T. crassiparves*
10. Conidiophore and conidiogenous cell shorter (20–25 x 2.5–2.8 µm), no percurrent proliferation 8
11. Conidiophores 1–4-septate, 42–85 x 2–2.5 µm; conidiogenous cells monophialidic; collarette cup-shaped, 2.8–3.8 µm deep, 3–4.5 µm wide; conidia fusiform, 13.5–14 x 2–2.2 µm; setulae 5–8 µm long *T. cupulata*
11. Conidiophores 2–3-septate, 30–55 x 2.5–3.5 µm. Conidiogenous cells cylindrical, with 1–3 sympodial proliferation; collarette funnel-shaped, 1.5–2 µm deep, 2–2.5 µm wide; conidia fusiform, 14–15 x 1.7–2 µm; setulae 5–6 µm long *T. phialogeniculata*

Tainosphaeria cupulata W.P. Wu & Y.Z. Diao, sp. nov., Figs. 120–121, Mycobank MB841590.

Etymology: refers to its cup-shaped collarettes.

Diagnosis: similar to *Tainosphaeria jonesii* but differs in monophialidic conidiogenous cell with cup-shaped collarettes, longer conidia and setulae, and ITS sequence.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on decaying seed pod of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17579; ex-type strain CGMCC 3.20761 = NN 78378).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2–4 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, solitary or 2–3 in groups, simple, erect, straight, or flexuous, brown but becoming paler towards the apex, 1–4-septate, smooth- and thick-walled, 42–85 x 2–2.5 µm, basal cell up to 5 µm wide. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, 22–26 x 2.5–2.8 µm; collarette cup-shaped, 2.8–3.8 µm deep, 3–4.5 µm wide. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, aseptate, hyaline, smooth, 13.9–14 x 2–2.2 µm, apex rounded, base slightly truncated or rounded, with one setula at each end, setulae 5–8 µm long.

Colonies on PDA effuse, colonies up to 1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead seed pod of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17584); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on decaying seed pod of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17579); China: Hunan, Zhangjiajie, on dead leaves of unidentified tree, 15 Oct. 2010, W.P. Wu (Wu11026). Living strain: ex-type strain 78378 (from Wu17579), 53392 (from Wu11026), 78380 (from Wu17584).

Ecology/Substrate/Host: Saprobe on decaying seed pod of *Acacia* sp.

Geographical distribution: China.

Notes: *Tainosphaeria cupulata* is similar to *T. jonesii*, but differs in producing monophialidic conidiogenous cells with deeper and wider cup-shaped collarettes, and longer conidia and setulae (Liu et al. 2016).

***Tainosphaeria jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde, Mycosphere 7:1328, 2016. 122**

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2–4 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, erect, straight, or flexuous, dark brown but becoming paler towards the apex, multiseptate, smooth- and thick-walled, up to 240 µm long, 2.5–3.5 µm wide, proliferation percurrent. Conidiogenous cells integrated, terminal then becoming intercalary due to percurrent proliferation, polyphialidic, subcylindrical, geniculate, up to 40 µm long, 2.5–3.5 µm wide; collarette funnel-shaped, 2–2.5 µm wide, 1–1.5 µm deep, proliferating percurrently through the collarette. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, curate, aseptate, hyaline, smooth, 11.5–13 x 2–2.5 µm, apex acute or rounded, with one setula at each end, setulae 3–4.5 µm long.

Colonies on PDA effuse, colonies 1–3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, grey to grey brown, reverse brown to dark brown.

Material examined: China: Guangdong Province, Guangzhou, Orchard Garden, on dead leaves of *Eucalyptus* sp., 29 Dec. 2012, W.P. Wu (Wu12454); China: Guangdong Province, Lufushan, on rotten wood, 14 Oct. 1998, W.P. Wu (Wu1981b); China: Guangdong Province, Zhaoqing, Dinghushan, on dead fruit of palm, 3 March 2012, W.P. Wu (Wu12141a); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1872c); China: Guangdong Province, Shenzhen, Lianhuashan, on dead seed of *Acer* sp., 15 Nov. 2019, W.P. Wu (Wu17141); China: Guangdong Province, Shenzhen, Lianhuashan, on dead seed of unidentified tree., 15 Nov. 2019, W.P. Wu (Wu17259); China: Guangdong Province, Shenzhen, Yangtaishan Park, on dead fruit of mongo, 18 Oct. 2020, W.P. Wu (Wu17422), China: Guangdong Province, Shenzhen, Yangtaishan Park, on dead fruit of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17483, Wu17486, Wu17581); China: Guangxi Province, Nanning, on dead leaves of *Eucalyptus* sp., 3 Jan 1998, W.P. Wu (Wu1612b); China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 28 Dec. 2020, W.P. Wu (Wu17651); China: Zhejiang Province, Huanan County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16140). Living strain: 55286 (from Wu12454), 54367 (from Wu12141), 46011 (from Wu2750a), 44886 (from Wu1981b), 43723 (from Wu1612b), 44639 (from Wu1872c), 53373 and 54367 (from Wu12141), 76369 (from Wu16140), 76370 (from Wu16140a), 77537 (from Wu17141), 77750 (from Wu17259a), 78328, 78424 and 78425 (from Wu17651), 78242 (from Wu17483), 78246 (from Wu17486), 78329 (from Wu17423), 78189 (from Wu17422), 78401 (from Wu17581)

Ecology/Substrate/Host: Saprobe on dead plant material, including *Eucalyptus* sp.

Geographical distribution: China.

Description and illustration: Lu et al. (2016).

Notes: *Tainosphaeria jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde, originally described from decaying wood in freshwater stream and collected from Guangxi, China, is characterized by absence of stroma and setae, macronematous conidiophores, terminated and polyphialidic conidiogenous cells with conspicuous funnel-shaped collarettes and percurrent proliferation, and fusiform conidia with one setula at each end (Lu et al. 2016). *T. jonesii* (conidia 14–19 x 2–3 µm; setulae 6–8.5 µm long) can easily be distinguished from the closely related species *T. crassiparis* (conidia 10.5–14.8 x 2–3 µm; setulae 4–8.5 µm long), the type species of the genus, by its larger conidia. Morphologically *T. jonesii* can be hardly distinguished from *T. siamensis*, both have fusiform-shaped conidia with one setula at each end and in very similar size of conidia and setulae (Liu et al. 2016; Lu et al. 2016). The ITS sequences from them are also very similar and with only 4–5 bp difference, and might represent the same species. The conidia from the examined collections by us are with smaller conidia, however phylogenetically they are closely related to each other. *T. jonesii* seems to be a rather common species and has been found on dead leaves and rotten wood in different regions of China.

***Tainosphaeria microsperma* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 123, Mycobank MB841591.**

Etymology: refers to its small conidia.

Diagnosis: similar to *Tainosphaeria jonesii* but differs in smaller conidia and shorter setulae.

Typification: China: Zhejiang Province, Huaian County, Qiandaohu, on decaying cone of *Pinus* sp., 18 Oct. 2019, W.P. Wu (Holotype WFH Wu16152; ex-type strain CGMCC 3.20729 = NN 76340).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, solitary or in groups, simple, erect, straight or flexuous, brown but becoming paler towards the apex, 2-6-septate, smooth- and thick-walled, 50-105 x 2-3 µm, basal cell up to 5 µm wide, terminated with a conidiogenous cell, with 1-3 percurrent proliferations and 1-2 sympodial proliferation. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, cylindrical, 25-30 x 2.5-3 µm; collarette funnel-shaped, 1.5-2 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, aseptate, hyaline, smooth, 9-13.5 x 2.5-2.8 µm, apex rounded, base slightly truncated or rounded, with one setula at each end, setulae 3-4 µm long.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Typification: China: Zhejiang Province, Huaian County, Qiandaohu, on decaying cone of *Pinus* sp., 18 Oct. 2019, W.P. Wu (Holotype Wu16152); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead fruit of unidentified tree, 3 March 2012, W.P. Wu (Wu12141, Wu12349). Living strains: ex-type strain 76340 and 76341 (from Wu16152), 54413 (from Wu12349).

Ecology/Substrate/Host: Saprobes on decaying cone of *Pinus* sp.

Geographical distribution: China.

Notes: *Tainosphaeria microsperma* is similar to *T. jonesii*, but differs in producing smaller conidia with shorter setulae (Liu et al. 2016).

Tainosphaeria parva (S. Hughes & W.B. Kendr.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 85, 2021.

≡ *Codinaea parva* S. Hughes & W.B. Kendr., N.Z. J. Bot. 6: 354, 1968.

≡ *Dictyochoeta pava* (S. Hughes & W.B. Kendr.) Hol.-Jech., Česká Mykol. 42: 204, 1988.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 36-septate, brown to dark brown at the lower part, becoming paler towards the apex, smooth, 40-110 x 3.5-5 µm, base with a swollen and lobbed cell up to 10 µm wide. Conidiogenous cells integrated, terminal, polyphialidic, cylindrical to geniculate, 10-20 x 3.5-4.5 µm, pale brown, thin- and smooth-walled, collarette funnel-shaped 3-3.5 µm wide, 1.5-2 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, curved, obtuse at the base, 11-17 x 2.5-3 µm, aseptate, hyaline, smooth, with a setula of 3-5 µm long at each end.

Material examined: China: Yunnan Province: Kunming: Kunming Botanical Garden, on dead leaves of undetermined trees, 24 Nov. 1995, W.P. Wu (Wu955g, Wu958a).

Geographical distribution: China, Costa Rica, New Zealand, Seychelles.

Description and illustration: Hughes and Kendrick (1968); Réblová et al. (2021e).

Notes: The species is very similar to *Dictyochoeta simplex* but differs from it by conidia with shorter setulae (Hughes and Kendrick 1968). This species is rarely known in the publication (Castañeda-Ruiz and Granados 2018). Its occurrence on palm in Hongkong was reported by Taylor and Hyde (2003).

Tainosphaeria phialogeniculata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 124, Mycobank MB841592.

Etymology: refers to its geniculate conidiophores due to proliferation.

Diagnosis: similar to *Tainosphaeria jonesii* but differs in relatively longer conidia and ITS sequence.

Typification: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 8 June 2018, Yu Zhang (Holotype WFH Wu15202; ex-type strain CGMCC 3.20799 (= NN 76036).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, solitary or 2-3 in groups, simple, erect, straight, or flexuous, brown but becoming paler towards the apex, 2-3-septate, smooth- and thick-walled, 30-55 x 2.5-3.5 µm, basal cell up to 4.5 µm wide. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, 20-25 x 2.5-2.8 µm; collarette funnel-shaped, 1.5-2 µm deep, 2-2.5 µm wide, with 1-3 geniculate proliferations. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, fusiform, aseptate, hyaline, smooth, 14-15 x 1.7-2 µm, apex rounded, base slightly truncated or rounded, with one setula at each end, setulae 5-6 µm long.

Colonies on PDA effuse, colonies 0.6 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: Typification: China: Yunnan Province, Pu Er, on dead leaves of unidentified tree, 8 June 2018, Yu Zhang (Holotype Wu15202); China, Yunnan, Kunming, Botanical Garden, on dead culm of bamboo, 22 Oct. 1999, W.P. Wu and Yan Huang (Wu2601b); China: Yunnan Province, Xishuangbanna, on dead wood, 16

Oct 1999, W.P. Wu & Yan Huang (Wu2750a). Living strain: ex-type strain 76036 (from Wu15202), 46011 (from Wu2750a), 46017 (from Wu2601a).

Ecology/Substrate/Host: Saprobe on decaying leave.

Geographical distribution: China.

Notes: *Tainosphaeria phialogeniculata* is similar to *T. jonesii*, but differs in producing longer conidia. In addition, their ITS sequences are with significant difference (Liu et al. 2016).

Tainosphaeria sivanesanii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 125, MycoBank MB841594.

Etymology: named after the former IMI mycologist, A. Sivanesan, with whom one of the authors (Wu) worked in the same office for 3 years in IMI and got strong support from him.

Diagnosis: Setae absent. Conidiophores 30-50 x 2-3.5 µm. Conidiogenous cells monophialidic with sympodial proliferation, cylindrical, 13-20 x 3-3.5 µm, bearing funnel-shaped collarette. Conidia falcate, fusiform, straight or curved, aseptate, 15-17 x 2.5-2.8 µm, both apex and base bear short setulae of 6-7 µm long.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan Forestry Park, on dead see pod of *Acacia* sp., 17 Oct 2020, W.P. Wu (Holotype WFH Wu17575; ex-type strain CGMCC 3.20676 (=NN 78406)).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, cylindrical to geniculate, dark brown and thick-walled in lower part, becoming paler and thin walled towards the apex, 2-5 septate, smooth, 30-50 x 2-3.5 µm. Conidiogenous cells integrated, terminal, monophialidic with sympodial proliferation, cylindrical, 13-20 x 3-3.5 µm, pale brown to brown, thin-walled, ending in a flared collarette which is funnel-shaped, 2.5-3 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, fusiform, straight or curved, aseptate, hyaline, smooth, 15-17 x 2.5-2.8 µm, both apex and base bear short setulae of 6-7 µm long.

Colonies on PDA effuse, colonies 1-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forestry Park, on dead see pod of *Acacia* sp., 17 Oct 2020, W.P. Wu (Holotype WFH Wu17575). Living strain: ex-type strain CGMCC 3.20676 (=NN 78406).

Ecology/Substrate/Host: Saprobe on dead plant material of *Acacia* sp.

Geographical distribution: China.

Notes: Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu17575, the closest matches in NCBI's GenBank nucleotide database were members of *Tainosphaeria*, *Pseudolachnea* and *Menispora* in *Chaetosphaeriaceae*, including *Tainosphaeria lunata* (GeneBank NR168796, identities 328/342 (96%), 2 gaps (0%)), *Tainosphaeria obclavata* (GeneBank NR168797, identities 329/350 (93%), 7 gaps (1%)).

Tainosphaeria vulgaris (S. Hughes & W.B. Kendr.) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 88, 2021.

≡ *Codinaea vulgaris* S. Hughes and W.B. Kendr., New Zealand Journal of Botany 6: 367, 1968.

≡ *Dictyochoeta vulgaris* (S. Hughes and W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 151, 2000.

Geographical distribution: New Zealand and Seychelles.

Description and illustration: Hughes and Kendrick (1968); Whitton et al. (2000); Réblová et al. (2021).

Notes: *Tainosphaeria vulgaris* differs from other relevant species by relatively larger conidia (17-23 x 2-2.7 µm) with shorter setulae (3-5 µm). It has been reported on leaf litter and rotten wood of various plants including *Nothofagus solandri* var. *cliffortioides*, *N. runcata*, *Pandanus seychellarum*, *Quintinia serrata*, *Rubus* sp. and *Weinmannia racemosa*.

Tainosphaeria verrucophora W.P. Wu & Y.Z. Diao, sp. nov., Figs. 126-127, MycoBank MB841593.

Etymology: refers to its verruculose conidiophores.

Diagnosis: Similar to *Tainosphaeria jonesii*, but differs in producing conidiophores with rough-wall and ITS sequence.

Typification: China: Hainan Province, Sanya, Yalongwan Park, isolated from dead leaves of unidentified tree, 28 Dec 2020, W.P. Wu (Holotype WFH Wu17647b1; ex-type strain CGMCC 3.20765 = NN 78530).

Colonies on PDA effuse, hairy, dark brown, granulate appearance due to sporulation in old culture. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 1-3 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores macronematous, mononematous, simple, single or a few in small group, erect, straight or slightly flexuous, cylindrical, brown to dark brown, thick-walled in lower part, becoming paler and thin-walled towards the apex, 1-3-septate, verruculose with dark colored pitch on the wall, 30-80 x 3-3.5 µm. Conidiogenous cells integrated, terminal, monophialidic, occasionally with percurrent proliferation, cylindrical, 25-30 x 3-3.5 µm, pale brown to brown, thin-walled, ending in a flared collarette which

is darker and funnel-shaped, 2.5-3 µm wide, 1-1.5 µm deep. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate, fusiform, straight or curved, aseptate, hyaline, smooth, 10-14 x 2-2.5 µm, bear a short setula of 2.5-5 µm long at each end.

Colonies on PDA effuse, colonies 1-1.4 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium less developed, pale brown to brown, reverse of the same color.

Material examined: China: Hainan Province, Sanya, Yalongwan Park, isolated from dead leaves of unidentified tree, 28 Dec 2020, W.P. Wu (Holotype WFH Wu17647b1). Living strain: ex-type strain 78530.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Notes: *Tainosphaeria verrucophora* W.P. Wu & Y.Z. Diao is unique in producing rough-walled conidiophores, terminal monophialidic conidiogenous cells, and hyaline, aseptate, fusiform to falcate conidia with 1 setula at each end. Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu17647b1, the closest matches in NCBI's GenBank nucleotide database were members of *Tainosphaeria* and *Codinaea* in Chaetosphaeriaceae, including *Tainosphaeria siamensis* GeneBank NR154524, identities 419/448 (94%), 11 gaps (2%), *Tainosphaeria jonesii* (GeneBank MN121306, identities 417/448 (93%), 11 gaps (2%), *Dictyochaeta mimusopis* (GeneBank MH107888, identities 390/434 (90%), 14 gaps (3%)).

Xyladelphia Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 90, 2021.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae. Teleomorph: Ascomata subglobose to broadly ovoid, dark brown, separate, superficial, papillate; setae sparse, scattered, brown, multiseptate, slender, tapering to an acute apex. Ascomatal wall of textura epidermoidea in surface view in water, and in lactophenol, composed of pseudoparenchymatic cells, with a thin, light-colored outer coating. Ascomatal apex papillate, acute, short. Paraphyses sparse, unbranched, hyaline, septate. Asci cylindro-clavate, short-stalked, unitunicate, thin-walled, broad apical cap, with 8 ascospores irregularly arranged. Ascospores hyaline, broadly fusiform to ellipsoid, rounded ends, aseptate, rarely one-septate. Anamorph: Setae sterile, straight, smooth- and thick-walled, tapering gradually towards the pointed apex, septate, uniformly brown except at the ultimate or penultimate cells which are dark brown. Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, pale brown to brown, becoming pale brown towards the apex, septate, dark brown but becoming paler towards the apex, thin- and smooth-walled. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, pale brown, thin-walled, ending in a flared collarete which is funnel-shaped. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, falcate but asymmetrical, slightly curved, narrowing sharply and attenuated towards the basal end, aseptate, hyaline, smooth, multiguttulate, without or with setulae at each end of the conidium.

Type species: *Xyladelphia longiseta* (F.A. Fernández & Huhndorf) Réblová & Hern.-Restr.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Asia, New Zealand, South America.

Notes: *Xyladelphia* Réblová & Hern.-Restr. is a recently created genera to include *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf with both teleomorph and anamorph known (Réblová et al. 2021e). The anamorph is *Codinaea*-like fungus, which produces sterile setae with a darker ultimate and/or penultimate cells, short conidiophores bearing terminal monophialidic conidiogenous cells, and hyaline, aseptate, guttulate and falcate conidia without or with setulae. They are phylogenetically very different from other species assigned to *Codinaea* and *Dictyochaeta* (Fernández & Huhndorf 2005; Lin et al. 2019; Réblová et al. 2021e). In our phylogenetic analysis, three *Codinaea*-like fungal species are clustered together with *Dictyochaeta brevis* C.G. Lin & K.D. Hyde and *Xyladelphia longiseta* and formed a strongly supported clade. Morphologically, all these species share very similar morphological characters with *Xyladelphia longiseta*. Apart from the type species, we add another 3 new species to the genus *Xyladelphia*.

Several species among many described *Dictyochaeta* species show high similarity with *Xyladelphia* in morphology of sterile setae with a darker ultimate or penultimate cell and acute apex, short conidiophores, and falcate and multiguttulate conidia, they are *D. intermedia* Gusmão & S.M. Leão, *D. vittata* Kuthub. & Nawawi and *Codinaea* state of *Chaetosphaeria pulchriseta* (Hughes and Kendrick 1968; Hewings & Crane 1981; Kuthubutheen and Nawawi 1991; Kuthubutheen & Nawawi 1991a; Whitton et al. 2000; Fernández & Huhndorf 2005; Cruz et al. 2008). They are transferred to the new genus and an identification key is provided.

Key to all accepted species of *Xyladelphia*

1. Conidia without or with inconspicuous setulae2
1. Conidia with setulae5
2. Setae uniformly brown except for the darker apical cell *S. pluriguttulata*
2. Setae uniformly brown except at the significantly darker penultimate cell3

3. Conidia asymmetrical, falcate 15-20 x 2.3-2.5 µm *S. sinensis*
 3. Conidia symmetrical, falcate 4
 4. Setae up to 360 µm long; conidia 23-29 x 2.4-3 µm *S. pulchriseta*
 4. Setae 156-240 µm long; conidia 22-25 x 2.3-2.5 µm *S. parapulchriseta*
 5. Conidia 25-32 x 2.5-3 µm, setulae 10-12 µm long *S. vittata*
 5. Conidia less than 25 µm long, setulae less than 10 µm long 6
 6. Conidia 18-21 x 1.5-2.5 µm, setulae 3.5-6.5 µm long *S. intermedia*
 6. Conidia 21.3-24.8 x 2.4-2.9 µm, setulae 5-8.3 µm long *S. longiseta*

Xyladelphia intermedia (Gusmão & S.M. Leão) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841699.

≡ *Dictyochoeta intermedia* Gusmão & S.M. Leão, Mycotaxon 106:18, 2008.

Teleomorph: unknown. Anamorph: Setae solitary, erect, straight, 9-15-septate, smooth, brown at the base, brown to pale brown at apex, 150-354 x 6-9 µm; penultimate cell dark brown, 25-47.5 µm long. Conidiophores arising solitary or in groups of 2-5, associated with base of setae, macronematous, mononematous, erect, straight or flexuous, 2-7-septate, simple, smooth, pale brown at the bases, subhyaline at apex, 30-90 x 3-6 µm. Conidiogenous cells monophialidic, determinate, integrated, cylindrical, conspicuous collarettes 1.8-2.4 µm long, pale brown to hyaline. Conidia 0-septate, falcate, simple, smooth, pluriguttulate, in slimy mass, hyaline, 18-25 x 1.5-4 µm, setulae simple at each end, 3.5-6.5 µm long.

Typification: Brazil: Bahia: Senhor do Bonfim, On leaves, 10 Oct. 2006, coll. S.M. Leão-Ferreira (Holotypus: HUEFS 114791).

Ecology/Substrate/Host: Saprobe on dead leaves.

Geographical distribution: Brazil.

Description and illustration: Cruz et al. (2008).

Notes: No specimen was examined, and the above diagnosis is based on the excellent documentation by Cruz et al. (2008). *Dictyochoeta intermedia* Gusmão & S.M. Leão was well documented in the original description and morphologically fits well to the concept of *Xyladelphia* on a combination of characters including setae with one cell darker and pluriguttulate conidia found in all accepted species, including *Chaetosphaeria longisetata*, *C. pulchriseta* S. Hughes & W.B. Kendr., *D. pluriguttulata* and *D. vittata* Kuthub. & Nawawi (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991b). The inconspicuous setulae and asymmetrical morphology of conidia in *D. pluriguttulata* are enough to separate it from *Xyladelphia intermedia*. *Xyladelphia intermedia* is most similar to *Codinaea* anamorph of *Chaetosphaeria pulchriseta* and *D. vittata* in the general morphology, but the size of conidia and setulae are intermediate between the two known species (Cruz et al. 2008).

Xyladelphia longiseta (F.A. Fernández & Huhndorf) Réblová & Hern.-Restr., J. Fungi 7 (12, no. 1097): 91, 2021.

≡ *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf, Fung. Div. 18:28, 2005

Anamorph: On natural substrate, setae associated with conidiophores, multiseptate, brown, tapering to an acute apex, 184-251 x 7-9.2 µm at the base, 3-4.5 µm for most of its length, sometimes two most apical cells dark brown, tapering to an acute apex. Conidiophores cylindrical, pale brown, 28-104 x 3-4.8 µm with terminal conidiogenous cells. Conidiogenous cells terminal, monophialidic, cylindrical, pale brown to brown, ending in an apical collarette, 25-37.5 x 3.5-4.6 µm, Conidia hyaline, fusiform, 21.3-24.8 x 2.4-2.9 µm, with a single setula at each end, 5-8.3 µm long.

Typification: Puerto Rico: Caribbean National Forest, El Verde Research Area, 16-ha Grid, Luquillo Mts., 18 January 1997, on 1 cm branch, S.M. Huhndorf, F.A. Fernández, SMH3048 (F; holotype).

Ecology/Substrate/Host: Saprobe on dead branches.

Geographical distribution: Costa Rica, Ecuador, Puerto Rico, USA.

Description and illustration: Fernández and Huhndorf (2005); Réblová et al. (2021).

Notes: *Xyladelphia longiseta* differs from other setose species in the genus by size of conidia and setulae (Kuthubutheen and Nawawi 1991; Fernández and Huhndorf 2005; Crut et al. 2008). Another species described from South American (Brazil), *X. intermedia* (setae 150-354 x 6-9 µm, with a darker penultimate cell; conidiophores 2-7 septate, 30-90 x 3-6 µm; conidia 0-septate, falcate, pluriguttulate, 18-25 x 1.5-4 µm, setulae 3.5-6.5 µm long) is very similar to *X. longiseta*, and can only be distinguished from *X. longiseta* by slighter shorter conidia (Crut et al. 2008).

Xyladelphia parapulchriseta W.P. Wu & Y.Z. Diao, sp. nov., Figs. 128-129, MycoBank MB841567

Etymology: refers to its morphological similarity to *Chaetosphaeria pulchriseta*.

Diagnosis: similar to *Dictyochoeta sampahia* Kuthub. & Nawawi, *D. pluriguttulata* Kuthub. & Nawawi and *Codinaea* state of *Chaetosphaeria pulchriseta* S. Hughes, W.B. Kendr. & Shoemaker in presence of setae, and guttulate and aseptate conidia with pointed ends, but differs in a combination of morphology of setae and conidia.

Typification: China: Guangdong, Shenzhen, Lianhuashan Park, on dead branches of unidentified tree, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17090; ex-type strains CGMCC 3.20751 = NN 77767).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-5 μm wide. Teleomorph: Unknown. Anamorph: Setae straight, crowded, arising mostly single, smooth- and thick-walled, (156) 190-240 μm long, 5-6.5 μm wide above the swollen base, tapering gradually towards the pointed apex, 6-9 septate, uniformly brown except at the penultimate cell which is significantly darker; penultimate cell black, 37-62 x 3.5-4.5 μm ; apical cell acute, 14-27.5 x 2.5-3.5 μm . Conidiophores macronematous, mononematous, simple, crowded, erect, straight, or slightly flexuous, pale brown to brown, becoming pale brown towards the apex, 1-2 septate, brown but becoming paler towards the apex, thin- and smooth-walled, smooth, 25-30 x 2.5-4.2 μm . Conidiogenous cells integrated, terminal, mono- or poly-phialidic, cylindrical, 20-23 x 3-4 μm , pale brown, thin-walled, ending in 1-4 cylindrical collarettes, up to 1 μm deep and wide. Conidia holoblastic, acrogenous, solitary, falcate, more or less symmetrical, slightly curved, narrowing gradually and attenuated towards the both ends, 22-24 x 2.3-2.6 μm , aseptate, hyaline, smooth, multiguttulate, with no or an inconspicuous setulae less than 2 μm long at each end of the conidium, accumulated in slimy, compact, colorless fascicles surrounding the tips of conidiogenous cells.

Colonies on PDA effuse, colonies up to 1 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium poorly developed, grey to grey brown, reverse brown to dark brown.

Material examined: China: Guangdong, Shenzhen, Lianhuashan Park, on dead branches of unidentified tree, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17090); China: Guangdong, Shenzhen, Lianhuashan Park, on dead branches of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17091). Living strains: ex-type strains 77767 and 77768 (from Wu17090).

Ecology/Substrate/Host: Saprobe on dead branches.

Geographical distribution: China.

Notes: *Xyladelphia parapulchriseta* W.P. Wu & Y.Z. Diao is characterized by presence of sterile setae with a darker penultimate cell and a pointed apex, short conidiophores, mono- or poly-phialidic conidiogenous cells with 1-4 cylindrical collarettes, and hyaline, aseptate, multiguttulate conidia with no or a very short (<2 μm long) setulae. Morphologically it resembles *Dictyochoeta sampahia* Kuthub. & Nawawi, *D. pluriguttulata* Kuthub. & Nawawi and *Codinaea* state of *Chaetosphaeria pulchriseta* S. Hughes, W.B. Kendr. & Shoemaker in presence of setae, and guttulate and aseptate conidia with pointed ends. *Xyladelphia parapulchriseta* differs from *D. sampahia* by fertile setae without a darker penultimate cell, and asymmetrical falcate conidia in *D. sampahia*; differs from *D. pluriguttulata* by its sterile setae with apical cell darker than others, and smaller conidia (Kuthubutheen and Nawawi 1991a). *Codinaea* state of *Chaetosphaeria pulchriseta* is the most closely related species to *E. parapulchriseta*, but in this species, the setae are significantly longer (up to 360 μm), and larger conidia (23-29 x 2.4-3.0 μm) (Hughes and Kendrick 1968). *D. vittata* Kuthub. & Nawawi and *D. intermedia* Gusmão & S.M. Leão also produce very dark and sterile setae, short conidiophores and guttulate conidia, but the conidia in both species are with setulae, thus they can be easily distinguished from *E. parapulchriseta* (Kuthubutheen and Nawawi 1991a; Cruz et al., 2008).

The LSU and ITS sequences were also obtained from the single spore isolate of both the studied specimens. Phylogenetically, on a megablast search using the ITS sequence from the type specimen Wu17090, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Dictyochoeta brevis* (GeneBank NR166298, identities 386/419 (92%), 8 gaps (1%)), *Dictyochoeta* sp. (GeneBank MN619652, identities 377/407 (93%), 11 gaps (2%)).

***Xyladelphia pluriguttulata* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841701**

$\equiv$ *Dictyochoeta pluriguttulata* Kuthub. & Nawawi, Mycol. Res. 95: 1212, 1991.

Teleomorph: Unknown. Anamorph: Setae straight, smooth- and thick-walled, up to 220 μm long, 5-7 μm wide above the swollen base, tapering gradually towards the pointed apex, up to 8-septate, uniformly brown except at the ultimate cell which is dark brown, rarely the penultimate cell is dark brown; the ultimate cell 18-28 μm long; the penultimate cell 20-50 μm long. Conidiophores simple, crowded, up to 5 around the base of 1-2 setae, erect, straight or slightly flexuous, pale brown to brown, becoming pale brown towards the apex, 2-3 septate, dark brown but becoming paler towards the apex, thin- and smooth-walled, 15-35 x 3-4 μm . Conidiogenous cells integrated, terminal, monophialidic, cylindrical, up to 25 μm long, 3.5-4 μm wide, pale brown, thin-walled, ending in a flared collarette which is funnel-shaped, 3-4 μm wide, 2.5-4 μm deep. Conidia solitary, formed in colorless slimy masses, falcate but asymmetrical, slightly curved, wide at the apical end, narrowing sharply and attenuated towards the basal end, 20-27 x 2-2.7 μm , aseptate, hyaline, smooth, multiguttulate, with no or very short and inconspicuous setulae at each end of the conidium, accumulated in slimy, compact, colorless fascicles surrounding the tips of conidiogenous cells.

Ecology/Substrate/Host: Saprobe on dead branches.

Geographical distribution: Brazil, China, Malaysia, Mexico.

Description and illustration: Kuthubutheen & Nawawi (1991); Aries et al. (2015, 2018).

Notes: *Xyladelphia pluriguttulata* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao is characterized by presence of sterile setae with darker ultimate cell and acute apex, short conidiophores in clusters with setae from basal

stroma, monoblastic conidiogenous cells with funnel-shaped collarette, and asymmetrical falcate and multiguttulate conidia (20-27 x 2-2.7 µm) with no or with very short setulae at each end (Kuthubutheen and Nawawi, 1991f). Several species among many described *Dictyochaeta* species show some similarity with *D. pluriguttulata* in morphology of sterile setae with darker and acute apex, short conidiophores, falcate and multiguttulate conidia, they are *D. intermedia* Gusmão & S.M. Leão, *D. matsushimae* (Hewings & J.L. Crane) Whitton, McKenzie & K.D. Hyde, *D. vittata* Kuthub. & Nawawi, *Dictyochaeta* state of *Chaetosphaeria pulchriseta* (Kuthubutheen and Nawawi, 1991a, e; Hewings and Crane 1981; Whitton et al. 2000). However, the conidia in all these species bear well-developed setulae, thus can be easily distinguished from *D. pluriguttulata*.

Xyladelphia pulchriseta (S. Hughes & W.B. Kendr. & Shoemaker) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841702

≡ *Chaetosphaeria pulchriseta* S. Hughes & W.B. Kendr. & Shoemaker, N.Z. J. Bot. 6:356, 1968.

Anamorph: Setae usually straight, with walls brown to dark brown throughout, 18-378 µm long and 7-10.5 µm wide just above the swollen base, up to 13-septate, the lower cells being 14.5-32.0 µm long, the penultimate cell 30-72 µm long and usually with dark, almost opaque contents, and the apical cell 18-30 µm long and rarely with dark contents. Conidiophores straight, unbranched, arising singly from repent hyphae or in groups of up to 3, often around the base of setae, pale brown to brown at the base, paler toward the apex, 1-5-septate, more or less cylindrical, 28-130 µm long, and 4.0-4.4 µm wide just above the slightly swollen base. Conidiogenous cells phialidic, with 1-3 successive proliferations, collarettes funnel-shaped, flare or incurved distally, hyaline to subhyaline, 2.2-3.0 µm wide and 1.6-2.1 µm deep. Conidia hyaline, curved, non-septate, more or less symmetrical, falcate with a short (1.5-3 µm long) subulate setula at each end; they are 27-33 x 2.2-3.0 µm, multiguttulate and at maturity appearing almost multiseptate, and accumulate in slimy, compact, colorless fascicles on the polyphialides.

Specimen: China: Hongkong, Hongkong Island, Mt Austin, On decaying leaves of *Pandanus furcatus*, 7 Jun. 1995, E.H.C. McKenzie (HKU(M) 4933); On decaying leaves of *Pandanus furcatus*, China: Hongkong, Hongkong Island, Mt Austin, 7 Jun. 1995, S.R. Whitton (HKU(M) 4931).

Ecology/Substrate/Host: Saprobies on decaying leaves, including *Pandanus furcatus*.

Geographical distribution: Brazil, Brunei, China, Czechoslovakia, Malaysia, New Zealand, USA.

Description and illustration: Hughes and Kendrick (1968); Holubová-Jechová (1984); Kuthubutheen and Nawawi (1991e); Whitton et al. (2000); Santa Izabel et al. (2011).

Notes: The fungus was reported on decaying leaves of palm in Hongkong. No specimen was examined by us and the above description is based on the origination and also documentation by Whitton, McKenzie & Hyde (2000). The *Codinaea* state of *Chaetosphaeria pulchriseta* is characterized by sterile setae with a darkly pigmented penultimate cell and an acute apex, and hyaline, aseptate, guttulate and falcate conidia with shorter setulae at each end (Hughes and Kendrick 1968; Whitton et al. 2000). It differs from other species in the genus by larger conidia with very shorter setulae.

Xyladelphia sinensis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 130, MycoBank MB841568

Etymology: refers to the locality where this fungus was originally discovered.

Diagnosis: similar to *Dictyochaeta sampahia*, *D. pluriguttulata* and *Codinaea* state of *Chaetosphaeria pulchriseta* but differs in a combination of setae, conidia and setulae.

Typification: On dead petiole of unidentified palm, China: Guangdong Province, Shenzhen, Lianhuashan Park, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17453; ex-type strain CGMCC 3.20760 = NN 78332).

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 2-4 µm wide. Teleomorph: Unknown. Anamorph: Setae straight, crowded, arising mostly single, smooth- and thick-walled, 100-230 µm long, 5-7 µm wide above the swollen base, tapering gradually towards the pointed apex, 3-7 septate, uniformly brown except at the penultimate and ultimate cell which are dark brown; penultimate cell dark brown, 45-57 x 4.5-5.5 µm; apical cell acute, dark brown, 15-17.5 x 2-3.5 µm; basal cell swollen, 12-15 µm wide. Conidiophores macronematous, mononematous, simple, crowded, up to 5 around the base of 1-2 setae or spreading among setae, erect, straight or slightly flexuous, pale brown to brown, becoming pale brown towards the apex, 1-8 septate, brown but becoming paler towards the apex, thick- and smooth-walled, 80-105 x 2.5-4 µm. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, 13-21 x 2.8-4 µm, pale brown, thin-walled, ending in a flared collarette which is funnel-shaped, 2.5-4 µm wide, 2.5-4 µm deep. Conidia holoblastic, acrogenous, solitary, falcate but asymmetrical, slightly curved, wide at the apical end, narrowing sharply and attenuated towards the basal end, 15-20 x 2-2.5 µm, aseptate, hyaline, smooth, multiguttulate, with no or very short and inconspicuous setulae at each end of the conidium, accumulated in slimy, compact, colorless fascicles surrounding the tips of conidiogenous cells.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium poorly developed, white, grey to grey brown, reverse brown to dark brown.

Material examined: On dead petiole of unidentified palm, China: Guangdong Province, Shenzhen, Lianhuashan Park, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17453; ex-type strain 78332); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead petiole of unidentified palm, 17 Oct 2020, W.P. Wu (Wu17556); China: Guangdong Province, on dead bark of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2049). Living strain: 78363 and 78364 (from Wu17556), ex-type strain 78332 (from Wu17453).

Ecology/Substrate/Host: Saprobe on dead petiole of palm and bark of tree.

Geographical distribution: China.

Notes: *Xyladelphia sinensis* W.P. Wu & Y.Z. Diao is characterized by presence of sterile setae with darker penultimate and sometimes ultimate cell, short conidiophores in clusters or layers with setae from basal stroma, monoblastic conidiogenous cells with funnel-shaped collarette, and asymmetrical falcate and multiguttulate conidia with no or with very short setulae at each end. Morphologically it resembles *Dictyochaeta sampahia* Kuthub. & Nawawi, *D. pluriguttulata* Kuthub. & Nawawi and *Codinaea* state of *Chaetosphaeria pulchriseta* S. Hughes, W.B. Kendr. & Shoemaker in presence of setae, and aseptate conidia with pointed ends. *E. sinensis* differs from *D. sampahia* by fertile setae without a darker penultimate cell, and asymmetrical falcate conidia without multiguttulate in *D. sampahia*; differs from *D. pluriguttulata* by its sterile setae with only apical cell darker than others, and smaller conidia (20-27 x 2-2.7 µm) (Kuthubutheen and Nawawi 1991a, e). In *Codinaea* state of *Chaetosphaeria pulchriseta*, the conidia are more or less symmetrical and significant larger (23-29 x 2.4-3.0 µm), the setae are significantly longer (up to 360 µm) (Hughes and Kendrick 1968). *D. vittata* Kuthub. & Nawawi and *D. intermedia* Gusmão & S.M. Leão also produce very dark and sterile setae, short conidiophores and guttulate conidia, but the conidia in both species are with setulae, thus they can be easily distinguished from *E. falcata* (Kuthubutheen and Nawawi, 1991e; Cruz et al. 2008).

Morphological variations were observed among the three collections from China. In the specimen Wu2049, the setae are longer (19-230 µm), the conidiophores are shorter (28-30 µm) and with only 1-2 septa, and the conidia are slightly longer (18-20 x 2-2.5 µm). While in the specimen Wu17453 and Wu17556, the setae varied a lot on size, the conidiophores are up to 8 septate and can be very long up to 105 µm, and the conidia are shorter (15-18 x 2.3-2.5 µm).

The LSU and ITS sequences were also obtained from the single spore isolate of both specimens. Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu17556a, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Dictyochaeta brevis* (GeneBank NR166298, identities 377/401 (94%), 4 gaps (0%)), *Dictyochaeta* sp. (GeneBank MN619652, identities 384/405 (95%), 6 gaps (1%)).

Xyladelphia vittata (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841703

≡ *Dictyochaeta vittata* Kuthub. & Nawawi, Mycol. Res. 95: 1217, 1991

Teleomorph: Unknown. Anamorph: *Setae* sterile, erect, smooth, thick-walled, up to 350 µm long, 6-8 µm wide above the base, tapering towards the pointed apex, uniformly brown except at the penultimate cell which is usually dark brown; apical cell 20-25 µm long, penultimate cell 20-35 µm long. Conidiophores simple, crowded, in fascicles of up to 5 around the bases of 1 or 2 setae, pale brown towards the base, paler above, up to 7-septate, more or less cylindrical, up to 80 µm long, 4-5 µm wide above the base, terminating in one locus. Conidiogenous cells with a single locus, integrated, determinate, up to 25 µm long, ending in a flared collarette. Collarette funnel-shaped, 3-4 µm wide, 2.5-3.5 µm deep. Conidia formed in colorless slimy masses, hyaline, O-septate, falcate, somewhat symmetrical but broader towards the base, multiguttulate, with 11-16 vacuoles across the breadth of the conidia giving the conidia the appearance of being banded, 25-32 µm (mostly 28-30 µm) long, 2.5-3 µm wide, with a single, simple, setula 10-12 µm long at each end of the conidium.

Geographical distribution: China, Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991); Tsui et al. (2001a).

Notes: The occurrence of *Dictyochaeta vittata* Kuthub. & Nawawi in Hong Kong, China was recorded by Tsui et al. (2001a). No specimen was examined by us, the above description is based on the excellent documentation from Kuthubutheen and Nawawi (1991) and Tsui et al. (2001a). On morphology, *Dictyochaeta vittata* is closely related to *D. intermedia*, *D. pluriguttulata* and the *Dictyochaeta* anamorph of *Chaetosphaeria pulchriseta*. In all three species, the setae are with one darker apical or subapical cell and conidia are multiguttulate with numerous vacuoles across the breadth of the conidia (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991; Tsui et al. 2001a). In *D. pluriguttulata*, however, setulae are inconspicuous while in the *Codinaea* anamorph of *C. pulchriseta*, the setulae are only rudimentary and less than 3 µm long. In *D. vittata* and *D. intermedia* the setulae are distinct, well-formed and 10-12 µm long. In *D. pluriguttulata*, the terminal cell of the setae is darkly pigmented while in the other three species, the penultimate cell is darkly pigmented. No living strain and DNA sequences are available for phylogenetic analysis, its placement in *Xyladelphia* is based on the characteristics of the genus. The phylogenetic relationship of *D. vittata* and *D. intermedia* is remained to be explored when the DNA sequence data will be available.

Doubtful species:

Dictyochaeta brevis C.G. Lin & K.D. Hyde, Mycosphere 10: 670, 2019.

Saprobic on decaying wood. Asexual morph: Colonies on plant substrate effuse, gregarious, white to brown, shining. Mycelium mostly immersed, composed of branched, septate, smooth, thin-walled, pale brown hyphae. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores mononematous, macronematous, sometimes in groups, pale brown at the base becoming subhyaline or hyaline towards the apex, straight or slightly flexuous, septate, unbranched, smooth, cylindrical, swollen at the base, 13.5–51(–102) μm long, 2–4 μm wide just above the basal cell, sometimes reduced to conidiogenous cells. Conidiogenous cells monophialidic, with flared collarette, terminal, integrated, cylindrical, 12.7–33.6 $\times$ 2.5–3.9 μm . Conidia aggregated in large, slimy, white and glistening heads at the apex of conidiophores, acrogenous, aseptate, fusiform, most curved, with hair-like and 3.5–6.5 μm long appendages at both ends, 0–2 guttulates, smooth, hyaline, 7.5–11.4 μm long, 2.0–2.9 μm wide.

Typification: China: Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 2-39 (MFLU 19-0216, holotype; HKAS 105173, isotype), ex-type living culture GZCC 18-0096.

Geographical distribution: China.

Description and illustration: Lin et al. (2019).

Notes: Phylogenetically, *D. brevis* C.G. Lin & K.D. Hyde grouped in one of the *Chaetosphaeria* clades but in a separate clade with *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf with high support value. However, the setae in *D. brevis* have no darker cells in apical part (Lin. et al. 2019).

Doubtful and excluded species from *Codinaea* and *Dictyochaeta*:

Key to doubtful species of *Codinaea* and *Dictyochaeta*

1. Setae present, fertile; conidiophores in small group associated with setae conidiogenous cells mono- or polyphialidic, with funnel-shaped collarette; conidia ovate, initially hyaline to subhyaline, becoming pale brown, 17–22 $\times$ 6–8 μm *D. subfuscospora*
1. Setae absent 2
2. Conidia septate 3
2. Conidia aseptate 4
3. Conidia lunate, 1-septate, 10–16 $\times$ 2.5–3.5 μm *D. lunata*
3. Conidia falcate, 0–2-septate, one rudimentary setula at apex, base acute, 17–23 $\times$ 2.5–3 μm *D. zapatensis*
4. Conidia strongly curved 5
4. Conidia straight or only slightly curved 7
5. Conidia botuliform, rounded at ends, with an inconspicuous basal scar, 15–19 $\times$ 3.1–3.5 μm *D. botulispora*
5. Conidia crescent-shaped or falcate 6
6. Conidia crescent-shaped, falcate or sigmoid, filiform, pointed at the ends, 8.8–12 $\times$ 0.8–1 μm *D. lunulospora*
6. Conidia always curved, crescent-shaped or falcate, both ends obtuse, 7–8–8.5 $\times$ 0.5–0.6–0.7 μm ; conidiophores 50–115 μm long *D. curvispora*
7. Conidia filiform, 21–30 $\times$ 0.5–1 μm *D. lilliputiana*
7. Conidia ellipsoid, allantoid, fusiform 8
8. Conidia fusiform, guttulate, 24–32 $\times$ 3–4 μm *D. occidentalis*
8. Conidia less than 20 μm long 9
9. Conidia 14–19 $\times$ 3.3–4.4 μm ; setula rudimentary *D. illinoensis*
9. Conidia less than 14 μm long 10
10. Conidia ellipsoid to allantoid, guttulate, 9–13 $\times$ 3–4 μm *D. heteroderae*
10. Conidia allantoid, 8.5–12 $\times$ 2.5–3 μm *D. curvispora*

Codinaea botulispora S. Hughes & W.B. Kendr., New Zealand J. Bot. 6: 332, 1968.

$\equiv$ *Dictyochaeta botulispora* (S. Hughes & W.B. Kendr.) Aramb. & Cabello, Mycotaxon 34: 681, 1989.

$\equiv$ *Dictyochaeta botulispora* (S. Hughes & W.B. Kendr.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4:137, 2000.

Geographical distribution: New Zealand.

Description and illustration: Hughes and Kendrick (1968).

Notes: Morphologically this species is closely related to several species with fusiform to falcate, and aseptate conidia in *Codinaea*/*Dictyochaeta*, including *Codinaea heteroderae*. No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Dictyochaeta curvispora L. Cai, McKenzie & K.D. Hyde, Nova Hedwigia 78: 441, 2004.

Geographical distribution: Philippine.

Description and illustration: Cai et al. (2004).

Notes: Based on the absence of setae and aseptate conidia, *Dictyochaeta curvispora* should be excluded from the redefined *Codinaea* and *Dictyochaeta*. However, the ITS sequence (MH862954) generated from the ex-type strain (CBS114070) showed 99% identity of *Codinaea aquatica*. Its taxonomic position is still in doubtful and needs to be further studied with the type strain.

Dictyochaeta curvispora (Y.L. Zhang & T.Y. Zhang) Y.L. Zhang & T.Y. Zhang, Flora Fungorum Sinicorum 51: 181, 2019.

≡ *Codinaea curvispora* Y.L. Zhang & T.Y. Zhang, Mycosystema 33: 795, 2014.

Geographical distribution: China.

Description and illustration: Zhang and Zhang (2014); Zhang and Wu (2019).

Notes: Morphologically this species is closely related to several species with fusiform to falcate, and aseptate conidia in *Codinaea*/*Dictyochaeta*, including *Codinaea heteroderae*. No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Codinaea heteroderae Morgan-Jones, Mycotaxon 14: 175, 1982.

≡ *Dictyochaeta heteroderae* (Morgan-Jones) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

≡ *Dictyochaeta heteroderae* (Morgan-Jones) Carris & Glawe, Mycotaxon 33: 23, 1988.

Geographical distribution: USA.

Description and illustration: Morgan-Jones (1982).

Notes: Morphologically this species is closely related to several species with absence of setae, solitary conidiophores with terminal monophialidic conidiogenous cells with conspicuous collarettes, and fusiform to falcate, and aseptate conidia in known *Codinaea*/*Dictyochaeta* species. No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Codinaea illinoensis Hewing & J.L. Crane, Mycotaxon 13: 419, 1981.

≡ *Dictyochaeta illinoensis* (Hewing & J.L. Crane) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

≡ *Dictyochaeta illinoensis* (Hewing & J.L. Crane) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4:140, 2000.

Geographical distribution: USA.

Description and illustration: Hewing and Crane (1981).

Notes: Morphologically this species is closely related to several species with absence of setae, solitary conidiophores with terminal monophialidic conidiogenous cells with conspicuous collarettes, and fusiform to falcate, and aseptate conidia in known *Codinaea*/*Dictyochaeta* species, including *Codinaea heteroderae*. No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Dictyochaeta incrassate Kuthub. & Nawawi

It is marked as legitimate name in MycoBank, but no data is available.

Dictyochaeta keniensis P.M. Kirk

It is marked as legitimate name in MycoBank, but no data is available.

Dictyochaeta lilliputiana R.F. Castañeda, Fungi Cubenses: 8, 1986.

Geographical distribution: Cuba.

Description and illustration: Castañeda-Ruiz (1986b).

No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Codinaea lunata Matsush., Icones Microfungorum a Matsushima Lectorum: 37, 1975.

≡ *Dictyochaeta lunata* (Matsush.) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

≡ *Dictyochaeta lunata* (Matsush.) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4:140, 2000.

Geographical distribution: Japan.

Description and illustration: Matsushima (1975).

Notes: No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Dictyochaeta lunulospora (Hewings & Crane) Hol.-Jech., Česká Mykol., Praha 40: 148, 1986. Fig. 131

≡ *Codinaea lunulospora* Hewings & Crane, Mycotaxon 13: 421, 1981.

≡ *Dictyochaeta lunulospora* (Hewings & Crane) Cabello & Aramb., Mycotaxon 34: 682, 1989.

Colonies effuse, hairy, dark brown. Mycelium partly immersed and partly superficial, composed of brown, branched and septate hyphae of 3-4.5 µm wide. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores

macronematous, mononematous, scattered or aggregated, simple, erect, straight, or slightly flexuous, 3-8-septate, pale brown to medium brown, thick- and smooth-walled, 50-80 x 2.5-3.5 µm. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, lageniform, subcylindrical, 13-16 x 3-3.5 µm, pale brown, thin- and smooth-walled, sporulating loci up to 1.5 µm, without conspicuously collarete. Conidia holoblastic, acrogenous, solitary, formed in droplet surrounding the tips of conidiogenous cells, uncinata, curved, filiform, rostrate at the apex, obtuse at the base, 8-12 x 0.5-0.8 µm, aseptate, hyaline, smooth.

Material examined: China: Sichuan Province, Huanglong Nature Reserve, on dead culm of bamboo, 8 Aug. 2000, W.P. Wu (Wu3524b).

Geographical distribution: China, Cuba, Malaysia, USA.

Description and illustration: Hewings & Crane (1981); Holubová-Jechová & Mena Portales (1986).

Notes: Of the accepted species in the genus, only *Dictyoachaeta lunulospora* (Hewings & Crane) Hol.-Jech. and *D. uncinata* R.F. Castañeda & W.B. Kendr. produce aseptate, uncinata, curved, falcate conidia. *D. uncinata* has larger conidia (20-25 x 1 µm) than *D. lunulospora*, thus they can easily be distinguished (Hewings and Crane 1981; Kuthubutheen and Nawawi 1991; Castañeda-Ruiz et al. 1998; Whitton et al. 2000). No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Dictyoachaeta occidentalis R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biology Series 32: 19, 1990.

Typification: On fallen leaves of *Alchornea latifolia*, Cuba: Pinar del Rio, Aspiro, 2 June 1988, R.F. Castañeda (INIFAT C88/182-1, holotype).

Geographical distribution: Cuba.

Description and illustration: Castañeda-Ruiz and Kendrick (1990a).

Notes: In this species, the conidiophores are short and with terminal monophialidic conidiogenous cells, with conspicuous collarete, and the conidia are hyaline, fusiform to falcate, aseptate, guttulate, 24-32 x 3-4 µm. It might belong to *Tainosphaeria* or similar genus.

Dictyoachaeta subfuscospora Kuthub & Nawawi, Mycol. Res. 95: 1214, 1991.

Setae fertile at the apex, aggregated in small clusters together with short conidiophores, smooth, dark brown, cylindrical, septate, 117-210 x 3.5-6 µm, widening up to 9 µm diam. in the apical part, percurrently proliferating; Conidiophores clustered with setae, light brown, smooth, cylindrical or slightly constricted near the middle, aseptate, 24-48 x 6-7 µm. Conidiogenous cells of the setiform conidiophores apical, brown, proliferating, with 1-several apical and subapical flaring, 4-6 µm wide and 2-3 µm deep collarettes, conidiogenous cells of the short conidiophores with 1 apical and several lateral collarettes similar to those of the setiform conidiophores. Conidia with densely granulated cytoplasm, at first hyaline, becoming brown during maturation, ellipsoid, smooth, apiculate, 17-25 x 8-10 µm, produced in slimy heads.

Geographical distribution: China, Malaysia, Mexico.

Description and illustration: Kuthubutheen and Nawawi (1991b); Kirschner et al. 2001; Marques and Gusmão (2015).

Notes: No specimen was examined, and the above description is based on the description by Kirschner et al. (2001). Among the many known species in *Dictyoachaeta* Speg. and *Codinaea* Maire, *D. subfuscospora* is the only species with brown conidia (Kuthubutheen and Nawawi 1991a; Whitton et al., 2000). Its occurrence in China was reported by Tsui et al. (2001) and Kirschner et al. (2001). No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Dictyoachaeta zapatensis R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biology Series 33: 18, 1990.

Typification: On fallen leaves of *Bucida palustris*, Cuba: Matanzas, Cienaga de Zapata, Palpite, 9 March 1989, R.F. Castañeda, B. Kendrick & Nag Raj (INIFAT C89/57, holotype).

Geographical distribution: Cuba.

Description and illustration: Castañeda-Ruiz and Kendrick (1990b).

Notes: In this species, the conidiophores are short and with terminal monophialidic conidiogenous cells, without conspicuous collarete, and the conidia are hyaline, fusiform to falcate, 1-septate, guttulate, 17-23 x 2.5-3 µm. No sequence is available for molecular phylogeny. It might belong to *Tainosphaeria* or similar genus.

Chloridium, Catenularia, Chaetosphaeria and related genera

In this chapter, all *Chloridium* and related genera are grouped together, phylogenetically they are more closely related to *Chaetosphaeria* complex. Morphologically they are with solitary conidiophores, terminal mono- or poly-phialidic conidiogenous cells, and hyaline to brown conidia with or without setulae. Among these genera, *Chloridium* and *Chaetosphaeria* are by far the largest genera with many species described, and have broadly geographical distribution, but they are for sure also polyphyletic.

Key to *Chloridium*, *Chaetosphaeria* and related genera

1. Conidia obpyramidal, in side view cuneiform, obovoid to obtriangular, with 2-5 protuberant corners and irregular outline when viewed from above, truncate at the basal scar 2
1. Conidia not round-tetrahedral to obpyramidal 5
2. Sterile setae present; conidiophores reduced to a few supporting calls; conidiogenous cell globose or subglobose, with broad funnel-shaped collarette *Paragaeumannomyces*
2. Sterile setae or capitate hyphae present or absent; conidiophores well-developed; conidiogenous cells cylindrical, with funnel-shaped collarettes 3
3. Capitate hyphae present or absent; conidia brown to dark brown, without setulae *Catenularia*
3. Sterile setae or capitate hyphae absent; conidia hyaline 4
4. Conidia pyramidal, with 2 corners at the tops *Chalarodes*
4. Conidial round tetrahedral to pyramidal, with 3-5 protuberant corners *Nawawia*
5. Conidia brown to dark brown 5
5. Conidia hyaline to very pale brown 7
6. Conidia cuneiform to obovoid, broadly rounded apically, truncate at base *Fuscocatenula*
6. Conidia globose, ellipsoid, or cylindrical, but not cuneiform *Craspedodidymum*
7. Conidiogenous cell monophialidic, with multisporeulating loci within collarette *Chloridium*
7. Conidiogenous cell polyphialidic, proliferation percurrent, with single sporulating loci within collarette ... 8
8. Setae fertile, with terminal phialides; conidiophores in clusters with setae; conidia fusiform, constricted in the middle *Fusichloridium*
8. Setae absent; conidia ellipsoid, elongate-ellipsoidal to cylindrical, not constricted in the middle *Chaetosphaeria*

Chloridium Link ex Fr., Mag. Ges. Naturf. Frende, Berl. 3: 13, 1809.

= *Gonytrichum* C.G. & F. Nees, Nova Acta Acad. Leop.-Carol. Nat. Cur. 9: 244, 1818.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth hyphae. Anamorph: Setae present or absent. Conidiophores solitary or in group, cylindrical, unbranched, erect, straight, or slightly flexuous, septate, brown, becoming paler towards the apex, smooth. Conidiogenous cells integrated, terminal, monophialidic or polyphialidic, pale brown to brown, becoming paler towards the apex, smooth, apex subhyaline, collarette funnel- or cup-shaped, cylindrical, proliferation sympodial and/or percurrent. Conidia produced singly, successively, semi-endogenous, aggregated in a spore masses or in short or long chains, subglobose, oblong-ellipsoidal, cylindrical, reniform, guttulate, straight, aseptate, hyaline to brown.

Type species: *Chloridium virescens* (Pers.) W. Gams & Hol.-Jech.

Ecology/Substrate/Host: Saprobe on dead material of plants and isolated from ecological samples.

Geographical distribution: Broadly distributed, especially in subtropical and subtropical area.

Description and illustration: (Hughes 1951); Ellis (1971); Gams and Holubová-Jechová (1976).

Notes: *Chloridium*, *Gonytrichum* and *Melanopsammella* are synonyms, Réblová et al. (2016), based on the widespread use of *Chloridium* and its priority, recommended to use the generic name *Chloridium* to accommodate species under *Chloridium*, *Gonytrichum* and *Melanopsammella* (Hughes 1951; Réblová and Winka 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Crous et al. 2012; Réblová et al. 2016, 2017). *Chloridium* and *Gonytrichum* was monographed by Gams and Holubová-Jechová (1976) and three sections can easily be distinguished for the accepted species: *Chloridium* section with multiple conidiogenous loci and pigmented chlamydospores, *Gongromeriza* section with single conidiogenous loci and percurrent proliferation, and *Psilobotrys* section with single conidiogenous loci and sympodial proliferation. Most species in this genus occur on dead barks and rotten wood. There are many species names described under the genus *Chloridium* and these species are morphologically very diversified on conidiophores and conidia (Tubaki 1958; 1963; Sinclair and Eicker 1985; Wang and Wilcox 1985; Crous et al. 1995; Datarathne et al. 2020). Some of these species have already been or need to be reclassified based on molecular phylogeny. For example, *Chloridium paucisporum* C.J.K. Wang & H.C. Wilcox was reclassified as a synonym of *Hyaloscypha finlandica* (C.J.K. Wang & J.C. Wilcox) Vohnik, Fehrer & Réblová (= *Phialophora finlandica* C.J.K. Wang & H.C. Wilcox) (Fehrer et al. 2018).

Under the genus *Gonytrichum*, Gams and Holubová-Jechová (1976) accepted four species and five varieties. Later, another two species were added (Sharma and Munjal 1978; Holubová-Jechová 1982). *G. ypsilosporum* V. Holubová-Jechová produces hyaline and y-shaped conidia, which is very different from any species in this genus (Holubová-Jechová, 1982). *G. indicum* Sharma & Munjal is very similar with *G. macrocladum* (Sacc.) Hughes but differs on the size of conidiophores and conidia, and also the arrangement and shape of phialides (Sharma and Munjal 1978). Among these known species, *Gonytrichum caesium* Nees and *Gonytrichum chlamydosporium* G.L. Barron & G.C. Bhatt are now transferred into *Chloridium*, as *Chloridium caesium* (Nees) Réblová & Seifert and

Chloridium chloroconium (W. Gams & Hol.-Jech.) Réblová & Seifert. A revision for known species under this genus is needed for redeposition in right genus.

The genus *Chloridium* Link is also polyphyletic, and members of the genus are grouped in several different clades, including some outside *Chaetosphaeriaceae* (Fig. 3 and Fig. 132). The type species of the genus *Chloridium*, *Chloridium virescens* (Pers. & Pers.) W. Gams & Hol.-Jech. (= *Chloridium viride* Link ex Link) is grouped together with all species known as *Gonytrichum* C.G. Nees & F. Nees (including *G. caesium* C.G. Nees & F. Nees (the type species, = *Chaetosphaeria inaequalis* (Grove ex Berl. & Voglino) W. Gams & Hol.-Jech.), *G. mirabile* Hol.-Jech., *G. chlamydosporium* Barron & Bhatt, and *G. macrocladum* (Sacc.) S. Hughes), *Chaetosphaeria vermicularioides* (Sacc. & Roum.) W. Gams & Hol.-Jech., *Chloridium aquaticum* M.J. Wei & H. Zhang, *C. chloroconium* (W. Gams & Hol.-Jech.) Réblová & Seifert, *C. cylindrosporium* W. Gams & Hol.-Jech., *C. salinicola* Dayar. & E.B.G. Jones, *C. submersum* Z.L. Luo, K.D. Hyde & H.Y. Su, *C. virescens* (Pers. & Pers.) W. Gams & Hol.-Jech. var. *chlamydosporium* (J.F.H. Beyma) W. Gams & Hol.-Jech., *C. virescens* (Pers. & Pers.) W. Gams & Hol.-Jech. var. *caudigerum* (Hohn.) W. Gams & Hol.-Jech. and several undescribed *Chloridium* species (Hughes 1951; Réblová and Winka 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Crous et al. 2012; Réblová 2000; Réblová et al., 2016). It is a sister group of *Sporoschisma* and well supported in the phylogenetic analysis. This supports the proposal by Réblová et al. (2021d) to redefine the genus *Chloridium* Link in narrow concept and monophyletic genus to only accommodate the species in this clade.

Most of the other studied *Chloridium* species are clustered together in a strongly supported group with the type species of *Chaetosphaeria*, *C. innumera* Berk. & Broome ex. Tul. & C. Tul. These species, including *Chloridium botryoideum* (Corda) S. Hughes var. *minutum* (Sacc.) W. Gams & Hol.-Jech., *Chloridium lignicola* (F. Mangelot) W. Gams & Hol.-Jech., *C. pini* Crous & Aklov, and several undescribed species, can be well accommodated by *Chaetosphaeria* Tul. & C. Tul. Among them, *Chloridium clavaeforme* (Preuss) W. Gams & Hol.-Jech. is the anamorphic state of *Chaetosphaeria myriocarpa* (Fr.) C. Booth, which has been confirmed by previous molecular analysis (Réblová 2000; Crous et al. 2018; Luo et al. 2019).

Chloridium obclavata Matsush., characterized by geniculate conidiogenous cells and hyaline, aseptate and obclavate conidia, is phylogenetically grouped together with *Tainosphaeria* with strong support, thus it should be transferred to the latter genus.

Two species of *Chloridium*, *C. phaeosporum* W. Gams & Hol.-Jech. and *C. reniforme* Matsush. are excluded from the genus *Chloridium* and family *Chaetosphaeriaceae*. *Chloridium reniforme* is clustered together with *Xylolentia brunneola* Réblová, the type species of the genus, *X. reniformis* C.G. Lin, K.D. Hyde & Jian K. Liu, and several other members of the recently established new family *Rhamphoriaceae* Réblová in *Sordariomycetidae* incertae sedis (Réblová 2018; Yuan et al. 2020). Thus, *Chloridium reniformis* should be transferred to *Xylolentia* Réblová. In fact, *X. reniformis* and *C. reniforme* probably represented the same fungal species, judged by both morphology and ITS sequences (Gams and Holubová-Jechová 1976; Yuan et al. 2020). Several strains of *Chloridium phaeosporum* or similar fungus with terminal conidiogenous cell bearing sympodial proliferation, and ellipsoidal, aseptate, pale brown conidia are obtained, and they are clustered together with members of *Plectosphaerellaceae* in *Glomerellales*, including *Gibellulopsis* Bat. & H. Maia, *Plectosphaerella* Kleb. and *Musciellum* Zare & W. Gams, thus should be excluded from the genus *Chloridium* and family *Chaetosphaeriaceae*. Based on morphological and phylogenetic study, a new generic name *Phaeochloridium* W.P. Wu & Y.Z. Diao is created to accommodate *C. phaeosporum* and similar species.

Three species in this genus have been reported from freshwater habitats in China (Luo et al. 2019). In addition, *Chloridium chlamydosporium* and *Chloridium laeëense* were also recorded from Taiwan, China (Matsushima 1980; Chen 1990). Here we reported the genus with some additional species from mainland China. The living strains of many studied species were also studied on PDA (Figs. 133-134), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Chloridium chloroconium (W. Gams & Hol.-Jech.) Réblová & Seifert, IMA Fungus 7: 134, 2016.

≡ *Chaetosphaeria chloroconia* W. Gams & Hol.-Jech., Stud. Mycol. 13: 86, 1976.

≡ *Melanopsammella chloroconia* (W. Gams & Hol.-Jech.) Réblová, M.E. Barr & Samuels, Sydowia 51: 65, 1999.

= *Gonytrichum chlamydosporium* G.L. Barron & G.C. Bhatt, Mycopath. Mycol. appl. 32: 126, 1967.

Colonies effuse, dark brown becoming white grey due to production of conidia. Mycelium partly immersed and partly superficial, consisted of hyaline to pale brown, septate, branched, thin- or slightly thick-walled hyphae, up to 3 µm wide. Conidiophores crowded, arising singly, consisting of a straight, erect stipe which are dark brown, 10-13-septate, setiform, 180-250 µm long, 3-3.5 µm wide, with a swollen base 7-8.5 µm wide, wall thick and smooth, becoming paler and thin-walled towards the apex, apex sterile and up to 1 µm wide, fertile hyphae formed just below septa in the lower 2/3 part of the conidiophores and bearing several whorls of 2-5 conidiogenous cells each. Collar hyphae regularly present, irregularly curved, darker than the phialides, 2-3 µm wide, hyaline to pale brown, smooth, 0-1 septate, from which 2-5 phialides formed. Conidiogenous cells integrated, terminal, determinate, monophialidic, without percurrent proliferation, 2-5 growing together on the fertile branches,

subcylindrical, lageniform, tapering to a narrower collarette of 1-1.5 μm wide, hyaline to subhyaline, 12-18 x 2.5-3 μm . Conidia holoblastic, solitary, aggregated into spore head on the apex of fertile branches, hyaline, aseptate, subglobose, subellipsoid, guttulate, 2.5-3.5 x 1.5-2.5 μm .

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangdong Province, Guangzhou, Baiyunshan, on dead leaves of *Bauhinia blakeana*, 5 March 2012, W.P. Wu (Wu12049); China: Zhejiang Province, Huaian County, Qiandaohu, on dead bark of *Platanus occidentalis*, 8 Oct. 2018, W.P. Wu (Wu16023, Wu16029); China: Yunnan Province, Kunming, Kunming Botanical Garden, on dead leaves of undetermined tree, 24 Nov. 1995, W.P. Wu (W986); China: Yunnan Province, Kunming, Kunming Botanical Garden, on dead stem of undetermined tree, 10 April 2015, W.P. Wu (Wu12927); China: Hunan Province, Zhangjiajie, on rotten wood, 15 Oct. 2012, W.P. Wu (Wu11036); China: Zhejiang Province, Hangzhou, Longjing, on rotten wood, 30 Sept. 2013, W.P. Wu (Wu13022); China: Sichuan Province, on dead culm and leaf sheath of bamboo, 15 Dec 2013, W.P. Wu (Wu13205, 13212, 13255); Japan: Mie Prefecture, Tsu, Tsukairaku Park, on dead branches of unidentified tree, 2 Oct 2019, W.P. Wu (Wu16931); Isolated from soil sample, China: Yunnan Province, June 2006, Cai Lei (51525, 51590). Living strain: 76204 (from Wu16023), 54434 (from Wu12056), 54234 (from Wu12049), C (from Wu12927), 57329 (from Wu13022), 57552 (from Wu13205), 57548 (from Wu13212), 57592 (from Wu13255), 77353 (from Wu16931), 53692, 53718, 58147, 58148, 72624 and 72666.

Ecology/Substrate/Host: Saprobes on dead material of many different plants.

Geographical distribution: widely distributed species.

Description and illustration: Ellis (1971); Gams and Holubová-Jechová (1976).

Notes: This species was fully described and illustrated under *Gonytrichum chlamydosporium* G.L. Barron & G.C. Bhatt by Ellis (1971) and Gams and Holubová-Jechová (1976). It differs from other species in the relevant genera by simple setiform conidiophores without secondary branch and flask-shaped phialides with irregularly curved collar hyphae, and hyaline to very pale colored conidia. Because the name *Chloridium chlamydosporium* (J.F.H. Beyma) S. Hughes (1958) already exists and refers to a different taxon, the next older epithet for this species was taken up and placed in *Chloridium* (Réblová et al. 2016). Both LSU and ITS sequences were obtained from the single spore isolates of many specimens and its affinity to other members of *Chloridium* was confirmed. However, ITS barcode seems to have difficult to distinguish it from the relevant species *Chloridium gonytrii* (= *Gonytrichum macrocladum*).

***Chloridium crousii* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 135, MycoBank MB841595.**

Etymology: named after the mycologist P. Crous.

Diagnosis: Conidiophores solitary or 2-3 in group, 1-3-septate, brown, 40-65 x 2-3 μm . Conidiogenous cells terminal, 20-25 x 2-2.5 μm wide, collarette funnel-shaped or cylindrical, with a single sporulating locus. Conidia aggregated in slime head, oblong-ellipsoidal, aseptate, 2.8-3.2 x 2.5-2.8 μm .

Typification: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1328b; ex-type strain CGMCC3.20701 = NN 42830).

Colonies on PDA effuse, grey to brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline, pale brown to dark brown, smooth, 1.5-3 μm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 1-3-septate, brown, dark brown at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 40-65 x 2-3 μm , up to 8 μm wide at the base, narrowing up to 1.5-2 μm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, phialidic, brown, becoming paler towards the apex, smooth, apex pale brown, 20-25 x 2-2.5 μm wide, apex 1-1.5 μm wide, collarette funnel-shaped or cylindrical, with a single sporulating locus, occasionally with 1-2 percurrent proliferation. Conidia produced singly, successively, within the collarette, aggregated in slime head, oblong-ellipsoidal, straight, aseptate, hyaline, guttulate, 2.8-3.2 x 2.5-2.8 μm .

Colonies on PDA effuse, colonies 0.8-1.2 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, white, yellow brown in the middle, reverse yellow brown to brown.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1328b). Living strain: ex-type strain 42830.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium crousii* W.P. Wu & Y.Z. Diao is characterized by simple and smooth-walled conidiophores, terminal monophialidic conidiogenous cells with darker funnel-shaped or cylindrical collarettes bearing single sporulating locus, and hyaline, aseptate, oblong to ellipsoidal conidia 2.8-3.2 x 2.5-2.8 μm . Morphologically it resembles *Chloridium preussi* (conidia 2.5-3.5 x 1.5-2 μm) and *C. lignicola* (conidia 3.5-5 x 1.5-2 μm) on conidiophores and conidiogenous cells, but clearly differs on conidial size (Gams and Holubová-Jechová 1976). Both LSU and ITS sequences were obtained from the single spore isolates of the holotype specimen and its affinity

to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu1328b, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium virescens* (GeneBank MT663381, identities 417/460 (91%), 7 gaps (1%)), *Phialocephala* sp. (GenBank MH268056, identities 419/466 (90%), 8 gaps (1%)).

***Chloridium culmicola* W.P. Wu & Y.Z., Diao sp. nov., Figs. 136, MycoBank MB841596**

Etymology: refers to its occurrence on culm of bamboo.

Diagnosis: Conidiophores 2-5-septate, 500-110 x 3-3.5 µm. Conidiogenous cells 22-26 x 3-3.5 µm, collarette funnel-shaped, with percurrent proliferation, with multispore loci, often with a marked protrusion of the meristematic tip beyond the collarette in the course of conidium formation. Conidia aggregated in short or long chains, oblong-ellipsoidal, aseptate, 4-5.6 x 2.2-2.5 µm.

Typification: China: Yunnan Province, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 22 Oct. 1999, Wu and Yan Huang (Holotype WFH Wu2606b; ex-type strain CGMCC 3.20639 (=NN 45714)).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-2.5 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2-5-septate, brown at the base, becoming pale brown to subhyaline towards the apex, tapering gradually towards the apex, verruculose, thin-walled, 50-110 x 3-3.5 µm, swollen up to 5 µm wide at the base, with percurrent proliferation. Conidiogenous cells monophialidic, integrated, terminal, lageniform, subcylindrical, pale brown to subhyaline, becoming very paler towards the apex, smooth or verruculose, (15-) 22-26 x 3.2-3.6 µm; collarette funnel-shaped or cylindrical, proliferation percurrent, with multispore loci within the collarette, often with a marked protrusion of the meristematic tip beyond the collarette in the course of conidium formation. Conidia produced singly, successively, within the collarette, aggregated in short or long chains, oblong-ellipsoidal, straight, aseptate, hyaline, guttulate, smooth- and thin-walled, 4-5.6 x 2.2-2.5 µm.

Colonies on PDA effuse, colonies 2-3 cm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Yunnan Province, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 22 Oct. 1999, Wu and Yan Huang (Holotype WFH Wu2606b). Living strain: ex-type strain CGMCC 3.20639 (=NN 45714).

Ecology/Substrate/Host: Saprobes on dead culm of bamboo.

Geographical distribution: China.

Notes: *Chloridium culmicola* W.P. Wu & Y.Z. Diao is characterized by pale brown and verruculose conidiophores, monophialidic conidiogenous cells bearing broader collarette, multispore loci and protrusion, and hyaline, aseptate and oblong conidia. On conidiophores, conidiogenous cells and conidia, it resembles *C. virescens* var. *chlamydosporem*, but can be distinguished by verruculose conidiophores, oblong-shaped conidia, and absence of chlamydospore in pure culture (Gams and Holubová-Jechová 1976).

Both LSU and ITS sequences were obtained from the single spore isolates of the holotype specimen and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu2606b, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Gonytrichum mirabile* (GenBank MH860990, identities 431/462 (93%), 10 gaps (2%)), *Gonytrichum caesium* var. *chlarioides* (GenBank MH860413, identities 426/455 (94%), 9 gaps (1%)), *Chloridium chloroconium* (GeneBank KY853435, identities 426/455 (94%), 9 gaps (1%)), *Chaetosphaeria inaequalis* (GeneBank AF178564, identities 401/419 (96%), 5 gaps (1%)).

***Chloridium cylindrosporellum* W.P. Wu & Y.Z., Diao, sp. nov., Fig. 137, MycoBank MB841597**

Etymology: refers to its cylindrical conidia and also similarity to *Chloridium cylindrosporum*.

Diagnosis: Conidiophores cylindrical, 170-210 x 4.5-6.5 µm. Conidiogenous cells cylindrical, 45-50 x 2.5-3.5 µm, with single sporulating loci, proliferating percurrently. Conidia cylindrical, fusiform to ellipsoidal, constricted in the middle, aseptate, 11-13 x 3-3.8 µm.

Typification: China: Sichuan Province, Ya An, on dead leaves of bamboo, 15 Dec. 2013, W.P. Wu (Holotype WFH Wu13210; ex-type strain CGMCC 3.20719 = NN 57621).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-5 4 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 7-9-septate, brown, dark brown to black at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 170-210 x 4.5-6.5 µm, narrowing up to 3-4 µm wide at the upper part below the collarette, swollen up to 22 µm wide at the base, with percurrent proliferation. Conidiogenous cells integrated, terminal, cylindrical, phialidic, pale brown, becoming paler towards the apex, smooth, apex subhyaline, 45-50 x 2.5-3.5 µm, collarette funnel- or cup-shaped, 3.0-3.5 µm wide, up to 1 µm high, with 3-5 proliferation percurrent, giving to the conidiophores an annellidic appearance. Conidia produced singly, successively, within the collarette, aggregated

in slime head, cylindrical to ellipsoidal, rounded at both ends, constricted in the middle, straight, aseptate, hyaline, 11-13 x 3-3.8 µm.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, dark grey to brown, reverse brown to dark brown.

Material examined: China: Sichuan Province, Ya An, on dead leaves of bamboo, 15 Dec. 2013, W.P. Wu (Holotype WFH Wu13210; ex-type strain NN 57621); China: Sichuan Province, Ya An, on dead leaves of bamboo, 15 Dec. 2013, W.P. Wu (Wu13211, Wu13213); China: Hubei Province, Shennongjia, on plant litter, Sept 2004, W.P. Wu (Wu8071). Living strain: ex-type strain 57621; 57622 (from Wu13211), 13213 (from Wu13213), 47981 (from Wu8071).

Ecology/Substrate/Host: Saprobes on dead culm of bamboo.

Geographical distribution: China.

Notes: *Chloridium cylindrosporellum* W.P. Wu & Y.Z. Diao is unique in conidial shape among the *Chloridium* species. It resembles *Chloridium cylindrosporum* W. Gams & Hol.-Jech. on conidial shape but differs by its absence of short conidiophores and larger conidia with obtuse ends (Gams and Holubová-Jechová 1976). Both LSU and ITS sequences were obtained from the single spore isolates of the holotype specimen and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu13210a, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium virescens* var. *caudigerum* (GenBank MH864068, identities 442/466 (95%), 2 gaps (0%)), *Chloridium chloroconium* (GeneBank AF178542, identities 442/466 (95%), 3 gaps (0%)).

Chloridium gonytrichii (F.A. Fernández & Huhndorf) Réblová & Seifert, IMA Fungus 7: 134, 2016. Fig. 138

= *Melanopsammella gonytrichii* F.A. Fernández & Huhndorf, Fungal Divers. 18: 42, 2005

= *Chloridium aseptatum* M.J. Wei & H. Zhang, Phytotaxa 362: 191, 2018.

= *Gonytrichum macrocladum* (Sacc.) S. Hughes, Trans. Br. mycol. Soc. 34, 565, 1951.

= *Chaetopsis macroclada* Sacc. Michelia 1: 79, 1877.

Colonies on natural substrate effuse, grey-brown at first but becoming grey-olivaceous to dull green with age, abundantly sporulating. Mycelium partly immersed and partly superficial, consisted of hyaline to pale brown, septate, branched, thin- or slightly thick-walled hyphae, up to 4 µm wide. Teleomorph: Not observed. Anamorph: Conidiophores crowded, arising singly, consisting of a straight erect stipe which are dark brown, 10-13-septate, wall thick and smooth, setiform with branched setae just above the fertile part, 250-280 µm long, with a swollen basal cell 11-15 µm wide, 6-7 µm wide at the base, 4-6 µm wide centrally, 2.0-2.5 µm wide above the ramifications, ending in a paler sterile seta or a sporulating phialide; in the lower half part with 7-8 whorls of phialides below each septum. In the upper part of the conidiophores one to three whorls of 3-4 sterile lateral pale brown to subhyaline setae, often present, branches 1-2 septate, 60-85 µm long, 2-3 µm wide, tapering towards the apex. Conidiogenous cells phialidic, integrated, terminal, determinate, arising from irregularly curved, pigmented collar hyphae in groups of 3-6, slender flask-shaped, cylindrical, lageniform, pale brown, 13-17 x 2.5-3.5 µm, tapering to 2 µm at the collarette; occasionally percurrently proliferating. Conidia holoblastic, solitary, accumulating in dark cirrhi or head on the apex of fertile branches, olivaceous, ellipsoidal to oval, or one side more strongly curved than other, slightly apiculate at the base, guttulate, 3.5-4.0 x 2-3 µm.

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Beijing, Huairou, Hongluosi, on rotten wood, 29 July 2020, W.P. Wu (Wu17332); China: Guangdong Province, Guangzhou, Baiyunshan, On rotten wood, March 5 2012, W.P. Wu (Wu12056, 12066); China: Yunnan Province, Simao, On dead branches of unidentified plant, 12 Oct 1999, W.P. Wu & Yan Huang (WU2698); China: Zhejiang Province, Huaian County, Qiandaohu, on dead bark of *Platanus occidentalis*, 18 Oct 2018, W.P. Wu (Wu16030); China: Zhejiang Province, Hangzhou, Longjing, on leaf sheath of bamboo, 30 Sept 2013, W.P. Wu (Wu13041); China: Zhejiang Province, Hangzhou, Longjing, on rotten wood, 30 Sept 2013, W.P. Wu (Wu13034); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten seed pod of unidentified Leguminosae, 16 Oct 2019, W.P. Wu (Wu17008). Living strain: 45849 (from Wu2698), 54434 (from Wu12056), 54220 (from Wu12066), 76205 (from Wu16030), 57339 (from Wu13034), 57344 (from Wu13041), 77334 (from Wu17008), 77977 and 77978 (from Wu17332).

Ecology/Substrate/Host: Saprobes on dead material of plant and in soil.

Geographical distribution: Canada, Chile, China, Slovakia, Bohemia, South Africa.

Description and illustration: Hughes (1951); Ellis (1971); Gams and Holubová-Jechová (1976), Persiani and Maggi (1990); Morgan-Jones, Sinclair & Eicker (1992); Bao et al. (2021).

Notes: *Chloridium gonytrichii* (F.A. Fernández & Huhndorf) Réblová & Seifert is originally described by Fernández and Huhndorf (2005) as *Melanopsammella gonytrichii*. Réblová et al. (2016) synonymized *Melanopsammella gonytrichii* under *Chloridium gonytrichii*. The fungus was fully documented under *Gonytrichum macrocladum* (Sacc.) Hughes by Ellis (1971) and Gams and Holubová-Jechová (1976). It differs

from other known species in the genus by often branched setae in whorls in the upper part of the conidiophores, 4-8 whorls of phialides below each septum and arising from irregularly curved, pigmented collar hyphae, and olivaceous ellipsoidal to oval conidia (Hughes 1951; Ellis 1971; Gams and Holubová-Jechová 1976). It is a rather common fungus on rotten wood but has not been reported from China. Some variation on sterile or fertile apex, and secondary branches of the setiform conidiophores was seen among different collections, for example, on the specimen Wu13041, the apex of setiform conidiophore is sterile and the secondary branches always present, while in the specimen Wu13034 and Wu13022, the apex of the setiform conidiophores are fertile and some setiform conidiophores bear branches while other are without branches.

Chloridium humicola (S.C. Jong & E.E. Davis) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841724.

= *Phialocephala humicola* S.C. Jong & E.E. Davis, Mycologia, 64:1353, 1972.

= *Phialocephala gabalongii* Sivasith., Trans. Br. Mycol. Soc. 64:336, 1975.

= *Phialocephala xylapensis* Persiani & Maggi, Mycotaxon 20 (2): 251, 1984.

= *Chloridium aquaticum* M.J. Wei & H. Zhang, Phytotaxa 362 (2): 192, 2018.

= *Chloridium terricola* Yong Wang bis, Jie & K.D. Hyde, Mycotaxon 132 (1): 80, 2017

Teleomorph: Unknown. Anamorph: Conidiophores, macronematous, arising singly or in small groups from hyphae, 92-340(-450) μm . Stipe, cylindrical, 5-12 septate, 125-196(-200) μm x 8 μm . One to three series of branches, distal series bearing phialides. Primary branches 2 to 3 in number, 3-9.5(-10) x 2.5-3-5 μm ; secondary branches, 5-7 x 2.0-2.5 μm , tertiary branches, 5-7 x 2.0-2.5 μm . Phialides, hyaline, 4-8(-10) x 1-1.5 μm and with inconspicuous openings. Conidia, ellipsoid, hyaline, (1.8-)3-4 x 1.5-2 μm .

Material examined: China: Guangdong Province, Dinghushan, on dead bark of unidentified plant, 11 Oct. 1998, W.P. Wu (Wu2005a). Living strain: 44898 (from Wu2005a)

Ecology/Substrate/Host: Saprobes on dead plant material or soil.

Geographical distribution: Australia, China, USA.

Description and illustration: Jong and Davis (1972); Sivasithamparam (1975); Onofri et al. (1994).

Notes: In a comprehensive study of morphology and phylogeny, Jacobs et al. (2003) clearly concluded that the morphologically variable genus *Phialocephala* is heterogenous and polyphyletic, and suggested a reclassification. The studied species were clustered into different clades which belong to different fungal orders, including *P. dimorphospora* (the type species), *P. fortinii*, *P. scopiformis* and *P. repens* closely connected to Pezizales and Helotiales; *P. fusca* and *P. xylapensis* to Sordariales, and *P. compacta* to Hypocreales. *Phialocephala humicola* S.C. Jong & E.E. Davis, together with other known species in the genus, was fully studied by Jacobs (2000) for morphology, conidiogenesis and phylogeny. Phylogenetically *P. humicola* is unrelated to *Phialocephala dimorphospora*, the type species of the genus, and should be correctly placed in the *Ophiostomatales*. In our phylogenetic tree generated by the combined LSU and ITS sequences, *P. humicola* is closely related with several *Chloridium* species in Chaetosphaeraceae, thus it is transferred to *Chloridium*.

The conidiogenesis in *Phialocephala humicola* was studied by Jacobs (2000) and Onofri et al. (1994) and they revealed a replacement wall building development type with a peculiar disposition of conidia at the apex of the conidiogenous cell, a pattern of conidiogenesis similar to the one described for *Chloridium virescens* var. *chlamydosporum*. This also supports the transferring of *P. humicola* into *Chloridium*.

Chloridium jilinense W.P. Wu & Y.Z. Diao, sp. nov., Figs. 139-140, MycoBank MB841598

Etymology: refers to the locality where this fungus was originally discovered.

Typification: China: Jilin Province, Dunhua, on dead branches of unidentified tree, 14 Aug 2012, W.P. Wu & Yang Huang (Holotype WFH Wu5039; ex-type strain CGMCC 3.20640 (=NN 46507)).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-2.5 μm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight, or slightly flexuous, 2-5-septate, brown, dark brown at the base, becoming paler towards the apex, slightly tapering towards the apex, smooth, 110-150 x 2.3-2.6 μm , sometime with percurrent proliferations. Conidiogenous cells monophialidic, integrated, terminal, pale brown to brown, becoming paler towards the apex, smooth, apex subhyaline, 20-26 x 3-3.5 μm wide, collarette funnel-shaped or inconspicuous, with broad opening, 2.5-2.8 μm wide. Conidia produced singly, successively, within the collarette, aggregated wet spore head, ellipsoidal, irregularly shaped, aseptate, hyaline, smooth- and thin-walled, guttulate, 4-5 x 2.5-3 μm . Chlamydospores abundant, terminal, lateral or also intercalary, globose, ellipsoid, brown, smooth- and thin-walled, 4-6 x 4-5.5 μm .

Colonies on PDA effuse, colonies 1-1.5 cm diameter in 14 days, circular, radially sulcate, margin entire and pale colored, aerial mycelium less developed, brown to dark brown, reverse of the same color.

Material examined: China: Jilin Province, Dunhua, on dead branches of unidentified tree, 14 Aug 2012, W.P. Wu & Yang Huang (Holotype WFH Wu5039). Living strain: ex-type strain CGMCC 3.20640.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium jilinense* resembles *C. virescens* var. *caudigerum* on conidiogenous cells and conidia, but differs in producing slightly broader conidia and ITS sequence. Both LSU and ITS sequences were obtained from the single spore isolates of the holotype specimen and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu5039, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium virescens* (GenBank MT146479, identities 414/424 (98%), 1 gap (0%)), *Chloridium virescens* var. *caudigerum* (GenBank MH864068, identities 445/471 (94%), 4 gaps (1%)), *Chloridium virescens* (GenBank MH864519, identities 438/463 (95%), 2 gaps (0%)).

Chloridium kirkii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 141, MycoBank MB841599.

Etymology: named after the British mycologist Paul M. Kirk who made great contribution to taxonomy of anamorphic fungi.

Diagnosis: Conidiophores 22-65 x 2-2.5 µm. Conidiogenous cells 20-25 x 2-2.3 µm, collarette inconspicuous, with multispore loci. Conidia oblong-ellipsoidal, produced in wet spore mass, 3-3.5 x 2-2.5 µm. Chlamydospore dark brown, lateral or intercalary, globose, 4-5 µm diam.

Material examined: China: Guangxi Province, Damingshan, on rotten wood, 20 Dec. 1997, W.P. Wu (Holotype WFH Wu1459b; ex-type strain CGMCC 3.20703 = NN 43888).

Colonies on PDA effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 1-3-septate, brown, dark brown at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 22-65 x 2-2.5 µm, narrowing up to 2 µm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, monophialidic, brown, becoming paler towards the apex, smooth, apex pale brown, 20-25 x 2-2.3 µm wide, apex 1.8-2.3 µm wide, collarette inconspicuous, cylindrical or slightly funnel-shaped, occasionally with 1-2 percurrent proliferations, with multi-spore loci, sometimes with a marked protrusion of the meristematic tip beyond the collarette in the course of conidium formation. Conidia produced singly, successively, within the collarette, aggregated in wet spore mass, oblong-ellipsoidal, straight, aseptate, hyaline, 3-3.5 x 2-2.5 µm. Chlamydospores dark brown, smooth; lateral and single, globose, 4-5 µm diam; or intercalary and chained, 4-7 x 4-6 µm.

Colonies on PDA effuse, colonies 1.5-1.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey brown to brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangxi Province, Damingshan, on rotten wood, 20 Dec. 1997, W.P. Wu (Holotype WFH Wu1459b). Living strain: ex-type strain 43888.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium kirkii* W.P. Wu & Y.Z. Diao resembles *Chloridium virescens* var. *chlamydosporum* on producing chlamydospore, multispore loci within the collarette, and smaller conidia in wet spore mass (Gams and Holubová-Jechová, 1976). However, in *C. virescens* var. *chlamydosporum*, the conidia are larger and the chlamydospores are terminal or lateral, rarely intercalary. In addition, their ITS sequences are significantly different. Both LSU and ITS sequences were obtained from the single spore isolates of the specimen Wu1459b and its affinity to other members of *Chloridium* was confirmed.

Chloridium lignicola (F. Mangenot) W. Gams & Hol.-Jech., Stud. Mycol. 13: 37, 1976. 1

≡ *Bisporomyces lignicola* F. Mangenot, Revue Mycol., Paris 18: 136, 1953.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 2-4 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or in group, cylindrical, unbranched, erect, straight, or slightly flexuous, 5-7-septate, brown to dark brown, blackish brown at the base, becoming paler towards the apex, smooth, 100-200 x 5-6.5 µm. Conidiogenous cells integrated, terminal, phialidic, pale brown to brown, becoming paler towards the apex, smooth, apex subhyaline, 20-45 x 4-5 µm wide, collarette funnel-shaped or cup-shaped, 3-4 µm wide and 2-3.5 µm deep, with up to 4 irregular percurrent proliferations. Conidia produced singly, successively, within the collarette, aggregated in a slime masses, ellipsoidal, cylindrical, rod-shaped, sometimes slightly curved, guttulate, smooth-walled, aseptate, hyaline, 4-5 x 2-2.5 µm.

Material examined: China: Hubei Province, Shennongjia, on decaying wood, 18 Sept 2004, W.P. Wu (Wu8146b); China: Sichuan Province, Huanglong Nature Reserve, on rotten wood, 8 Aug. 2000, W.P. Wu (Wu3505). Living strain: 50583 (from Wu8146b).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: Canada, China, France, USA.

Description and illustration: Mongenot (1953); Holubová-Jechová and Gams (1976).

Notes: *Chloridium lignicola* (F. Mangenot) W. Gams & Hol.-Jech. is characterized by unbranched conidiophores with terminal conidiogenous cells, funnel- or cup-shaped collarete, and hyaline, aseptate and ellipsoidal to cylindrical conidia (Gams and Holubová-Jechová 1976). Its occurrence on submerged wood from Hong Kong was also reported (Ho et al. 2002). Both LSU and ITS sequences were obtained from the single spore isolates of the specimen Wu8146b and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu8146b, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium lignicola* (GeneBank AF178544, identities 438/443 (99%), 0 gap (0%)), *Chaetosphaeria lentomita* (GeneBank AF178548, identities 438/444 (99%), 1 gap (0%)), *Chloridium pini* (GenBank NR170050, identities 421/441 (95%), 3 gaps (0%)).

Chloridium matsushimae W. Gams & Hol.-Jech., Studies in Mycology 13: 29, 1976.

Teleomorph: Unknown. Anamorph: Conidiophores solitary or slightly fasciculate, erect, straight, septate, dark brown near the base, lighter in the upper part, 130-240 µm long, near the base 5-6 µm wide, in the upper part 4-5 µm wide, tapering towards the tip, with a funnel-shaped collarete, frequently once or twice percurrently proliferating. Conidia aggregated in slimy droplets, arising singly in the collarete, cylindrical-ellipsoidal, 15-19 x 3.5-5.3 µm, smooth-walled, hyaline, brownish when dry, with a slimy apical appendage.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Distribution: China, Japan

Description and illustration: Matsushima (1975); Gams and Holubová-Jechová (1976).

Notes: *Chloridium matsushimae* is unique in producing larger cylindrical to ellipsoidal conidia (15-19 x 3.6-5.3) with a slimy apical appendage (Matsushima, 1975; Gams and Holubová-Jechová 1976). Its occurrence on submerged wood in Hong Kong, China was reported by Tsui et al. (2000). The above description is based on the original document by Matsushima (1975) and Gams and Holubová-Jechová (1976). Its phylogenetic relationship with the type species of *Chloridium* is remained to be studied.

Chloridium mirabile (Hol.-Jech.) W.P. Wu & Y.Z. Diao, comb. nov. Figs. 142-143, MycoBank MB841725.

≡ *Gonytrichum mirabile* Hol.-Jech., Stud. Mycol. 13: 84, 1976.

Colonies on natural substrate effuse, olivaceous-grey, dark brown becoming greenish due to production of conidia. Mycelium partly immersed and partly superficial, consisted of hyaline to pale brown, septate, branched, thin- or slightly thick-walled hyphae, up to 4 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores crowded, arising singly, consisting of a straight erect stipe which are brown to dark brown, become paler toward apex, multiseptate, setiform, apex blunt and sterile, irregularly branched above the fertile part and anastomosing, intricately entangled, 200-290 µm long, 2.5-4.5 µm wide, wall thick and smooth; Conidiogenous cells phialidic, arising from the straight portions of the conidiophores stipes and branches, mostly directly below septa, with a curved swollen base, or rarely from a collar hypha delimited from the phialide by a septum; phialides mostly in groups of 2-3, pale brown, much lighter than the conidiophores stipes, 6-8 µm long, inflated at the base to 3.5-4.8 µm and tapering to the 1-1.5 µm wide collarete. Conidia holoblastic, solitary, accumulating in whitish cirrhi or head on the apex of phialides, hyaline, aseptate, ellipsoidal, smooth-walled, guttulate, 3.5-4 x 2-2.5 µm.

Material examined: China: Beijing, Huairou, Beige Village, on rotten wood of undetermined tree, 1 June 2020, W.P. Wu (BJ01-1, BJ01-2, BJ02, BJ04, BJ18, BJ15, BJ24). Living strain: 77444 (from BJ01-1), 77247 (from BJ01-2), 77445 (from BJ01-UN), 77446 (from BJ02), 77447 (from BJ04), 77424 (from WuBJ15), 77426 and 77427 (from WuBJ18), 77430 and 77431 (from WuBJ24).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: Brazil, China, Europe.

Description and illustration: Gams and Holubová-Jechová (1976); Cruz and Gusmão (2009).

Notes: *Chloridium mirabile* (Hol.-Jech.) W.P. Wu & Y.Z. Diao differs from other species in the genus by irregularly branched conidiophore stipes, lacking collar hyphae and phialides directly formed from the conidiophore stipes, and hyaline, aseptate, ellipsoidal conidia. Compared to other species with branched conidiophores in *Chloridium* and *Gonytrichum*, *Chloridium mirabile* is rarely known with limited report on its occurrence and represents a new record for China (Gams and Holubová-Jechová, 1976; Cruz and Gusmão 2009).

Both LSU and ITS sequences were obtained from the single spore isolates of several specimens and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the specimen WuBJ01-1, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Gonytrichum mirabile* (GeneBank MH860990, identities 460/460 (100%), 0 gap (0%)), *G. macrocladum* (GeneBank MH859240, identities 528/550 (96%), 4 gaps (0%)).

Chloridium proliferatum W.P. Wu & Y.Z. Diao, sp. nov., Figs. 224c-i, 144-145, MycoBank MB841600.

Etymology: refers to its percurrent proliferation of conidiophores.

Typification: On dead seed pod of *Entada phaseoloides*, China: Hainan Province, Sanya, Yalongwan Park, 28 Dec. 2020, Wu (Holotype WFH Wu17684; ex-type strain CGMCC 3.20766 = NN 78531).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary, rarely in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2-5-septate, brown, dark brown to black at the base, becoming paler towards the apex, tapering gradually towards the apex, smooth, 35-115 x 1.5-3 µm, swollen up to 5 µm wide at the base, narrowing up to 1.5-2.5 µm wide at the upper part below the collarette, 1-3 percurrent proliferations, terminated with a conidiogenous cells. Conidiogenous cells integrated, terminal, phialidic, cylindrical, subcylindrical, lageniform, brown, becoming paler towards the apex, smooth, apex subhyaline, 15-30 x 1.5-2.5 µm wide, apex 1-1.5 µm wide, collarette inconspicuous, with 1-3 percurrent proliferations. Conidia produced singly, successively, within the collarette, aggregated in short or long cylindrical slimy mass, ellipsoidal, pyriform, aseptate, pale brown, smooth, 2.5-3.5 x 1.5-2 µm.

Colonies on PDA effuse, brown, hairy. Mycelium partly superficial and partly immersed in the substrate, composed of pale brown to brown, septate, subhyaline to pale brown, smooth hyphae. Conidiophores solitary, rarely in group, cylindrical, erect, unbranched, straight or slightly flexuous, 1-2-septate, dark brown at the base, becoming paler towards the apex, tapering gradually towards the apex, smooth, 35-60 x 2-3 µm, swollen up to 4 µm wide at the base, narrowing up to 1.5-2 µm wide at the upper part below the collarette, terminated with a conidiogenous cells. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, lageniform, brown, becoming paler towards the apex, smooth, thin-walled, 30-40 x 2-2.5 µm wide, apex 1.5-2 µm wide, collarette inconspicuous, with 1-4 percurrent proliferations. Conidia produced singly, successively, within the collarette, aggregated in slimy mass, ellipsoidal, subglobose, aseptate, pale brown, smooth or slightly verrucose, 4-5 x 2.3-2.5 µm.

Material examined: On rotten seed pod of unidentified *Leguminosae*, China: Zhejiang Province, Deqing County, Moganshan, Luhudang, 16 Oct 2019, W.P. Wu (Wu17053); On dead seed pod of *Entada phaseoloides*, China: Hainan Province, Sanya, Yalongwan Park, 28 Dec. 2020, Wu (Wu17684, holotype). Living strain: 77410 and 77411 (from Wu17053), 78518 and 78531 (from Wu17684).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium proliferatum* W.P. Wu & Y.Z. Diao is characterized by single and unbranched conidiophores, terminal conidiogenous cells with inconspicuous collarette, and very pale brown, aseptate, ellipsoid to subglobose conidia produced in cylindrical or globose slimy mass. In pure culture, the conidiophores constantly proliferate percurrently. It differs from other species by pale colored conidia (Gams and Holubová-Jechová, 1976; Yuan et al., 2020). *Chloridium cocoicola* Joanne E. Taylor, K.D. Hyde & E.B.G. Jones (conidia 5.6-10 x 2.4-4 µm) and *Chloridium phaeosporum* W. Gams & Hol.-Jech. (4-5 x 1.7-2.2 µm) also produces monophialidic conidiogenous cell and pale colored conidia, but the conidia in *C. cocoicola* are much longer, while the conidia in *C. phaeosporum* are narrower (Gams and Holubová-Jechová 1976; Taylor and Hyde 2003).

Both LSU and ITS sequences were obtained from the single spore isolates of several specimens and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu17684, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium salincola* (GenBank MN047125, identities 407/448 (91%), 18 gaps (4%)), *Phialocephala humicola* (GenBank NR103570, identities 407/448 (91%), 17 gaps (3%)), *Chloridium aquaticum* (GeneBank MH476570, identities 408/448 (91%), 17 gaps (3%)).

***Chloridium preussii* W. Gams & Hol.-Jech., Stud. Mycol. 13: 35, 1976**

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 2-4 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or in group, cylindrical, unbranched, erect, straight, or slightly flexuous, 10-15-septate, brown to dark brown, becoming paler towards the apex, smooth, 200-350 x 4.5-6.5 µm. Conidiogenous cells integrated, terminal, phialidic, pale brown to brown, becoming paler towards the apex, smooth, apex subhyaline, 20-25 x 3-3.5 µm, collarette funnel-shaped or cylindrical, 2-2.5 µm wide and 2-2.5 µm deep. Conidia produced singly, successively, within the collarette, aggregated in a slime masses, ellipsoidal, cylindrical, rod-shaped, guttulate, smooth-walled, aseptate, hyaline, 3 x 1.5-2 µm.

Material examined: China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1236a/b); China: Ningxia Province, Liupan Mountain, Erlonghe, on dead branch of unidentified plant, 24 Aug. 1997, W.P. Wu (Wu1067); Yunnan Province, Gaoligongshan, on rotten wood of unidentified plant, 12 Oct 2003, W.P. Wu (Wu7049).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: Canada, China, Netherlands, UK.

Description and illustration: Holubová-Jechová & Gams (1976).

Notes: *Chloridium preussii* W. Gams & Hol.-Jech. resembles *C. lignicola*, but can be distinguished from it by gradually tapering, dark brown conidiophores, and relatively smaller conidia.

Chloridium setosum W.P. Wu & Y.Z. Diao, sp. nov., Figs. 146-147, MycoBank MB841601.

Etymology: refers to presence of setae in the colony.

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead cone of *Pinus* sp., 16 Oct. 2019, W.P. Wu (Holotype WFH Wu17032; ex-type strain CGMCC 3.20741 = NN 77407).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1-3 μm wide hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, simple, or occasionally branched, erect, straight, or flexuous, dark brown, unicolored, dark brown, thick-walled, smooth, 5-11-septate, 80-137 $\times$ 2.5-3.7 μm , sterile with an obtuse apex, or fertile and terminating by a conidiogenous cell. Conidiophores solitary or 3-7 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 5-10-septate, brown, dark brown to black at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 50-125 $\times$ 2-3 μm , swollen up to 7 μm wide at the base, narrowing up to 2-2.5 μm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, monophialidic, ellipsoidal, fusiform, brown, becoming paler towards the apex, smooth, apex pale brown, 13-16 $\times$ 2.5-3 μm , apex 2-2.5 μm wide, collarette funnel-shaped or cylindrical, proliferation sympodial and/or percurrent. Conidia produced singly, successively, within the collarette, ellipsoidal, subglobose, aseptate, hyaline, 3-3.8 $\times$ 2-2.5 μm , aggregated in slimy yellow-colored cylindrical conidial mass.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey to grey brown, with pale colored margin, reverse pale brown to dark brown.

Material examined: China: Hunan Province, Zhangjiajie, on plant litter, 15 Oct. 2010, W.P. Wu (Wu11038); China: Sichuan Province, Ya An, Yucheng, Bifengxia, on dead leaves of bamboo, 15 Dec. 2013, W.P. Wu (Wu13218); China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead cone of *Pinus* sp., 16 Oct. 2019, W.P. Wu (Wu17032, holotype). Living strain: 57629 (from Wu13218), 53381 (from Wu11038), 77405 and ex-type strain 77407 (from the holotype Wu17032).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium setosum* W.P. Wu & Y.Z. Diao is characterized by presence of sterile or fertile setose, 3-7 conidiophores in group with 1-3 setae, ellipsoidal to subcylindrical conidiogenous cells, and hyaline, aseptate, globose to ellipsoidal conidia (Gams and Holubová-Jechová 1976; Ellis 1971, 1976). Among the known *Chloridium* species, several species including *C. botryoideum* (Corda) S. Hughes (conidiogenous cell repeatedly sympodially proliferating, conidia elongate-ellipsoidal to cylindrical, 3-4.5 $\times$ 0.8-1 μm), *C. cylindrosporium* W. Gams & Hol.-Jech. (conidiogenous cells sympodially proliferating, conidia cylindrical with tapering and rounded or truncate ends, slightly constricted, 8.5-11.5 $\times$ 2.2-3 μm), *C. transvaalense* Morgan-Jones, R.C. Sinclair & Eicker (conidiogenous cell monophialidic, oblong, 4-5 $\times$ 1.5 μm) and *C. virescens* (Pers. ex. Pers.) W. Gams & Hol.-Jech. (conidiogenous cell monophialidic and with multispore-producing loci, conidia 2.5-3.8 $\times$ 2-2.5 μm) produce unbranched sterile setae or setiform conidiophores among the short conidiophores. They differ from *C. setosum* by a combination of conidiogenesis and conidia morphology (Gams and Holubová-Jechová 1976; Morgan-Jones et al. 1983).

Both LSU and ITS sequences were obtained from the single spore isolates of several specimens and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu17032, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including *Chloridium* sp. (GeneBank MN598810, identities 463/466 (99%), 2 gaps (0%)), *C. virescens* var. *caudigerum* (GeneBank MH857142, identities 458/464 (99%), 0 gap (0%)), *Chloridium chloroconium* (GeneBank MAF178542, identities 458/464 (99%), 0 gap (0%)).

Chloridium shangsiense W.P. Wu & Y.Z. Diao, sp. nov., Figs. 148-149, MycoBank MB841602.

Etymology: refers to the locality where this fungus was originally discovered.

Typification: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branched of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1285b; ex-type strain CGMCC 3.20632 (=NN 43199)).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 μm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 6-9-septate, brown, dark brown to black at the base, becoming paler towards the apex, tapering gradually towards the apex, smooth, 140-170 μm , 4.5-7 μm wide at the base, basal cell 7-12 μm wide, with percurrent proliferation. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, brown, becoming paler towards the apex, smooth, 25-30 $\times$ 3-4.5 μm ; collarette inconspicuous, with broad opening 3-4 μm wide, with multispore-producing loci. Conidia produced singly, successively, within the collarette, aggregated in spore head, oblong-ellipsoidal, straight, aseptate, hyaline, guttulate, 3.8-5 $\times$ 2-2.5 μm .

On PDA, the colony effuse, brown, slow growing. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1-3 μm wide hyphae. Conidiophores macronematous, single, or 1-2 in cluster, cylindrical, erect, unbranched, straight, or slightly flexuous, 1-4-septate, brown, dark brown at the base, becoming paler towards the apex, 40-75 (-90) μm long, 2.5-3 μm wide, basal cells 4-6 μm wide, with percurrent proliferation. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, brown, becoming paler towards the apex, smooth, 25-30 x 2.5-3.5 μm ; collarette inconspicuous, with broad opening 3-3.6 μm wide, with multispore-producing loci. Conidia produced singly, successively, within the collarette, aggregated in spore head, oblong-ellipsoidal, straight, aseptate, hyaline, guttulate, 3.5-4.2 x 2.5-3.5 μm . Chlamydospores lateral, single or 2-3 in chain, dark brown, smooth- and thin-walled, 4.5-7 x 4.5-5 μm .

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branched of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1285b). Living strain: ex-type strain CGMCC 3.20632 (=NN 43199).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium shangsiense* is characterized by presence of cylindrical and multiseptate conidiophores, terminal and monophialidic conidiogenous cells with inconspicuous collarette and multispore-producing loci, and hyaline, oblong-ellipsoidal conidia. It is similar to *Chloridium virescens* var. *caudigerum* and *C. virescens* var. *chlamydosporum* but differs from them by conidiogenous cells with broader and inconspicuous collarette, oblong conidia and also ITS sequences (Gam and Holubová-Jechová 1976).

Both LSU and ITS sequences were obtained from the single spore isolates of the type specimen Wu1285b and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu1285b, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Gonytrichum mirabile* (GeneBank MH860990, identities 426/454 (94%), 7 gaps (1%)), *Chloridium gonytrichii* (GeneBank MT559106, identities 428/457 (94%), 10 gaps (2%)), *Gonytrichum macrocladum* (GenBank MH857954, identities 427/456 (94%), 9 gaps (2%)).

***Chloridium sinense* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 150, MycoBank MB841603**

Etymology: refers to the country where this fungus was originally discovered.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten seed pods of unidentified Leguminosae, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu17056; ex-type strain CGMCC 3.20743 = NN 77481).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1-3 μm wide hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, simple, or occasionally branched, erect, straight, or flexuous, dark brown, brown to dark brown, thick-walled at the base, thin-walled at the upper part, smooth, 5-6-septate, 135-200 x 3-4.5 μm , fertile at the apex and terminating by a conidiogenous cell. Conidiophores solitary or 2-5 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2-3-septate, brown, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 50-60 (-80) x 2.5-3.5 μm , swollen up to 5 μm wide at the base, narrowing up to 2-2.5 μm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, brown, becoming paler towards the apex, smooth, apex pale brown, 32-42 x 2.5-3.5 μm , apex 2-2.5 μm wide, collarette inconspicuous. Conidia produced singly, successively, within the collarette, ellipsoidal, subglobose, aseptate, hyaline, 3.4-3.8 x 2-2.5 μm , aggregated in slimy spore mass.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten seed pods of unidentified Leguminosae, 16 Oct. 2019, W.P. Wu (Wu17056, Holotype). Living strain: 77481, 77482 and 77483 (all from Wu17056).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium sinense* W.P. Wu & Y.Z. Diao is characterized with unbranched setae with fertile apex, clustered conidiophores with setae, cylindrical conidiogenous cells with inconspicuous collarette, and hyaline, aseptate, ellipsoidal to subglobose conidia (Ellis 1971; Gams and Holubová-Jechová 1976). It differs from other *Chloridium* species with setae, *C. botryoideum* (Corda) S. Hughes (conidiogenous cell repeatedly sympodially proliferating, conidia elongate-ellipsoidal to cylindrical, 3-4.5 x 0.8-1 μm), *C. cylindrosporium* W. Gams & Hol.-Jech. (conidiogenous cells sympodially proliferating, conidia cylindrical with tapering and rounded or truncate ends, slightly constricted, 8.5-11.5 x 2.2-3 μm), *C. setosum*, *C. transvaalense* Morgan-Jones, R.C. Sinclair & Eicker (conidiogenous cell monophialidic, oblong, 4-5 x 1.5 μm) and *C. virescens* (Pers. ex. Pers.) W. Gams & Hol.-Jech. (conidiogenous cell monophialidic and with multispore-producing loci, conidia 2.5-3.8 x 2-2.5 μm) by a combination of morphology of setae, conidiogenesis and conidia (Gams and Holubová-Jechová 1976; Morgan-Jones et al. 1983).

LSU and ITS sequences were obtained from the single spore isolate of the type specimen Wu17056 and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen Wu17056, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Gonytrichum mirabile* (GeneBank MH860990, identities 434/463 (94%), 9 gaps (2%)), *Chloridium* sp. (GeneBank MN860551, identities 419/428 (98%), 3 gaps (0%)), *C. macrocladum* (GeneBank MH859954, identities 427/464 (92%), 9 gaps (1%)).

Chloridium terricola Yong Wang, Jie & K.D. Hyde, Mycotaxon 132: 79-86, 2017.

Teleomorph: Unknown. Anamorph: Conidiophores mononematous, erect arising from the hypha, hyaline to pale brown, smooth. Conidiogenous cells borne directly on the hypha or in divergent forks on the conidiophores, ampulliform or lageniform, pale brown, smooth, 7–15 × 2.5–4 µm. Conidia obovoid or ellipsoid, truncate at the base, pale brown, smooth, 2–3 × 2–2.5 µm. Sexual stage not observed.

Typification: China, Sichuan Province, Jiuzhaigou, isolated from soil, August 2005, Yu-Lan Jiang (Holotype, HGUPd4519 [dried culture]; ex-type culture, HGUP4519; GenBank KM434144, KT893302).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Description and illustration: Wang et al. (2017).

Notes: *Chloridium terricola* Yong Wang, Jie & K.D. Hyde is a recently described species with *Penicillium*-like conidiophores, phialides and slime spore head, which is rather unique in the genus. Morphologically it is close to *Chloridium aquaticum* M.J. Wei & H. Zhang, which also produces *Penicillium*-like sporulating structure at the apex of the conidiophores. They differ by longer and narrower conidia in *C. aquaticum* (conidia 3.4–5.5 × 1.1–2.7 µm) (Wang et al. 2017; Wei and Zhang 2018).

Chloridium tropicale W.P. Wu & Y.Z. Diao, sp. nov., Fig. 151, MycoBank MB841604.

Etymology: refers to its occurrence in tropical area.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15234=YN004; ex-type strain CGMCC 3.20725 = NN 76009).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth hyphae. Setae absent. Teleomorph: Unknown. Anamorph: Conidiophores solitary or in group, cylindrical, erect, unbranched, straight or slightly flexuous, 3–5-septate, brown, dark brown to black at the base, becoming paler towards the apex, tapering gradually towards the apex, smooth, 70–110 × 2.5–3.5 µm, swollen up to 7 µm wide at the base, narrowing up to 2–2.5 µm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, phialidic, clavate, subcylindrical, brown, becoming paler towards the apex, smooth, apex subhyaline, 30–40 × 3–4 µm wide, collarette inconspicuous up to 2.5 µm wide. Conidia produced singly, successively, within the collarette, aggregated in short or long chains, oblong-ellipsoidal, straight, or slightly curved, aseptate, hyaline, guttulate, 3.5–5 × 1.8–2 µm, aggregated into slimy spore mass in globose to cylindrical shape.

Colonies on PDA effuse, colonies 1–1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15234=YN004). Living strain: ex-type strain NN 76009.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium tropicale* W.P. Wu & Y.Z. Diao differs from other species in the genus by clavate-shaped conidiogenous cells without conspicuous collarette, and small oblong-ellipsoidal conidia. It resembles *C. virescens* and *C. lignicola* (Mangenot) W. Gams & Hol.-Jech. but without conspicuous collarette. Both LSU and ITS sequences were obtained from the single spore isolate of the type specimen Wu15243 and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Chloridium virescens* (GeneBank MT66338, identities 433/465 (93%), 10 gaps (2%)), *Chaetosphaeria* sp. (GeneBank MT610981, identities 430/466 (92%), 11 gaps (2%)), *Phialocephala* sp. (GeneBank MH268056, identities 430/466 (92%), 11 gaps (2%)).

Chloridium virescens (Pers.) W. Gams & Hol.-Jech. var. ***caudigerum*** (Höhn.) W. Gams & Hol.-Jech., Studies in Mycology 13: 19, 1976. Fig. 152

= *Cirrhomycetes caudiger* Höhn., Annls mycol. 1: 529, 1903

= *Chloridium caudigerum* (Höhn.) S. Hughes, Can. J. Bot. 36: 748, 1958.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5–3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Setae cylindrical, dark brown, 5–8 (12)-septate, erect, straight or slightly flexuous, thick-walled, smooth, becoming paler and thin-

walled in the upper part, (64-)100-140 x 3-4 µm, with a swollen basal cell up to 10 µm, terminating with a monophialidic conidiogenous cell. Conidiophores 3-6 in group with a setae, cylindrical, erect, unbranched, straight, or slightly flexuous, 2-3-septate, pale brown to brown, dark brown at the base, becoming paler towards the apex, smooth, thin-walled, 30-70 x 1.5-2.5 µm, with 0-2 percurrent proliferation. Conidiogenous cells integrated, terminal, monophialidic, pale brown to brown, becoming paler towards the apex, smooth, apex subhyaline, 15-25 x 2-2.8 µm, collarete cylindrical, inconspicuous, 1.8-2.5 µm wide, up to 1.0 µm deep, with 0-2 irregular percurrent proliferation. Conidia produced singly, successively, within the collarete, aggregated in a slime masses or whitish conidial cirrhi, ellipsoidal, sometimes slightly curved, uniguttulate, smooth-walled, aseptate, hyaline, 2.5-4 x 1.5-2.5 µm, formed in cirrhi on top of the conidiogenous cell.

Material examined: China: Beijing, Mentougou, Baihuashan, on rotten cone of *Pinus* sp., 4 Aug. 2018, W.P. Wu (Wu15218); China: Guangdong Province, Shaoguan, Danxiashan, on dead bark of unidentified tree, 3 March 2012, W.P. Wu (Wu12125); China: Jilin Province, Changbaishan, on rotten wood of ?*Betula* sp., 5 Sept. 1998, W.P. Wu (Wu1801a); China: Yunnan Province, on rotten wood of unidentified plant, Dec 18 1997, W.P. Wu (Wu2065a); China: Yunnan Province, Simao, on dead branches, 13 Oct 1999, W.P. Wu & Yan Huang (Wu2811). Living strain: 54231 (from Wu12125), 76072 (from Wu15218), 75663 and 85045.

Ecology/Substrate/Host: Saprobes on dead material of plants, including ?*Betula* sp. and *Pinus* sp., .

Geographical distribution: Widely distributed in Europe and North America.

Description and illustration: Holubová-Jechová and Gams (1976); Morgan-Jones et al. (1991).

Notes: *Chloridium virescens* var. *caudigerum* is characterized by presence of setiform conidiophores clustered with 3-6 short conidiophores, monophialidic conidiogenous cells with broad collarete with multispore loci, and hyaline, aseptate, ellipsoidal conidia aggregated in cirrhi (Gams and Holubová-Jechová, 1976). It is known on rotten material of many different plants, including *Acer*, *Betula*, *Cedrus*, *Fagus*, *Fraxinus*, *Picea*, *Populus*, *Quercus*.

Both LSU and ITS sequences were obtained from the single spore isolate of the specimen Wu12125 and its affinity to other members of *Chloridium* was confirmed. The ITS sequences obtained from the two different Chinese collections are with some variation (8 bp), but morphologically they cannot be distinguished. On a megablast search using the ITS sequence from the strain obtained from the specimen Wu12125, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including *Chloridium virescens* var. *caudigerum* (GeneBank MH864068, identities 470/471 (99%), 0 gap (0%)), *Chaetosphaeria vermicularioides* (GeneBank KM056319, identities 452/457 (99%), 1 gap (0%)).

Chloridium virescens (Pers. ex Pers) W. Gams & Hol.-Jech. var. ***chlamydosporum*** (van Beyma) W. Gams & Hol.-Jech., Stud. Mycol. 13: 21, 1976.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Conidiophores solitary in small group, cylindrical, erect, unbranched, straight or slightly flexuous, 5-7-septate, brown, dark brown to black at the base, becoming paler and thinner towards the apex, thick-walled, smooth, 78-150 x 3-4 µm, swollen up to 10 µm wide at the base, terminating with a monophialidic conidiogenous cell, with 1-3 percurrent proliferation. Conidiogenous cells integrated, terminal, monophialidic, brown, becoming paler towards the apex, smooth, apex subhyaline, 10-20(-30) x 2.5-3 µm, apex 2-3 µm wide, collarete funnel-shaped or inconspicuous, with 1-3 percurrent proliferations. Conidia produced singly, successively, within the collarete, aggregated in slime head, oblong-ellipsoidal, straight, aseptate, hyaline, 3.5-4 x 2-2.5 µm.

Colonies on PDA effuse, colonies 1.2-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China, Jilin Province, Changbaishan, on rotten wood of *Betula* sp., 5 Sept. 1998, W.P. Wu (Wu1822a); China: Guangdong Province, Guangzhou, Baiyunshan, on rotten wood, 5 March 2012, W.P. Wu (Wu12033). Living strain: 54238 (from Wu12033), 53598, 58529, 58557, 58587, 72291, 72279, 75743, 85152, 85146.

Ecology/Substrate/Host: Saprobes on dead material of plant, including *Betula* sp.

Geographical distribution: China.

Note: *Chloridium virescens* (Pers. ex Pers) W. Gams & Hol.-Jech. var. *chlamydosporum* (van Beyma) W. Gams & Hol.-Jech. differs from *C. virescens* var. *caudigerum* by absence of setae and conidia aggregated into slimy head (Gams and Holubová-Jechová, 1976). Both LSU and ITS sequences were obtained from the single spore isolates of the specimen Wu12033 and its affinity to other members of *Chloridium* was confirmed, although there are some differences between the sequences obtained. On a megablast search using the ITS sequence from the strain obtained from the specimen Wu12033, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including uncultured fungus (GeneBank LC096379, identities 481/481 (100%), 0 gap (0%)), *Chloridium* sp. (GeneBank AB846979, identities 481/481 (100%), 0 gap (0%)), *Chloridium virescens* (GeneBank MK139839, identities 437/437 (100%), 0 gap (0%)), *Chloridium virescens* var.

chlamydosporum (GeneBank EF029220, identities 475/481 (99%), 2 gaps (0%)), *Chloridium virescens* (GeneBank MT663381, identities 461/481 (96%), 12 gap (2%)).

Chloridium xigazense Y.M. Wu & T.Y. Zhang, Mycotaxon 123: 277 (2013) [MB#801786]

Teleomorph: Unknown. Anamorph: Conidiophores brown, paler towards the apex, macronematous, mononematous, solitary or in groups, erect, septate, smooth, 80-140 µm long, 2-3 µm wide. Conidiogenous cells monophialidic, terminal, constricting abruptly and expanding in a flaring collarete, thereafter frequently proliferating 1-4 times. Conidia produced singly but often adhering in chains, 0-septate, smooth, hyaline, ellipsoidal to oblong, obtuse at the apex, with a dark hilum at the subtruncate base, 3-5 x 2-2.5 µm.

Typification: China: Tibet, Xigaze, from a grassland soil, altitude 3600 m, 7 Sept. 2007, Y.M. Wu (Holotype HSAUP II 070874; isotype HMAS 196268).

Ecology/Substrate/Host: Saprobes in soil.

Geographical distribution: China.

Description and illustration: Wu and Zhang (2013); Zhang and Wu (2019).

Notes: *Chloridium xigazense* Y.M. Wu & T.Y. Zhang, is characterized by unbranched conidiophores with frequently sympodial proliferation, and ellipsoidal to oblong, hyaline, and small size conidia (3-5 x 2-2.5 µm). It differs from relevant species *Chloridium smithiae* by its larger conidia and *C. phaeosporum* by its frequently proliferating conidiogenous cells and hyaline conidia (Wu and Zhang 2013; Zhang and Wu 2019).

Chloridium xishuangbanaense W.P. Wu & Y.Z. Diao, sp. nov., Fig. 153, MycoBank MB841605

Etymology: refers to the locality where this fungus was originally collected.

Diagnosis: Conidia 35-50 x 2.5-3 µm. Conidiogenous cell monophialidic, cylindrical, with funnel-shaped collarete, 25-27 x 2.5-3 µm. Conidia oblong-ellipsoidal, aseptate, hyaline, 3.8-5 x 2.2-2.4 µm, produced in slime head.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, On dead leaves of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15242=YN013; ex-type strain CGMCC 3.20723 = NN 75978).

Colonies on PDA effuse, slow growing, brown, hairy. Mycelium partly superficial and partly immersed in the media, composed of brown, septate, subhyaline to pale brown, smooth, 1-3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Setae absent. Conidiophores solitary or 2-3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 1-2 (-5) septate, brown, dark brown at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 35-50 (-70) x 3.5-3 µm, produced from the hyphae. Conidiogenous cells integrated, terminal, monophialidic, brown, becoming paler towards the apex, smooth, apex subhyaline, cylindrical, subcylindrical, 25-27 x 2.5-3 µm wide, collarete funnel-shaped, percurrently proliferating, collarete 2-2.3 µm wide, 1.2-1.5 µm deep. Conidia produced singly, successively, within the collarete, aggregated in slimy head, oblong-ellipsoidal, straight, aseptate, hyaline, 3.8-5 x 2.2-2.4 µm.

Colonies on PDA effuse, colonies 0.8-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white to yellow brown, with pale colored margin, reverse pale to yellow.

Material examined: China: Yunnan Province, Jinghong, Xishuangbanna, On dead leaves of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15242=YN013). Living strain: ex-type strain NN 75978, 75979 and 75980 (from Wu15242).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Notes: *Chloridium xishuangbanaense* W.P. Wu & Y.Z. Diao is characterized by short conidiophore consisting of 1-2 basal cell and a terminal conidiogenous cell, long conidiogenous cell with a funnel-shaped collarete and oblong-ellipsoidal conidia. It is similar to *Chloridium lignicola* but has broader conidia (Gams and Holubová-Jechová 1976). Both LSU and ITS sequences were obtained from the single spore isolate of the holotype specimen Wu15242 and its affinity to other members of *Chloridium* was confirmed. On a megablast search using the ITS sequence from the strain obtained from the type specimen, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including *Chloridium virescens* (GeneBank MT663381, identities 418/459 (97%), 8 gaps (1%)), *Chloridium virescens* var. *chlamydosporum* (GeneBank MH864069, identities 416/459 (91%), 9 gaps (1%)).

Catenularia Grove in Sacc., Syll. Fung. 4: 303, 1888.

= *Haplochalara* Linder, Mycologia 25: 347, 1933.

= *Psiloniella* Costantin, Les Mucédinées Simples 25: 190, 1888.

Teleomorph: Ascomata perithecia, superficial, solitary or in groups growing among phialophores and capitate hyphae, globose with a short ostiolar papilla, black, bearing radiating and usually upwardly bent capitate hyphae and sometime also phialophores. Asci are unitunicate with a non-amyloid annulus near the apex, cylindrical-clavate, 8-spored, subsessile. Ascospores are distichous, ellipsoidal, hyaline, septate. Anamorph: Colonies effuse,

sparse, brown to dark brown, hairy. Mycelium immersed in the substratum, composed of branched, septate, pale brown to brown hyphae. Capitate hyphae absent or present, cylindrical, erect, straight, brown to dark brown, septate, bearing a hyaline cap of mucilage at the apex. Conidiophores macronematous, mononematous, simple, erect, straight, or flexuous, smooth, dark brown at the base, becoming paler towards the apex, cylindrical, septate, percurrently proliferating. Conidiogenous cells integrated, determinate, monophialidic, cylindrical, with a funnel- or cup-shaped and pale brown collarete, percurrently proliferating. Conidia develop singly and successively within the collarete to form a chain which readily secedes, cuneiform, brown to dark brown, smooth, aseptate, base truncate, apex slightly angular with 3-6 blunt corners when viewed from above and at each corner is seen a small circular, thin and pale area of cell wall which presumable functions as a germ pore.

Type species: *Catenularia cuneiformis* (Richon) E.W. Mason (= *Catenularia simplex* Grove).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Ecological distribution: Broadly distributed, especially in subtropical and subtropical area.

Description and illustration: Hughes (1965); Ellis (1971, 1976).

Notes: *Catenularia* Grove was introduced with two species, *C. simplex* Grove (the type species) and *C. atra* (Corda) Sacc. (= *Spadicoides atra* (Corda) S. Hughes) (Hughes, 1965). The genus was revised by Hughes (1965) with four accepted species and ten species were excluded from the genus. He delimited the genus by presence of capitate hyphae bearing a hyaline cap of mucilage at the distal end; cylindrical, brown, septate conidiophores with percurrent proliferation; cylindrical conidiogenous cells with funnel-shaped collarete; and brown to dark brown, aseptate, cuneiform conidia produced endogenously in chains. A number of species have been added into the genus during the last a few decades, they are *C. cubensis* Hol.-Jech., *C. cuneiformis* var. *minor* Hol.-Jech., *C. guadalcanalensis* Matsush., *C. hughesii* N.D. Sharma, *C. kalakadensis* Subram. & Bhat, *C. malabarica* Subram. & Bhat, *C. pidopliczkoi* (Zhdanova) Litv., *C. piceae* M.B. Ellis, *C. simmonsii* Morgan-Jones, *C. variegata* H.H. Li & X.G. Zhang (Matsushima 1971; Ellis 1971, 1976; Morgan-Jones 1972; Holubová-Jechová 1978; Sharma 1980; Holubová-Jechová 1973, 1982, 1983; Holubová-Jechová and Mercado Sierra 1984; Subramanian and Bhat 1987; Li et al. 2017; Réblová et al. 2021d). Among them, three species were excluded from the genus and taxonomically reassigned: *Catenularia guadalcanalensis* Matsush. into *Monilochaetes* as *M. guadalcanalensis* (Holubová-Jechová and Gams, 1976; Réblová et al. 2011a), *Catenularia simmonsii* Morgan-Jones into *Sporoschismopsis* as *S. simmonsii* (Holubová-Jechová and Hennerbert 1972), and *Catenularia piceae* into *Exochalara longissima* (Grove) W. Gams & Hol.-Jech. (Gams and Holubová-Jechová 1976). The remaining species are morphologically similar to *Catenularia* defined by Hughes (1965) but differ from it by lacking capitate hyphae among conidiophores. The genus was recently reviewed by Réblová et al. (2021d) who accepted 11 species with or without capitate hyphae.

Phylogenetically it belongs to Chaetosphaeriaceae (Fig. 3, 42 and 154), which has been confirmed by both pure culture study and also molecular phylogeny study (Booth 1957, 1958; Hughes 1965; Holubová-Jechová 1982; Réblová 1999a, 2000, 2004; Réblová and Seifert 2003; Luo et al. 2019; Li et al. 2020). All known teleomorphs of the genus *Catenularia* were placed under *Chaetosphaeria*, i.e. *Chaetosphaeria catenulata* Z.L. Luo, K.D. Hyde & H.Y. Lu, *C. cubensis* Hol.-Jech., *C. cupulifera* (Berk. & Broome) Sacc., *C. novae-zelandiae* S. Hughes & Shoemaker and *C. trianguloconidia* Réblová & Seifert.

Molecular phylogeny study with inclusion of several species, including *Catenularia angulospora*, *C. minor*, *Chaetosphaeria catenulata* Z.L. Luo, K.D. Hyde & H.Y. Su and *Chaetosphaeria cubensis* Hol.-Jech., supports a separation of *Catenularia* from *Chaetosphaeria* (Réblová et al. 2011b; Luo et al. 2019). Inclusion of more species in the phylogenetic analysis will further clarify the concept of the genus and their relationship (Fernández, et al. 2006; Luo et al. 2019). The conidia of these species seem to be difficult to germinate and the fungus grows very slowly on PDA (Fig. 155).

Species of the genus *Catenularia* are saprophytic occurring on the surface of decaying wood or bark. Four species were recorded from China and here we add another 3 species, incl. 2 new species.

Key to accepted species of *Catenularia* and *Fuscocatenula*

1. Conidia with blunt corners at the distal end (*Catenularia*) 2
1. Conidia rounded and without blunt corners at the distal end (*Fuscocatenula*) 13
2. Capitate hyphae present 3
2. Capitate hyphae absent 8
3. Conidia longer than 20 µm 4
3. Conidia shorter than 20 µm 5
4. Conidia rounded-obconic, usually with 3 blunt corners, 27-45 x 16.8-24 µm *C. longispora*
4. Conidia with 3-5, usually 4 blunt corners, 21-28 x 19-28 µm *C. macrospora*
5. Conidia 6 cornered, up to 8 µm long, 6-7 µm wide at the distal end *C. cubensis*
5. Conidia 2-5 cornered, longer than 8 µm 6
6. Conidia 12.6-17.5 x 11.4-18.2 µm *C. novae-zelandiae*
6. Conidia up to 13.5 µm long and 11 µm wide 7

7. Conidia 9-13.5 x 7.5-10 µm	<i>C. cupulifera</i>
7. Conidia 9.0-10.0 x 9.0-11.0 µm	<i>C. minor</i>
8. Conidia more than 20 µm long and wide	9
8. Conidia less than 20 µm long and wide	10
9. Conidia 34-42 x 34-38 µm, 8-9.5 µm wide at the flattened base, with 4 corners	<i>C. elegans</i>
9. Conidia 23-24.5 x 20.8-24 µm, 3-4 µ wide at the flattered base, with five corners	<i>C. elsikii</i>
10. Conidia less than 9 µm long	11
10. Conidia more than 9 µm long in average	12
11. Conidia up to 8 x 6-7 µm, 1.5-3.5 µm side at the base, with six corners	<i>C. kalakadensis</i>
11. Conidia 6-8(-9) x 4.5-6(-7) µm, ca. 2 µm wide at the base, with 3 blunt corners	<i>C. angulospora</i>
12. Conidia 12-18 x 18-21 µm, 3-4 µm wide at the base, with 4-5 corners	<i>C. malabarica</i>
12. Conidia 13-15 x 12-14 µm, with 3-4 corners	<i>C. catenulata</i>
13. Conidia 21-27 x 12-14 µm	<i>F. submersa</i>
13. Conidia less than 20 µm long	14
14. Conidia 8.5-11 x 5.5-7.5 µm	<i>F. variegata</i>
14. Conidia 10-15 x 5-5.5 µm	<i>F. bambusicola</i>

Catenularia angulospora (Linder) Mason, Mycol. Pap. 5:121, 1941.

= *Halachalara angulospora* Linder, Mycologia 25: 347, 1933.

= *Sphaeria cupulifera* Berk. & Broome, Ann. Mag. Nat. His. 7:435, 1871.

= *Chaetosphaeria cupulifera* (Berk. & Broome) Sacc. Syll. Fung. 7:435, 1883.

= *Lasiosphaeria cupulifera* (Berk. & Broome) Coke & Plowr., Grevillea 7:85, 1879.

Colonies effuse, sparse, brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, cylindrical, smooth, dark brown at the base, becoming paler towards the apex, 3-7-septate, 130-250 x 6-8 µm wide, percurrently proliferating at the apex. Conidiogenous cells integrated, determinate, monophialidic, lageniform, brown, smooth, 24-35 x 5-7 µm, with a funnel-shaped and pale brown collarete 3-3.5 µm deep and 4-4.5 µm wide at the distal end, phialides may proliferate 1-4 times through the collarete. Conidia develop singly and successively within the collarete to form a chain of up to 10 which readily secedes, smooth, cuneiform, brown, truncate at base, rounded at the apex, 12-13 µm long, 11-13 wide at the widest distal end, 2.5-3 µm wide at the flattened base, apex slightly angular with 3-4 blunt corners when viewed from above and at each corner is seen a small circular, thin and pale area of cell wall which presumable functions as a germ pore.

Material examined: China: Guangdong Province, Lufushan, on dead culm of bamboo, 14 Oct. 1998, W.P. Wu (Wu1959a); China: Guangdong Province, Lufushan, on rotten wood, 14 Oct. 1998, W.P. Wu (Wu1978a); China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 14 Oct. 1998, W.P. Wu (Wu1989a); China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2219); China: Yunnan Province, Xishuangbanna, on dead stem of unidentified plant, 20 Oct. 1999, W.P. Wu & Yan Huang (Wu2802, Wu2842).

Ecology/Substrate/Host: Saprobe on dead plant material, including dead culm of bamboo, dead branch and rotten wood.

Geographical distribution: China, Europe, and North America.

Description and illustration: Mason (1941); Réblová et al. (2021d).

Notes: *Catenularia angulospora* belongs to a group of several species with obclavate conidiogenous cells and no capitate hyphae among conidiophores. These species can be distinguished from each other by size of the cuneiform-shaped conidia (Mason 1941; Matsushima 1971; Ellis 1971, 1976; Morgan-Jones 1972; Sharma 1980; Holubová-Jechová 1982; Holubová-Jechová and Mercado Sierra 1984; Subramanian and Bhat 1987; Réblová et al. 2021d). *C. catenulata* is morphologically very similar to *C. angulospora*. This is the first record from China. No living strain was observed from those fresh collections.

Catenularia catenulata (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & A.N. Mill., MycoKeys 81: 13, 2021.

= *Chaetosphaeria catenulata* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99: 582, 2019.

Saprobic on decaying wood submerged in freshwater habitats. Colonies on the substratum superficial, scattered, brown. Mycelium immersed, brown to dark brown, composed of septate, brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores 187-283 µm long, 6-10 µm wide, macronematous, mononematous, cylindrical, single, erect, straight, unbranched, thick-walled, dark brown, becoming paler towards the apex, smooth. Conidiogenous cells monophialidic, integrated, terminal, cylindric-clavate, flared collarete. Conidia 13-15 µm long, 12-14 µm wide, acrogenous, formed in chains, aseptate, turbinate-triangular, with 3 blunt protruding edges at the broader distal end, viewed from above 3-lobed or cruciform with blunt protruding corners, hyaline to subhyaline when young, greyish brown at mature, smooth-walled.

Typification: saprobic on submerged decaying wood, China: Yunnan Province, Nujiang River, October 2016, Z.L. Luo, S-891 (MFLU 18–1620, holotype), ex-type living culture DLUCC 0891.

Material examined: China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on rotten wood, 15 Oct. 2003, W.P. Wu (Wu7260a, Wu7260b, Wu7273b, 7274). Living strain: 47776 (from Wu7260a).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Description and illustration: Luo et al. (2019).

Notes: *Catenularia catenulata* resembles *C. cubensis* in having mononematous, macronematous, septate, unbranched, cylindrical conidiophores, integrated, terminal, monophialidic, percurrent conidiogenous cells and cuneiform, aseptate conidia, but can be distinguished by the relatively larger conidia in *C. catenulata* (Holubová-Jechová 1982; Luo et al., 2019; Réblová et al. 2021d).

Catenularia cubensis Hol.-Jech., Mycotaxon 15: 278, 1982.

= *Chaetosphaeria cubensis* Hol.-Jech., Mycotaxon 15: 278, 1982.

Colonies effuse, sparse, brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2–3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, cylindrical, smooth, dark brown at the base, becoming paler towards the apex, 5–8-septate, 110–150 x 4–6 µm, percurrently proliferating at the apex. Conidiogenous cells integrated, determinate, monophialidic, cylindrical, obclavate, brown, smooth, 24–32 x 5–5.5 µm, with a funnel-shaped and pale brown collarete 4–4.5 µm wide at the distal end, irregularly percurrently proliferating 1–2 times. Conidia develop singly and successively within the collarete to form a chain of up to 10 which readily secedes, smooth, cuneiform, brown, truncate at base, rounded at the apex, 6.5–8 µm long, 4.5–6 µm wide at the widest distal end, 2.5–3 µm wide at the flattened base, apex slightly angular with 3–4 blunt corners when viewed from above and at each corner is seen a small circular, thin and pale area of cell wall which presumable functions as a germ pore.

Material examined: China: Hainan Province, on rotten wood of unidentified plant, 15 Dec. 2000, W.P. Wu & Yan Huang (Wu5503d).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Cuba.

Description and illustration: Ellis (1971); Xia et al. (2013); Luo et al. (2019).

Notes: *Catenularia cubensis* differs from other species by its smaller conidia and lacking capitate hyphae among conidiophores (Holubová-Jechová 1982; Mercado Sierra et al. 1997; Xia et al. 2013). The fungus was recently reported on submerged decaying wood from Yunnan (Luo et al. 2019).

Catenularia elegans W.P. Wu & Y.Z. Diao, sp. nov., Figs. 156–157, MycoBank MB841606.

Etymology: *elegans* (L), beautiful, refers to its beautiful conidia.

Diagnosis: Differs from all other species in the genus by wide collarete and larger conidia (34–42 x 34–38 µm).

Typification: China: Hunan Province, Mangshan, on dead branches of unidentified plant, 21 April 2002, W.P. Wu (Holotype WFH Wu6078).

Colonies effuse, sparse, brown. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 3–6 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, smooth, dark brown at the base, becoming paler towards the apex, cylindrical, 5–8-septate, 300–500 x 7–11 µm wide, percurrently proliferating at the apex. Conidiogenous cells integrated, determinate, monophialidic, with a funnel-shaped, pale brown collarete 3–5 µm deep and 13–15 µm wide at the distal end with a frayed margin, phialides may proliferate through the collarete to produce a series of up to 4 phialides. Conidia develop singly and successively within the collarete to form a chain of up to 10 which readily secedes, smooth broadly obovoid to more or less rounded-obconic, with 3 corners at the top, truncate at the basal scar, rounded at the apex, brown to dark brown, smooth, 34–42 µm long, 34–38 µm wide at the distal end, 8–9.5 µm wide at the flattened base; slightly angular with 3 blunt corners when viewed from above and at each corner is seen a small circular, thin and pale area of cell wall which presumable functions as a germ pore.

Material examined: China: Hunan Province, Mangshan, on dead branched of unidentified plant, 21 April 2002, W.P. Wu (Holotype WFH Wu6078).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China.

Notes: Among the described species of the genus *Catenularia*, *Catenularia elegans* resembles *C. macrospora* S. Hughes (conidia 21–28 µm long, 19–28 µm wide at the distal end, and 4–7 µm wide at the flattened base) in conidial size, but differs by lacking capitate hyphae among conidiophores and producing significant larger conidia in *C. elegans* (Hughes 1965; Réblová et al. 2021d). No living strain was obtained for phylogenetic study.

Catenularia kalakadensis Subram. & Bhat, Kavaka 15(1-2): 49, 1989 [1987]

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight or flexuous, smooth, 5-8-septate, 75-200 x 3.5-5 µm. Conidiogenous cells monophialidic, integrated, terminal, with a distinct collarette, 25-35 x 4-5 µm. Conidia 6.5-8.5 µm long, 4-6.5 µm wide at the distal broad end, 1.5-2.5 µm wide at the truncate base.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, India.

Description and illustration: Subramanian and Bhat (1989); Xia (2017).

Notes: *Catenularia kalakadensis* was originally described from India and reported from China by Xia (2017). Based on the description and illustration from both original description and documentation by Xia (2017), it is hardly distinguished from *C. cubensis* (Subramanian and Bhat, 1989; Xia, 2017).

Chaetosphaeria Tul. & C. Tul., Select. Fung. Carpol. (Paris) 2: 252, 1863.

= *Chaetolentomitia* Maubl., Boletim de Agricultura São Paulo 16 (4): 313, 1915.

= *Didymopsamma* Petr., Ann. Mycol. 23: 80, 1925.

= *Miyoshiella* Kawam., J. Japanese Bot. 4: 295, 1929.

= *Montemartinia* Curzi, Atti dell'Istituto Botanico della Università e Laboratorio Crittogamico di Pavia 3 (3): 84, 1927.

= *Urnularia* P. Karst., Notiser ur Sällskapetets pro Fauna et Flora Fennica Förhandlingar 8: 209, 1866. = *Aposphaeriella* Died., Ann. Mycol. 10: 140, 1912.

= *Miyoshia* Kawam., J. Coll. Sci. imp. Univ. Tokyo: 10, 1907.

= *Trichocollonema* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 111: 1015, 1902

Type species: *Chaetosphaeria innumera* Berk. & Broome ex Tul. & C. Tul.

Ecology/Substrate/Host: Saprobe on dead material of plants and isolated from ecological samples.

Geographical distribution: Broadly distributed, especially in subtropical and subtropical area.

Descriptions and illustration: Réblová et al. (1999); Maharachchikumbura et al. (2016).

Notes: The genus *Chaetosphaeria*, as typified by *C. innumera*, is characterized by non-stromatic, dark, papillate ascomata, persistent paraphyses, unitunicate asci with a shallow, refractive annulus and hyaline, ellipsoidal, fusiform to filiform, one to several-septate hyaline ascospores, although several species with versicolorous ascospores are also accommodated in the genus (Tulanse and Tulanse 1863; Maharachchikumbura et al. 2016). The asexual conidial phases in the genus *Chaetosphaeria* are with tremendous variation in morphology, including conidiomata, conidiophores, conidiogenous cells and conidia, and traditionally classified into more than 10 different dematiaceous genera, in which phialidic conidiogenous cells and hyaline or dark-colored conidia are found. These dematiaceous phialidic hyphomycetes include *Catenularia*, *Cryptophiale*, *Dictyochaeta*, *Menispora*, *Chloridium*, *Thozetella*, etc. (Hughes and Kendrick 1968; Réblová et al. 1999, 2006, 2020, 2021a, b, c, d; Réblová and Winka 2000; Huhndorf et al. 2001, 2004; Réblová 2004; Fernández & Huhndorf 2005a, b; Fernández et al. 2006; Réblová and Seifert 2008; Liu et al. 2016; Perera et al. 2016; Luo et al. 2019; Hyde et al. 2020). The members of *Chaetosphaeria* are lignicolous perithecial ascomycete and the genus has world-wide distribution. Four species in this genus have been reported from freshwater habitats (Luo et al. 2019).

Our phylogenetic analysis (Fig. 3, 94 and 308) clearly shows that the genus *Chaetosphaeria* Tul. & C. Tul. is polyphyletic and problematic, which is aligned with what was reported already (Réblová 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Liu et al. 2016; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c, d). The species included in the analysis are distributed in several different clades on the ML tree. Some of them are grouped with the asexual genera, e.g. *Cacumisporium* Preuss, *Catenularia*, Grove, *Chloridium* Link, *Codinaea* Marie, *Craspedodidymum* Hol.-Jech., *Dictyochaeta* Speg., *Exserticlava* S. Hughes, *Obeliospora* Nawawi & Kuthub., *Thozetella* Kuntze. and *Zanclospora* S. Hughes & W.B. Kendr. A systematic revision of the genus is needed towards redelimitation of monophyletic generic concept and this has been on its way. For example, based on both morphology and molecular analysis, Réblová et al. (2020) adapted *Paragaeumannomyces* Matsush. to accommodate 13 known *Chaetosphaeria* species with scolecospore ascospore which are phylogenetically clustered as a distinct group from other *Chaetosphaeria* species. The new genus *Achrochaeta* was created for *Chaetosphaeria talbotii* with a *Dictyochaeta* anamorph proved different from the core of *Dictyochaeta* and forming a separate lineage in the Chaetosphaeriaceae (Réblová et al., 2021c). It is also clear from our analysis that several species, such as *Chaetosphaeria rivularia* Réblová & J. Fourn. and *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf, should be replaced to other genera.

On the phylogenetic tree (Fig. 3, 94 and 308), the *Chaetosphaeria* species with the anamorphic state classified in *Catenularia*, *Cacumisporium*, *Dischloridium* and *Exserticlava* are grouped together with *Paragaeumannomyces* and formed a clade with strong support from all analysis and independent from the type

species of the genus *Chaetosphaeria*. They probably represent different monotypic genera and different from others including *Chaetosphaeria* and *Paragaeumannomyces*, thus we recommend maintaining the anamorphic generic names for these fungi.

Chaetosphaeria innumera Berk. & Br. Et Tul., Sel. Fung. Carpol. 2: 252, 1863.

= *Lasiosphaeria innumera* (Berk. & Br. Ex Tul.) Stevenson, Mycol. Scot.:391, 1879.

= *Byssosphaeria innumera* (Berk. & Br. Ex Tul.) Cooke, Grevillea 15: 123, 1887.

= *Chloridium botryoideum* (Corda) S. Hughes, Can. J. Bot. 36: 748, 1958.

= *Chloridium minutisporum* Lindau, Rabenh. Krypt.-Fl. 1: 724, 1906.

= *Chloridium botryoideum* (Corda) S. Hughes var. *minutum* (Sacc.) W. Gams & Hol.-Jech. Stud. Mycol. 13: 43, 1976.

= *Rhinotrichum minutum* Sacc., Michelia 1: 87, 1877.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-2.5 µm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or 2-5 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2-7-septate, brown, dark brown to black at the base, becoming paler towards the apex, cylindrical, tapering gradually towards the apex, smooth, 100-150 x 3-3.5 µm, swollen up to 6 µm wide at the base, narrowing up to 2-2.5 µm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, phialidic, brown, becoming paler towards the apex, smooth, apex subhyaline, 10-22 x 2-2.5 µm wide, apex 1-1.5 µm wide, collarette funnel-shaped or cylindrical, proliferation sympodial and/or percurrent, giving to the conidiophores a geniculate or annellidic appearance. Conidia produced singly, successively, within the collarette, aggregated in short or long chains, oblong-ellipsoidal, straight, aseptate, hyaline, 1.5-2 x 1 µm.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Beijing, Mentougou, Baihuashan, on rotten wood, 4 Aug. 2018, W.P. Wu (Wu15225); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Cinnamomum* sp., 30 Dec 1997, W.P. Wu (Wu1559b); China: Hubei Province, Shengnongjia, on rotten wood of unidentified plant, 17 Sept. 2004, W.P. Wu (Wu8296); China: Hubei Province, Shennongjia, on plant litter, 18 Sept 2004, W.P. Wu (Wu8290); China: Hunan Province, Zhangjiajie, on rotten wood, 16 Oct. 2010, W.P. Wu (Wu11034); China, Jilin Province, Changbaishan, On rotten wood of *Betula* sp., 5 Sept. 1998, W.P. Wu (Wu1820b); China: Ningxia Province, Liupan Mountain, Qiuxianjia, on dead stem of *Quercus* sp., 26 Aug. 1997, W.P. Wu (Wu1104a,b); China: Ningxia Province, Jingyuan County, Liupan Mountain, Qiuqianjian, on dead stems of herbaceous plant, 26 Aug. 1997, W.P. Wu (Wu1007I). Living strain: 43746 (from Wu1007i), 43874 (from Wu1104b), 44692 (from Wu1820b), 50679 (from Wu8290), 76105 and 76091 (from Wu15225).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Czechoslovakia, Hungary, and widely distributed in other countries from Europe and North America.

Description and illustration: Gams and Holubová-Jechová (1976); Holubová-Jechová and Révay (1987).

Notes: The anamorph of *Chaetosphaeria innumera* is known as *Chloridium botryoideum*, which has a broad distribution and commonly found on rotten wood (Gams and Holubová-Jechová, 1976). In the specimen Wu1820b, we constantly observed the annellidic proliferation of the conidiogenous cells and this character has not been described in this species in the literature.

Both LSU and ITS sequences were obtained from the single spore isolates of several different specimens and its affinity to other member of *Chaetosphaeria* in Chaetosphaeriaceae was confirmed from the phylogenetic analysis. The ITS sequences obtained from these strains has almost identical sequence with *Chloridium botryoideum* var. *minutum* strain CBS247.75. No, ITS sequence was found for *Chloridium botryoideum* var. *botryoideum*, however the two LSU sequences under this names have only 95% identity to our sequences from the strain 1820b.

Chaetosphaeria lentomita W. Gams & Hol.-Jech., Studies in Mycology 13: 24, 1976

= *Chloridium pachytrachelum* W. Gams & Hol.-Jech., Stud. Mycol. 13: 26, 1976.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Belgium, China, Netherland, Slovakia, and many other countries in Europe.

Description and illustration: Gams and Holubová-Jechová (1973).

Notes: Ho et al. (2002) found this species on submerged wood in Hongkong, China, but did not provide description and illustration in their study. The anamorphic status *Chloridium pachytrachelum* W. Gams & Hol.-Jech, was also discovered from Hong Kong (Ho et al. 2002).

Craspedodidymum Hol.-Jech., Česká Mykol. 26: 70-73, 1972.

Colonies effuse, thin, consisting of isolated, blackish bristles. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores mononematous, erect, straight, or slightly curved, simple, or branched, cylindrical, septate, brown, smooth. Conidiogenous cells integrated, determinate, clavate, pale brown to medium brown, smooth, with a thin, pale brown, funnel-shaped and flaring collarette. Conidia holoblastic, aggregated in slimy heads, ovoidal, brown to blackish, smooth- and thick-walled, aseptate or septate.

Type species: *Craspedodidymum elatum* Hol.-Jech.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: Broadly distributed.

Description and illustration: Holubová-Jechová (1972).

Notes: The genus *Craspedodidymum* Hol.-Jech. is characterized by brown, branched or unbranched conidiophores; monophialidic and apically inflated conidiogenous cells with large, funnel-shaped phialidic collarettes; and the brown, aseptate conidia aggregated in slime heads (Holubová-Jechová 1972). The concept of the genus such as branches of conidiophores, shape and septation of the conidia has become broader with the introduction of other species into the genus (Yanna et al. 2000; Figueroa et al. 2018). The mechanism of percurrent proliferations of conidiogenous cell was described by Sutton (1976). A total of 15 species name have been published under the genus (Holubová-Jechová 1972; Lunghini and Onofri 1980; Kirk 1985; Rao and de Hoog 1986; Subramanian and Bhat 1989; Mercado Sierra & Mena Portales 1992; Bhat and Kendrick 1993; Yanna et al. 2000; Pinruan et al. 2004; Ma et al. 2011a; Figueroa et al. 2018). Among them, *C. pulneyense* Subram. & Bhat is a synonym of *C. proliferans* V. Rao & de Hoog (Bhat and Kendrick 1993); *C. hyalosporum* Bhat & W.B. Kendr. was transferred into the recently described genus *Anacraspedodidymum* C.R. Silva, R.F. Castañeda & Gusmão; *Craspedodidymum licualae* Pinruan was reported to be the anamorph of *Thailandiomyces bisetulosus*, which phylogenetically belongs to *Diaporthales* (Pinruan et al. 2008). Those accepted species can be distinguished by their conidial morphology, as illustrated by Yanna et al. (2000), Pinruan et al. (2004) and Figueroa et al. (2018). A key to the 14 accepted species was provided by Figueroa et al. (2018).

In our phylogenetic tree, *Craspedodidymum elatum* Hol.-Jech., the type species of the genus *Craspedodidymum* Hol.-Jech., is grouped together with *Chaetosphaeria dilabens* Réblová & W. Gams with strong support. It is the first time that the ITS and LSU sequences are obtained for the type species of *Craspedodidymum*. The genus *Craspedodidymum* has been assigned to Chaetosphaeriaceae, but that is based on observation of the similar anamorphs obtained for several scolecosporous species of *Chaetosphaeria*, now known as *Paragaeumannomyces* (Huhndorf and Fernández 2005; Perera et al. 2016; Réblová et al. 2020). In these species, very similar phialidic structure (broad funnel-shaped collarette) and conidial shape were observed, but they never develop long conidiophores and dark-colored conidia; and phylogenetically they are clustered as two very distinct groups. The morphological similarity of *C. elatum* and *C. dilabens* is the development of conidiophores, terminal monophialidic conidiogenous cell with well-developed collarette, and ellipsoidal, aseptate and pale brown to brown conidia. Morphologically the known species of *Craspedodidymum* are diverse and future phylogenetical study is needed to clarify their phylogenetic relationship.

The genus was only recently known for China with 4 species, including *C. abigianense* Lunghini & Onofri, *C. fujianense* L.G. Ma & X.G. Zhang, *C. hyalosporum* Bhat & W.B. Kendr. (now as *Anacraspedodidymum hyalosporum* (Bhat & W.B. Kendr.) R.F. Castañeda, C.R. Silva & Gusmão) and *C. proliferans* V. Rao & de Hoog. (Ma et al. 2011a; Xia et al. 2015; Chang 2015; Yang et al. 2016). Here we added another 3 species as new records for China, including *C. cubense* J. Mena & Mercado, *C. fimbriatum* Bhat & W.B. Kendr. and *C. guatemalense* Figueroa, Bran, O. Morales & R.F. Castañeda.

Key to accepted species of *Craspedodidymum* (based on Figueroa et al., 2018)

1. Conidia unicellular 2
1. Conidia septate 13
2. Conidiogenous cells mono- or rarely polyphialidic, conidia globose or obovoid, papillate at the base, brown, 13.5–14.5 × 14.5–16.5 µm *C. abigianense*
2. Conidiogenous cells always monophialidic 3
3. Conidia globose or subglobose to broadly obovoid 4
3. Conidia not as above 7
4. Conidia fibrillose with numerous acellular curved appendages forming a pile or coat on the surface, mid brown, 18–24 µm diam *C. fimbriatum*
4. Conidia not fibrillose 5
5. Conidia ≤5 µm wide, papillate at the base, pale brown, 5–6.2 × 3.5–4 µm *C. microsporum*
5. Conidia >5 µm wide 6
6. Conidia solitary, sometimes pyriform, dark brown, 11.5–15 × 10.5–13 µm *C. cubense*
6. Conidia arranged in false chains, brown to dark brown, 18–22 × 13.2–19 µm *C. seifertii*
7. Conidia obovoid to cuneiform 8

7. Conidia not as above	9
8. Conidia not papillate, brown, 10–14 × 8–11 µm	<i>C. proliferans</i>
8. Conidia papillate, brown, 13.7–17.5 × 7.5–10 µm	<i>C. licualae</i>
9. Conidia mostly oblong or cylindrical	10
9. Conidia not as above	11
10. Conidia brown, 13–15.5 × 7.5–10 µm	<i>C. fujianense</i>
10. Conidia brown, 11–17 × 7–8.5 µm	<i>C. pulneyense</i>
11. Conidia fabiform to allantoid, brown, 8.5–12.5 × 4–5 µm	<i>C. guatemalense</i>
11. Conidia ellipsoid	12
12. Conidia papillate at the base, dark brown, 13.5–20 × 7.5–11.5 µm	<i>C. elatum</i>
12. Conidia not papillate at the base, medium brown, 15–20 × 6.2–7.5 µm	<i>C. siamense</i>
13. Conidia 1-septate, broadly ellipsoid to obovate, truncate at the base, brown, flattened, 11–18 × 6–9 µm	<i>C. kenienne</i>
13. Conidia 3- (to 4-) septate, with two dark brown distal cells, broadly ellipsoidal to obovoid, truncate at the base, 24–30 × 13–19 µm	<i>C. nigroscapitatum</i>

***Craspedodidymum abigianense* Lunghini & Onofri, Trans. Br. Mycol. Soc. 74: 208, 1980**

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, straight or slightly flexuous, dark brown, 4–6 septate, 120–170 × 5.2–7 µm, tapered gradually towards the apex. Conidiogenous cells terminal, ellipsoidal, monophialidic or rarely polyphialidic, percurrent, 20–30 × 6.5–8 µm, pale brown, with a distinct funnel-shaped collarete, 1.5–2.0 µm high, 5.5–7.5 µm wide at the open end. Conidia holoblastic, acrogenous, solitary, spherical or more often obovoid, smooth, dark brown, generally paler when young, aseptate, 15.5–18.5 × 5.5–16.5 µm, papillate at the base.

Specimens: China: Hainan Province, Diaoluoshan, On dead stems of unidentified broadleaf tree, 26 May 2014, X.Y. Li (HSAUP H7566).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China, West African.

Descriptions and illustrations: Lunghini and Onofri (1980); Yang et al. (2016).

Notes: No specimen was examined by the author. The above description is based on excellent documentation by Yang et al. (2016). The conidia from the Chinese collection seems to be much bigger than those in the original description (13.5–14.5 × 14.5–16.5 µm) (Lunghini and Onofri 1980).

***Craspedodidymum carpaticum* (Hol.-Jech. & Révay) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 158, MycoBank MB841726.**

≡ *Chloridium carpaticum* Hol.-Jech. & Révay, Acta Bot. Hungarica 33: 63, 1987.

= *Craspedodidymum guatemalense* Figueroa, Bran, O. Morales & R.F. Castañeda, Mycotaxon 133: 316, 2018.

Colonies on the natural substrate effuse, hairy, dark brown. Mycelium partly superficial and partly immersed, composed of septate, branched, brown, smooth-walled hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, erect, straight or slightly flexuous, cylindrical, 4–7-septate, mid to dark brown near the base, with the upper part pale olivaceous brown, smooth-walled, 100–180 × 3–5 µm. Conidiogenous cells integrated, terminal, enteroblastic, monophialidic, integrated, determinate or enteroblastic percurrent extended, cylindrical, pale brown, 8–15 × 4–5 µm, with distinct funnel-shaped collarete and percurrent proliferations, 1.5–2.5 µm high, and 1.5–2.5 wide at the open end, narrowing to 1.2–1.5 µm diam at the base. Conidia holoblastic, acrogenous, aggregated in brown to dark brown spore mass, allantoid to fabiform, unicellular, smooth-walled, brown, 8–12.5 × 4–5 µm, both ends with slightly paler color and thin-walled.

Material examined: China: Hubei Province, Shengnongjia, on rotten wood of unidentified plant, Aug 2000, W.P. Wu (Wu8296).

Ecology/Substrate/Host: Saprobies on dead material of plant.

Geographical distribution: China, Czechoslovakia, Guatemala, Hungary.

Descriptions and illustrations: Holubová-Jechová & Révay (1987); Figueroa et al. (2018).

Notes: *Craspedodidymum guatemalense*, originally described on decaying bark of *Quercus* sp. from Guatemala, is no doubt the same fungus named as *Chloridium carpaticum* Hol.-Jech. & Révay. Its allantoid- to fabiform-shaped conidia with a paler and thinner small germ pore at both or only at one end clearly differs it from all other known species in the genus (Gams and Holubová-Jechová 1976; Figueroa et al. 2018). The conidia from our collection did not germinate on PDA medium, thus no living culture was obtained for molecular study. Its phylogenetic position remains to be clarified in future.

***Craspedodidymum elatum* Hol.-Jech., Česká Mykologie 26: 70, 1972. Fig. 159.**

Colonies effuse, thin, consisting of isolated, blackish bristles. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores mononematous, erect, straight or slightly curved, simple, cylindrical, 8-12-septate, brown, becoming pale brown towards the apex, smooth-walled, 180-260 x 5-9 µm. Conidiogenous cells integrated, determinate, clavate, pale brown to medium brown, smooth, 18-34 µm long, 12-13 µm wide at the widest part, with a thin, pale brown, funnel-shaped and flaring collarette, 6-10 µm long, 8-9 µm wide at the apex. Conidia holoblastic, aggregated in slimy heads, ovoidal, brown to blackish, smooth- and thick-walled, aseptate, 12-14 x 10-11 µm.

Colonies on PDA effuse, colonies 0.5-0.7 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, reverse light-yellow brown.

Material examined: China: Guangxi Province, Shangsì, Shiwandashan, Wangle, On dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1267a, Wu1270b, Wu1322a). Living strain: 42874 (from Wu1322a).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China, Cuba.

Descriptions and illustrations: Holubová-Jechová (1972); Mena Portales & Mercado Sierra (1992, 1997).

Notes: *C. elatum* Hol.-Jech. resembles *Craspedodidymum cubense* J. Mena & Mercado but differs by its branched conidiophores; it also resembles *C. proliferans* V. Rao & de Hoog but in the latter species the conidiogenous cells are with percurrent growth through the collarettes (Rao and de Hoog 1986; Portales and Mercado Sierra 1992, 1997). These species might represent the same fungus, which needs to be further confirmed by molecular study.

Both LSU and ITS sequences were obtained from the single spore isolates of the specimen Wu1322a and its affinity to other members of Chaetosphaeriaceae was confirmed. On a megablast search using the ITS sequence from the strain obtained from the specimen Wu1322a, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including *Chaetosphaeria dilabens* (GeneBank NR159784, identities 417/455 (92%), 4 gaps (0%)), *Chaetosphaeria hebetiseta* (GeneBank AF178549, identities 383/432 (89%), 13 gaps (3%)), *Chaetosphaeria innumera* (GeneBank AY906956, identities 381/434 (88%), 12 gaps (2%)).

***Craspedodidymum fimbriatum* Bhat & W.B. Kendr., Mycotaxon 49: 33, 1993.**

Colonies gregarious, effuse, velvety, dark brown to black, consisting of isolated, blackish bristles. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores mononematous, fasciculate in groups, erect, straight or slightly curved, simple, cylindrical, 4-8-septate, brown, becoming pale brown towards the apex, smooth-walled, percurrently regenerating, 135-210 x 4-6 µm. Conidiogenous cells integrated, determinate, monophialidic, cylindrical to clavate, pale brown to medium brown, smooth, 18-30 µm long, slightly inflated and rounded at the apex, 8-11 µm wide at the widest part, apex bears an inconspicuous collarette. Conidia holoblastic, aggregated in slimy heads, globose, aseptate, pale brown, thick-walled, 19-22 µm diam., with numerous acellular, fibrillose, curved appendages forming a pile or coat on the surface.

Specimens: China: Hainan Province, tropical forest of Bawangling, On dead branches of unidentified plant, 8 May 2011, Sh. C. Ren (HMAS146164).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China, India.

Descriptions and illustrations: Bhat and Kendrick (1993); Ren et al. (2012).

Notes: *Craspedodidymum fimbriatum* is very characteristic in processing a cylindrical to clavate conidiogenous cells with inconspicuous collarette, and pale brown, thick-walled, globose-shaped conidia with densely fibrillose surface and formed in slime head (Bhat and Kendrick 1993; Ma et al. 2012).

***Craspedodidymum fujianense* L.G. Ma & X.G. Zhang, Mycotaxon 117: 351, 2011.**

Colonies effuse, dark brown, consisting of isolated, blackish bristles. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, erect, straight or flexuous, cylindrical, up to 10 septate, brown, becoming pale brown towards the apex, smooth-walled, 175-420 x 6.5-8.5 µm. Conidiogenous cells integrated, terminate, determinate, clavate, swollen at the subapical region, pale brown to medium brown, smooth, 21-30 µm long, 9-12 µm wide at the widest part, with a thin, pale brown, funnel-shaped and flaring collarette, 6-7.5 µm long, 6.5-9.5 µm wide at the apex, 4.5-5.5 µm wide at the base. Conidia holoblastic, aggregated in slimy heads, oblong, brown to blackish, smooth- and thick-walled, aseptate, 13-17.5 x 7.5-10 µm.

Typification: China: Fujian Province, The National Forest Park of Wuyishan, On dead branches of *Acacia confusa*, 15 Aug 2009, L.G. Ma (HSAUP H1010, holotype; HMAS 146089, isotype).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China.

Descriptions and illustrations: Ma et al. (2011); Xia (2017).

Notes: The isotype material HMAS 146089 preserved in HMAS was examined by us. As discussed by Ma et al. (2011), the fungus differs from the closely related species *C. siamense* Pinruan in the genus by its oblong and aseptate conidia without a papilla (Pinruan et al. 2004). Apart from the type specimen from Fujian, *C. fujianense* was also reported from Hainan (Xia 2017).

Craspedodidymum proliferans Vasant Rao & de Hoog, Stud. Mycol. 28: 64, 1986.

Colonies on the natural substrate effuse, dark brown. Mycelium partly superficial and partly immersed. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, erect, straight, or flexuous, simple, cylindrical, septate, mid to dark brown near the base, with the upper part pale olivaceous brown, smooth-walled, up to 390 µm, 8-10 µm wide. Conidiogenous cells integrated, terminal, enteroblastic, monophialidic, percurrent, integrated, determinate, clavate, 20.5-24 x 9.5-10 µm, with a very large and distinct funnel-shaped collarette, 4.5-6.5 µm high, and 7-7.5 µm wide at the open end, narrowing to 4-4.5 µm diam at the base. Conidia holoblastic, aggregated in slimy heads, obovoid, subglobose to trapezoid, truncate at the base, aseptate, 9.5-13 x 8.5-12 µm.

Material examined: China: Fujian Province, The National Forest Park of Wuyishan, on dead branches of *Magnolia paenetaluma*, 15 Aug 2009, L.G. Ma (HMAS 146090).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: China, India.

Descriptions and illustrations: Rao & de Hoog (1986); Chang (1995); Ma et al. (2011).

Notes: The specimen HMAS 146090 preserved in HMAS was examined by us. It is similar to *C. cubensis* J. Mena & Mercado but has narrower conidia (Mercado Sierra and Mena Portales 1992). In addition to the report in mainland China, the fungus was also recorded from Taiwan (Chang 1995).

Ejnerjensenia W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841699

Etymology: Named after the former Vice President Ejner B. Jensen from Novozymes, who made significant contribution to industrial biotechnology and gave strong encouragement for this mycological research during last 25 years.

Diagnosis: Ascospore hyaline, cylindrical, 1-septate. Conidiophore cylindrical, dark brown, septate, terminated with a monophialidic conidiogenous cell bearing a cup-shaped collarettes; Conidia hyaline, aseptate, short cuneate or dacryoid.

Type species: *Ejnerjensenia myriocarpa* (Fr.) W.P. Wu & Y.Z. Diao.

Teleomorph: Perithecia often densely aggregated, with or without a thin, black, basal pseudostroma. Perithecia black, brittle, subglobose, ostiole conical, smooth-walled, glossy; Wall consisting of several layers of strongly compressed, pigmented cells of textura epidermoidea. Asci thin-walled, narrow cylindrical. Paraphyses emerging between the asci. Ascospore mostly somewhat obliquely monostichous, chromophilic, cylindrical, with rounded ends, 1-septate, hyaline, smooth-walled. Anamorph: Setae absent. Conidiophore macronematous, mononematous, solitary, simple, cylindrical, erect, straight or flexuous, septate, brown to dark brown, smooth-walled, terminated with a conidiogenous cell, with percurrent proliferation only. Conidiogenous cells integrated, terminal, phialidic, brown, becoming paler towards the apex, smooth, apex subhyaline, collarette flaring or funnel-shaped or cup-shaped, 2.5-3 µm long, 2-2.5 µm wide at the widest part, with 1-3 percurrent proliferation. Conidia produced singly, successively, within the collarette, aggregated in a slime masses or regular chain, typically short-cuneate or dacryoid with a truncate base and rounded tip, smooth-walled, aseptate, hyaline.

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: Broadly distributed in world wide.

Notes: The new genus *Ejnerjensenia* is created for *Chaetosphaeria myriocarpa* (Fr.) C. Booth and its anamorphic state *Chloridium clavaeforme* (Preuss) W. Gams. & Hol.-Jech., which in the phylogenetic tree is distinct from the type species of *Chaetosphaeria* (*C. innumera* Berk. & Br.) and other genera in Chaetosphaeriaceae species. Morphologically it differs from other related genera by 1-sepate ascospore, and monophialidic and percurrently proliferated conidiogenous cells with flaring or funnel-shaped or cup-shaped collarettes, and hyaline aseptate, short-cuneate or dacryoid with a truncate base and rounded apex, and formed in slime head (Gams and Holubová-Jechová 1976).

In the phylogenetic analysis, *E. myriocarpa* is grouped together with two other *Chaetosphaeria* species, *C. pygmaea* (P. Karst.) Constant., K. Holm & L. Holm and *C. guttulata* Z. L. Luo, K.D. Hyde & H.Y. Sun. *Chaetosphaeria pygmaea* also produces one-septate ascospore, and *Chloridium*-like anamorph with flask-shaped conidiogenous cells bearing cup-shaped collarettes, and dacryoid conidia with a truncate base and rounded apex and formed in chain, which is very similar to *E. myriocarpa* (Constantinescu et al. 1995). While *Chaetosphaeria guttulata* is created for an anamorphic fungus from freshwater in China and characterized by dark brown and

septate conidiophore with a terminal holoblastic and polyblastic conidiogenous cell bearing numerous tiny protuberant conidiogenous loci, and hyaline ovoid or fusiform, 3-septate conidia (Luo et al. 2019)

Ejnerjensenia myriocarpa (Fr.) W.P. Wu & Y.Z. Diao, comb. nov., Fig. 160, MycoBank MB 842448.

≡ *Sphaeria myriocarpa* Fr., Kongliga Svenska Vetenskapsakademiens Handlingar 38: 267, 1817.

≡ *Chaetosphaeria myriocarpa* (Fr.) C. Booth, Mycological Papers 68: 5, 1957.

≡ *Sphaeria myriocarpa* Fr., Syst. mycol. 2(2): 459, 1823.

= *Chloridium clavaeforme* (Preuss) W. Gams & Hol.-Jech., Stud. Mycol. 13: 31, 1976.

= *Gongromeriza clavaeformis* Preuss, Linnaea 24: 106, 1851.

= *Catenularia beimii* Mangelot, Revue Gen. Bot. 59: 445, 1952

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-2 µm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2-5-septate, brown, dark brown at the base, becoming paler towards the apex, smooth, 80-130 x 2.5-3 µm, swollen up to 8 µm wide at the base, narrowing up to 1.5-2 µm wide at the upper part below the collarette. Conidiogenous cells integrated, terminal, phialidic, brown, becoming paler towards the apex, smooth, apex subhyaline, 20-30 µm long, 2.5-3 µm wide, collarette funnel-shaped or cup-shaped, 2.5-3 µm long, 2-2.5 µm wide at the widest part, with 1-3 percurrent proliferation. Conidia produced singly, successively, within the collarette, aggregated in a slime masses or regular chain, typically short-cuneate or dacryoid with a truncate base and rounded tip, smooth-walled, aseptate, hyaline, 2.5-3 x 1.5-1.8 µm.

Colonies on PDA effuse, colonies 0.5-0.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey, with pale colored margin, reverse brown to dark brown.

Material examined: On dead stems of unidentified grass, China: Ningxia Province, Jingyuan County, Liupan Mountain, Qiuqianjian, 26 Aug. 1997, W.P. Wu (Wu1007a); On wood of unidentified plant, China: Ningxia Province, Jinyuan, Liupan Mountain, Langtianxia, 25 Aug. 1997, W.P. Wu (Wu196B); On dead culms of bamboo, China: Guangxi Province, Damingshan, 18 Dec 1997, W.P. Wu (Wu1374c); On dead wood of *Betula* sp., China, Jilin Province, Changbaishan, Sept. 5 1998, W.P. Wu (Wu1777b); On rotten wood of ?*Betula* sp., China, Jilin Province, Changbaishan, Sept. 5 1998, W.P. Wu (Wu1802). Living strain: 44603 (from Wu1777b).

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: China, Ukraine, and also widely distributed in Europe and North America.

Description and illustration: Booth (1957); Holubová-Jechová and Gams (1976); Constantinescu et al. (1995); Crous et al. (2018); Luo et al. (2019).

Notes: The anamorphic state of *Chaetosphaeria myriocarpa* (= *Chloridium clavaeforme*) can easily be distinguished from all other species in the genus by producing short conidiophores, terminal conidiogenous cells bearing a distinct and broader collarette, and hyaline, short-cuneate or dacryoid conidia. It has been reported on rotten material of many different plants, including *Acer*, *Alnus*, *Betula*, *Cedrus*, *Fagus*, *Populus*, *Quercus*, *Sorbus*, bamboo, grass (Gams and Holubová-Jechová 1976; Crous et al. 2018; Luo et al. 2019). Among the examined specimens, some of them such as Wu1777b are always with conidia in regular chain, while the others are always with conidia in slime mass. This species was recently reported on submerged decaying wood from Yunnan Province, China (Luo et al. 2019). Both LSU and ITS sequences were obtained from the single spore isolates of Wu1777b and are almost identical to those from *Chaetosphaeria myriocarpa* (99.77%) and *Chloridium clavaeforme* (99.77%) in the GenBank.

Ejnerjensenia pygmaea (P. Karst.) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB842449

≡ *Chaetosphaeria pygmaea* (P. Karst.) Constant., K. Holm & L. Holm, Mycological Research 99: 590 (1995)

≡ *Sphaeria pygmaea* P. Karst., Fungi Fenn. exsicc.: no. 875, 1869

≡ *Zignoella pygmaea* (P. Karst.) Sacc., Michelia 1: 346, 1878.

≡ *Psilosphaeria pygmaea* (P. Karst) Cooke, Grevillea 16: 50, 1887.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Europe including Finland.

Description and illustration: Constantinescu et al. (1995).

Notes: Based on both morphologic similarity and molecular phylogeny, *Chaetosphaeria pygmaea* is transferred into the new genus *Ejnerjensenia*. It seems to be no anamorph has been discovered from natural substrate, but is abundantly formed on CMA or MA from the single ascospore culture. The anamorph was carefully studied and compared with *Chloridium clavaeforme* (Preuss) W. Gams & Hol.-Jech. and *C. phaeophora* W. Gams (Constantinescu et al. 1995). The cup-shaped collarettes and dacryoid conidia with truncated base and rounded apex in *E. pygmaea* is very similar with the anamorph of *E. myriocarpa*.

Fuscatenula Réblová & A.N. Mill., MycoKeys 81: 31, 2021. MycoBank No: 839468

Colonies effuse, hairy, brown, mycelium partly immersed, partly superficial. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, erect, unbranched, brown to dark brown, thick-walled, paler and thinner-walled towards the apex. Conidiogenous cells integrated, terminal, monophialidic, extending percurrently, cylindrical to lageniform, brown; collarettes funnel-shaped, brown. Conidia cuneiform to obovoid, broadly rounded apically, truncate at the base, aseptate, hyaline when young, pale brown at maturity, with protracted maturation, smooth, formed in a basipetal chain.

Type species: *Fuscocatenula submersa* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & A.N. Mill.

Ecology/Substrate/Host: Saprobes on dead material of plant in terrestrial and freshwater environments.

Geographical distribution: China.

Description and illustration: Réblová et al. (2021d).

Notes: *Fuscocatenula* is a newly established genus as a segregate genus for two fungi distantly related from *Catenularia*, although morphologically similar (Réblová et al. 2021d). Conidia of *Fuscocatenula* are obovoid with a truncate base, lack an angular outline and small, circular, thin-walled pale areas in corners that are present in *Catenularia*. Conidia in these two accepted species have a protracted maturation; at first they are hyaline and only later become pale brown, while still attached in a chain. Sometimes the chain consists of hyaline conidia with only one or a few mature pigmented conidia (Li et al. 2017; Luo et al. 2019). While in *Catenularia*, conidia are also hyaline when young but mature soon and when released from the conidiogenous locus they are usually pigmented. Two species are accepted in the genus and both are reported from China, here we add another species and the DNA barcode is provided for *F. variegata*.

Key to known species of *Fuscocatenula*

1. Conidia 21–27 x 12–14 µm	<i>F. submersa</i>
1. Conidia less than 20 µm long	2
2. Conidia 8.5–11 x 5.5–7.5 µm	<i>F. variegata</i>
2. Conidia 10–15 x 5–5.5 µm	<i>F. bambusicola</i>

Fuscocatenula bambusicola W.P. Wu & Y.Z. Diao, sp. nov., Fig. 161, MycoBank MB841607.

Etymology: refers to the substrate from which this fungus was originally discovered.

Diagnosis: similar to *Fuscocatenula variegata* (conidia 8.5–11 x 5.5–7.5 µm) but differs in longer conidia.

Typification: China: Ningxia Province, Liupanshan, Liangdianxia, on dead culms of bamboo, 24 Aug. 1997, W.P. Wu (Holotype WFH Wu1182b).

Colonies effuse, sparse, brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2–3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, simple, erect, straight, smooth, dark brown at the base, becoming paler towards the apex, cylindrical, 5–7-septate, 100–220 x 4–6 µm wide, percurrently proliferating at the apex. Conidiogenous cells integrated, determinate, monophialidic, brown, smooth, 30–35 x 6–7 µm, with a funnel-shaped and pale brown collarette 4–5 µm deep and 4.5–5 µm wide at the distal end, phialides may proliferate 1–3 times through the collarette. Conidia develop singly and successively within the collarette to form a chain of up to 10 which readily secedes, smooth, narrowly cuneiform, brown, truncate at base, rounded at the apex, 10–15 µm long, 5–5.5 wide at the widest distal end, 3–4 µm wide at the flattened base.

Material examined: China: Ningxia Province, Jingyuan County, Liupan Mountain, Langtianxia, on dead culm of bamboo, 25 Aug. 1997, W.P. Wu (Wu1050a, Wu1187c); China: Ningxia Province, Liupanshan, Liangdianxia, on dead culms of bamboo, 24 Aug. 1997, W.P. Wu (Holotype WFH Wu1182b).

Ecology/Substrate/Host: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Notes: *Fuscocatenula bambusicola* W.P. Wu & Y.Z. Diao differs from other known species in the genus by conidial size (Réblová et al. 2021d). The conidia in *F. variegata* H.H. Li & X.G. Zhang is smaller (8.5–11 x 5.5–7.5 µm) than those in *F. bambusicola*; while the conidia in *F. submersa* (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & A.N. Mill. are much longer and wider (21–27 x 12–14 µm) (Luo et al. 2019).

Fuscocatenula submersa (Z.L. Luo, K.D. Hyde & H.Y. Su) Réblová & A.N. Mill., MycoKeys 81: 31, 2021.

Basionym. *Chaetosphaeria submersa* Z.L. Luo, K.D. Hyde & H.Y. Su, Fungal Divers. 99: 585. 2019.

Teleomorph: Unknown. Anamorph: Conidiophores 380–596(–691) µm long, 15–21 µm wide, erect, solitary, cylindrical, straight or slightly flexuous, unbranched, percurrently growing, 9–13-septate, brown to dark brown below, pale brown to subhyaline toward the apex, smooth. Conidiogenous cells monophialidic, percurrently proliferating, integrated, terminal, pale brown, cylindric-clavate. Conidia 21–27 x 12–14 µm, acrogenous, solitary, cuneiform, aseptate, guttulate, rounded at apex, truncate at base, hyaline when young, light brown at mature, smooth-walled.

Typification: China: Yunnan Province, Cangshan Mountain, saprobic on submerged decaying wood in freshwater stream, October 2016, Z.L. Luo, S-824 (MFLU 18–1616, holotype), ex-type living culture MFLUCC 18–1342.

Ecology/Substrate/Host: Saprobes on submerged decaying wood.

Geographical distribution: China.

Description and illustration: Luo et al. (2019).

Notes: *Chaetosphaeria submersa* Z.L. Luo, K.D. Hyde & H.Y. Su morphologically resembles members of *Catenularia* in producing cuneiform conidia. However, the conidia in this species have no blunt corners and germ pore when viewed from above, which is very characteristic in the genus *Catenularia*. Furthermore, phylogenetically *C. submersa* and members of *Catenularia* clearly belong to two very different phylogenetic groups.

Fuscocatenula variegata (H.H. Li & X.G. Zhang) Réblová & A.N. Mill., MycoKeys 31: 31, 2021. Fig. 162.

≡ *Catenularia variegata* H.H. Li & X.G. Zhang, Mycotaxon 132: 621, 2017.

Saprobic on decaying leaving. Colonies on the substratum effuse, dark brown, with chained conidia at the tip of conidiophores. Mycelium partly immersed, partly superficial, composed of branched septate, dark brown, smooth hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, solitary, cylindrical, straight, or slightly flexuous, unbranched, percurrently growing, smooth or verruculose, thick-walled, 5-10-septate, brown to dark brown below, pale brown towards the apex, 160-225 µm long, 4.5-7 µm wide at the widest part. Conidiogenous cells monophialidic, percurrently proliferating, integrated, terminal, pale brown to brown, cylindric-clavate, 33-35 x 5-5.5 µm, collarette 3-3.5 µm high, up to 4 µm wide. Conidia acrogenous, formed in long chain, cuneiform, aseptate, guttulate, rounded at apex, truncate at base, hyaline when young, light brown at mature, smooth- and thick-walled, 8-10 µm long, 5.8-6.2 µm wide at the widest part, 2-2.5 µm wide at the truncate base.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Typification: China, Fujian Province: Wuyishan, on dead stems of an unidentified broadleaf tree, 22 Apr. 2016, J.Y. Wang (Holotype, HSAUP H10178; isotype, HMAS 245641).

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, On dead leaves of palm, 25 Dec 2012, W.P. Wu (Wu12520). Living strain: CGMCC 3.20652 (=NN 55332) and 55381 (from Wu12520).

Ecology/Substrate/Host: Saprobes on dead material of plant, including palm.

Geographical distribution: China.

Description and illustration: Li et al. (2017).

Notes: *Fuscocatenula variegata* was originally described under *Catenularia* and was recently transferred into the new genus *Fuscocatenula*, based on its similarity to *F. submersa* on solitary conidiophores, terminal and monophialidic conidiogenous cells with broad collarette, and hyaline then brown conidia in chains (Li et al. 2017; Luo et al. 2019; Réblová et al. 2021d). It differs from *F. submersa* by large conidia (21-27 x 12-14 µm) in the latter species. The conidiophores, conidiogenous cells and conidia in our collection match the original description of *F. variegata*. The living strain was obtained from the fresh specimen, and the ITS bar code is provided here. On the phylogenetic tree, *F. submersa* is closely linked to *F. variegata*.

Fusichloridium W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841536

Etymology: Refers to its fusiform-shaped conidia.

Diagnosis: Similar to *Chloridium* but differs in producing both setiform and short conidiophores, and fusiform-shaped conidia which are slightly constricted in the middle. Phylogenetically they are also different.

Type species: *Chaetosphaeria fusiformis* W. Gams & Hol.-Jech.

Clones effuse, brown. Teleomorph: Ascomata perithecia, black, smooth-walled, shining, subglobose, ostiole conical, covered with conidiophores, without a basal stroma, walls consisting of numerous layers of thick-walled, pigmented cells. Paraphyses threadlike, soon evanescent. Asci cylindrical to somewhat fusiform, thin-walled, with a thin apical plate, with spores in 3-4 rows. Ascospores fusiform with a somewhat rounded upper end, mostly 3-septate, each cell 1-2 guttulate. Anamorph: Conidiophores forming two layers: the lower short conidiophores pale brown, cylindrical, 0-1 septate, sympodially or sometime percurrently proliferating, monophialidic or polyphialidic, funnel-shaped collarettes, with abundant whitish to yellowish sporulation; the upper with darker, thick-walled setiform conidiophores, septate, tapering towards the apex, terminating in a monophialidic conidiogenous cells with almost hyaline collarettes. Conidia in dry, star-like heads, cylindrical with tapering and rounded or truncate ends, centrally sometime slightly constricted, hyaline, aseptate, smooth-walled.

Fusichloridium fusiforme (W. Gams & Hol.-Jech.) W.P. Wu & Y.Z. Diao, comb. nov. MycoBank MB841727.

≡ *Chaetosphaeria fusiformis* W. Gams & Hol.-Jech., Mycotaxon 13:257, 1981.

≡ *Chaetosphaeria fusispora* W. Gams & Hol.-Jech., Stud. Mycol. 13: 45, 1976.
 = *Chloridium cylindrosporum* W. Gams & Hol.-Jech., Stud. Mycol. 13: 46, 1976.
 = *Chaetopsis cylindrospora* (W. Gams & Hol.-Jech.) DiCosmo, S.M. Berch & W.B. Kendr., Mycologia 75:962, 1983.

Typification: Czech Republic: Mor., Hruby Jeseník Mts., Mt. Mravenečník, on rotten branches of *Abies alba*, 3 Aug. 1971, PRM 794008 (Holotype).

Ecology/Substrate/Host: Saprobes on dead material of plant.

Geographical distribution: Czech Republic, Ukraine.

Description and illustration: Gams and Holubová-Jechová (1976, 1981); Réblová and Gams (1999).

Notes: *Fusichloridium* W.P. Wu & Y.Z. Diao is created to accommodate the unique fungus *Chaetosphaeria fusiformis* W. Gams & Hol.-Jech., which is phylogenetically distinct from *Chaetosphaeria innumera* Berk. & Broome ex Tul. & C. Tul., the type species of *Chaetosphaeria*. Morphologically they are also different on both teleomorph and anamorph. In *C. fusiformis*, the ascospores are fusiform to filiform, the conidiophores are two layers, and the conidia are in dry mass, cylindrical with tapering and rounded or truncate ends, centrally sometime slightly constricted. While in *C. innumera*, the ascospores are fusiform, the conidiophores are one layer, and the conidia are in slimy head or simple chains, elongate-ellipsoidal to cylindrical (Gams & Holubová-Jechová, 1976).

Nawawia Marvanová, Trans. Br. Mycol. Soc. 75: 227, 1980.

Colonies effuse, hairy, pale brown. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores cylindrical, single or in small groups, erect, straight, unbranched, or occasionally branched irregularly, thick-walled, smooth, medium to dark brown, becoming paler towards the apex, often proliferating percurrently, septate. Conidiogenous cells integrated, terminal, phialidic, medium brown, smooth, cylindrical, collarettes terminal, funnel-shaped, often proliferates with a new phialides. Conidia of two types: a) hyaline, aseptate, ellipsoid to oval, smooth, thin-walled, base truncate, apex rounded or occasionally with a short appendage, formed before the second type; b) hyaline, aseptate, smooth, thin-walled, turbinate to triangular-shaped, viewed from above the conidium is also triangular and from each corner of the triangle as a long, hair-like appendage, truncate.

Type species: *Nawawia filiformis* (Nawawi) Marvanová (≡ *Clavatospora filiformis* Nawawi)

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Broadly distributed.

Description and illustration: Marvanová (1980).

Notes: *Nawawia* was established by Marvanová (1980) based on *Clavatospora filiformis* Nawawi (Nawawi 1973); it is characterized by septate, macronematous conidiophores, terminal phialidic conidiogenous cells, and turbinate–tetrahedral to obpyramidal unicellular hyaline conidia with a filiform appendage at each blunt corner. Six species are known, and they are distinguished by a combination of conidial morphology, including shape, size and setulae (Nawawi 1973; Kuthubutheen et al. 1992, Hyde et al. 1996; Melnik and Hyde 2006; Crous et al. 2009; Goh et al. 2014a; Pent et al. 2016).

Chalarodes McKenzie, *Nawawia* Marvanová, and *Phialosporostilbe* Mercado & Portales are three dematiaceous hyphomycete genera with similar conidial morphology and conidiogenesis (Marvanová 1980; Mercado Sierra and Mena Portales, 1985; McKenzie 1991a; Kuthubutheen et al. 1992). They all have phialidic conidiogenous cells and hyaline, aseptate, tetrahedral to pyramidal conidia with 2–4 distal setulae, and sometime also a single basal setula. The chained conidia formed in single conidiophores in *Chalarodes* distinguish it from the other two genera, *Nawawia* and *Phialosporostilbe*. The two latter genera can be further distinguished by the solitary conidiophores in *Nawawia* and synnemata in *Phialosporostilbe*. Hyde et al. (1996) pointed out that *Phialosporostilbe* and *Nawawia* may be congeneric, and they placed a new synnematous *Phialosporostilbe*-like species into *Nawawia*, as *N. dendroidea* K.D. Hyde, Goh & T. Steinke. Bhat and Kendrick (1993) suggested that a reassessment of these genera is needed.

There are 8 published names under *Nawawia* Marvanová. Among them, *N. dendroidea* K.D. Hyde, Goh, & T. Steinke was transferred to *Phialosporostilbe* due to its synnematous conidiomata; *N. nitida* Kuthub., G.M. Liew & Nawawi was transferred into *Obeliospora* Kubuth. & Nawawi based on similarity on conidiogenous cells and conidia; and *N. malaysiana* Crous & S.S. Lee was transferred into a new genus *Neonawawia* J. Yang, K.D. Hyde & J.K. Liu based on the phylogenetic analysis. Other species, *N. antennata* Réblová, *N. filiformis* (Nawawi) Marvanová, *N. oviformis* J. Peng & Z.F. Yu, *N. quatrissetulata* Goh, Lau & K.C. Eteo and *N. sasae-kurilensis* Melnik & K.D. Hyde, are kept in the genus (Marvanová 1980; Kuthubutheen Liew & Nawawi 1992; Hyde et al. 1996; Cantillo-Pérez et al. 2017; Yang et al. 2018a).

Key to accepted species of *Nawawia*

1. Conidia oviform, 13–20 x 11–15 µm, bearing 1 apical, 4 lateral setulae 3–10 µm long.....*N. oviformis*
1. Conidia turbinate, triangular, tetrahedral, or lobbed, with only polar setulae only2

2. Conidia 4-5-lobed, 30-37 x 22.5-32.5 μm , with 4 apical setulae 30-57 μm long *N. quatrissetulata*
 2. Conidia not lobed, smaller in size 3
 3. Conidia round-tetrahedral, 10-14 x 8-11.5 μm , 3 apical setulae 4-6 μm long *N. sasae-kurilensis*
 3. Conidial setulae more than 10 μm ; conidia turbinate to triangular, obpyramidal 4
 4. Conidia 3 corners, 13-18 x 14-18 μm , 3 apical setulae 15-34 μm long *N. filiformis*
 4. Conidia (3-)4 corners, 14-17 x 11-14.5 μm ; setulae 14-43 μm long *N. antennata*

Nawawia filiformis (Nawawi) Marvanová, Trans. Br. Mycol. Soc. 75: 227 (1980).

= *Clavatospora filiformis* Nawawi, Trans. Br. Mycol. Soc. 61: 390 (1973).

Colonies effuse, hairy, pale brown. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae 2-3 μm wide. Teleomorph: Unknown. Anamorph: Conidiophores cylindrical, single or in small groups, erect, straight, unbranched, or occasionally branched irregularly, thick-walled, smooth, medium to dark brown, becoming paler towards the apex, often proliferating percurrently, 3-7 septate, 100-180 μm long, 4-4.5 μm wide. Conidiogenous cells integrated, terminal, phialidic, medium brown, smooth, cylindrical 17-50 μm long, 3.5-6.5 μm wide at the widest part, 3-4 μm wide just below the terminal collarette, collarettes terminal, funnel-shaped, 1.5-2 μm long, 3-5 μm wide at the tip, often proliferates with a new phialide. Conidia of two types: a) hyaline, aseptate, ellipsoid to oval, smooth, thin-walled, base truncate, apex rounded or occasionally with a short appendage, 7.5-12.5 x 3.5-6.5 μm , formed before the second type; b) hyaline, aseptate, smooth, thin-walled, turbinate to triangular-shaped, viewed from above the conidium is also triangular and from each corner of the triangle as a long, hair-like appendage, 10-25 μm long, base truncate, 13-18 μm long and 14-18 μm wide.

Material examined: China: Guangdong Province, Dinghushan, on rotten wood of unidentified plant, 10 Oct. 1998, W.P. Wu (Wu2069); China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2059); China: Guangxi, on dead branches of unidentified plant, 23 Dec 1997, W.P. Wu (Wu2088); China, Hainan Province, on dead branches, 20 Dec. 2000, W.P. Wu and Yan Huang (Wu5518).

Ecology/Substrate/Host: Saprobe on rotten wood and dead branches.

Geographical distribution: China, Malaysia, Thailand.

Description and illustration: Nawawi (1973); Wu & McKenzie (2003); Yang et al. (2018a).

Notes: Two types of conidia were also noted for *N. filiformis* in the original description; however, the two spore types were not found to be produced together (Marvanová 1980; Mercado Sierra & Mena Portales 1985; McKenzie 1991a; Kuthubutheen et al. 1992; Yang et al. 2018a). On natural substrate only b) spore was produced, while on 2% malt agar only the a) spore was formed. In some of our examined specimens collected from nature (Wu2088, Wu2069), both types of conidia were seen from spore head at the top of the same conidiogenous cell. While in other specimens only b) type of conidia were seen. Its affinity to Chaetosphaeriaceae has been confirmed by molecular phylogenetic analysis (Yang et al. 2018a).

Nawawia oviformis J. Peng & Z.F. Yu, Mycotaxon 132: 737, 2016.

Teleomorph: Unknown. Anamorph: Conidiophores arise from a small stromatic cushion, cylindrical, single, unbranched, erect, robust, thick-walled, smooth, dark brown, becoming paler towards the apex, 10-13-septate, 246-323 x 4-9 μm . Conidiogenous cells phialidic integrated, terminal, determinate, brown, 21-60 x 3.5-9 μm . Conidia oviform to somewhat globose, slightly truncate at the base, unicellular, smooth, hyaline, guttulate, 8-10.5 μm diam. 13-20 x 11-15 μm , with four equatorial filiform appendages and an apical filiform appendage, all 3-10 μm long.

Typification: China: Sichuan Province, Gaosun County, Damuling Mountain, 28°92'N 103°88'E, elev. 513 m, on submerged leaves of an unidentified dicotyledonous plant in a stream, July 2015, Z.F. Yu (Holotype, YMF 1.04361).

Ecology/Substrate/Host: Saprobe on submerged leaves.

Geographical distribution: China.

Description and illustration: Peng et al. (2016).

Notes: *Nawawia oviformis* J. Peng & Z.F. Yu is a recently described species from China and it is characterized by unique in oviform-shaped conidia (Peng et al. 2016). All other accepted *Nawawia* Marvanová species including the type species *N. filiformis* (Nawawi) Marvanová, *N. quatrissetulata* Goh, Lau & K.C. Tao and *N. sasae-kurilensis* Melnik & K.D. Hyde have round-tetrahedral or obpyramidal conidia that are distally 3-5-lobed and with 1 apical setula at each end (Melnik & Hyde 2006; Goh et al. 2014a). On the oviform-shaped conidia with lateral setulae, *N. oviformis* is closer to members of *Bahusutrabeja* Subram. & Bhat (Subramanian and Bhat 1977; Li et al. 2013). Its phylogenetic relationship remains to be explored when the living culture and DNA sequence are obtained from fresh collection.

Paragaeumannomyces Matsush., Matsush. Mycol. Mem. 10:156, 2003 (2001); Emend. Réblová & A. N. Miller, MycoKeys 74:34, 2020.

= *Obeliospora* Nawawi & Kuthub., Mycotaxon 37: 395, 1990

Teleomorph: Ascomata perithecial, non-stromatic, superficial, subglobose to conical, solitary, in small groups or aggregated, sometimes collapsing laterally upon drying, ranging from white, yellow-white, light fawn-grey, ginger-brown, reddish-brown, russet to dark brown, papillate, glabrous or setose, setae dark brown, acute, opaque, scattered over entire ascoma and/or clustered around the ostiole, centrum sometimes pink to pale red. Ostiole periphysate. Ascomatal wall three-layered; outer layer composed of thin-walled, globose, subglobose to polyhedral cells, sometimes containing pale purple pigment when fresh; middle layer composed of brick-like, dark brown cells with opaque walls; inner layer of flattened, thin-walled, subhyaline cells. Paraphyses persistent, branching, tapering. Asci unitunicate, 8-spored, cylindrical-fusiform, stipitate, apex with a non-amyloid apical annulus. Ascospores asymmetrical, cylindrical-filiform, slightly tapering towards the basal end, multiseptate, hyaline, occasionally light pink, with negative or positive dextrinoid reaction in Melzer's reagent. Anamorph: Colonies effuse, pale brown, sparse. Mycelium immersed or superficial, composed of pale brown, branched, smooth, septate hyphae. Setae sterile, simple, erect, straight, dark brown to blackish, thick-walled, smooth, septate, tapered gradually towards the acute to pointed apices, with inflated base. Conidiophores mononematous, semimacronematous to micronematous, brown, septate, unbranched or reduced to single conidiogenous cells. Conidiogenous cells phialidic, obclavate or broadly lageniform, doliiform, brown, with an apical opening; collarette conspicuously flared and cup-shaped. Conidia globose, subglobose, subangular to triangular, conical to pyramidal, unicellular, hyaline, furnished with several appendages formed simultaneously about the crown.

Type species: *Paragaeumannomyces sphaerocellularis* Matsush.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Broadly distributed.

Description and illustration: Nawawi and Kuthubutheen (1990); Matsushima (2001); Wu and McKenzie (2003); Huhndorf and Fernández (2005); Réblová et al. (2020).

Notes: Based on morphological and phylogenetic analysis, *Paragaeumannomyces* was proposed to accommodate the morphologically and phylogenetically well-delimited group of chaetosphaeriaceous fungi (14 species) with scolecosporous ascospores and *Obeliospora*-like anamorph (Réblová et al. 2020). Members of *Paragaeumannomyces* display a wide geographical distribution pattern; they have a predominantly pantropical distribution in Central America and Asia but were also encountered in the subtropical and temperate climate zones of Europe, China, Japan, Malaysia, New Zealand and North America (Huhndorf and Fernández 2005; Réblová et al. 2020).

Our phylogenetic analysis (Fig. 3, 154) shows that *Obeliospora minima* is closely related to all 14 species of *Paragaeumannomyces* Matsush., as emended by Réblová et al. (2020). This brought our attention on the teleomorph and anamorph connections between *Chaetosphaeria raciborskii* and related species with scolecosporous spores by Huhndorf and Fernández (2005). In that study, they described the *Craspedodidymum*-like anamorph for several species with scolecosporous ascospore, including *Chaetosphaeria ellisii* (Barr.) Huhndorf & F.A. Fernández, *Chaetosphaeria lapaziana* (Carroll & Munk) F.A. Fernández & Huhndorf, *Chaetosphaeria panamensis* Huhndorf & F.A. Fernández, *Chaetosphaeria raciborskii* (Penz. & Sacc.) F.A. Fernández & Huhndorf, and *Chaetosphaeria rubicunda* Huhndorf & F.A. Fernández. The so-called *Craspedodidymum*-like anamorphs from these species in pure culture produce simple phialidic conidiogenous cell on hyphae or dark brown conidiophore, flask-shaped to obclavate phialides with flared or cup-shaped collarette, and globose, subglobose or triangular conidia with or without elongate setulae. In *C. raciborskii*, the dark-colored setae were also observed. All these characters are very similar to those described in *Obeliospora* species (Kuthubutheen and Nawawi 1990, 1994; Wu and McKenzie, 2003; Cantillo-Pérez et al. 2017). The very similar conidiophores, conidiogenous cells and conidia are also reported from the Thailand strain of *P. panamensis* by Perera et al. (2016). Combined with morphology and molecular analysis, it is clear that *Obeliospora* and *Paragaeumannomyces* are congeneric. Although *Obeliospora* represents an earlier name for these fungi, we recommend using *Paragaeumannomyces* to avoid too many changes of names.

Obeliospora was erected by Nawawi & Kuthubutheen (1990) for a single dematiaceous hyphomycete species, *O. basispira* Nawawi & Kuthub., colonizing submerged decaying wood in a freshwater stream. The genus is characterized by presence of subulate setae; mononematous, solitary or grouped, pigmented conidiophores; terminate, integrated, enteroblastic, monophialidic, doliiform conidiogenous cells ending in conspicuously flared, cup-shaped collarettes; and acrogenous, semi-endogenous, hyaline, globose to subglobose phialoconidia furnished with several non-septate, filiform appendages formed simultaneously about the crown. *Obeliospora basispira*, *O. microappendiculata* Cantillo & Gusmão, *O. minima* W.P. Wu & McKenzie, *O. nitida* (Kuthub., G.M. Liew & Nawawi) Cantillo & Gusmão and *O. triappendiculata* Kuthub. & Nawawi are the only known species described so far in this genus (Nawawi and Kuthubutheen 1990, 1994; Wu and McKenzie, 2003; Cantillo-Pérez et al. 2018).

Key to known *Paragaeumannomyces* species known with only *Obeliospora* anamorph

1. Conidia without setulae or with very short setulae <5 µm long	2
1. Conidia with long setulae, longer than 5 µm	4
2. Setae absent; conidia 20-32 x 18-30 µm; appendage 0-3, 3-5 µm long	<i>G. microappendiculatus</i>
2. Setae present; conidia less than 15 µm wide	3
3. Conidia 11-13.5 µm wide, 10-12 µm high	<i>P. asetulus</i>
3. Conidia 8-9 µm wide, 6-9 µm high	<i>P. nawawii</i>
4. Setae absent; conidia round-tetrahedral or obpyramidal, 29-35 x 20-26 µm, setulae 38-74 µm long	<i>P. nitidus</i>
4. Setae present	5
5. Conidia 13-15 x 15-19 µm, with 4-8 setulae of 25-46 µm long	<i>P. basispirus</i>
5. Conidia with 3 setulae	6
6. Conidia 21-28 x 21-24 µm, setulae 44-55 µm long	<i>P. triappendiculatus</i>
6. Conidia 7-9 x 8-10 µm, setulae 7-12 µm long	<i>P. minimus</i>

Paragaemannomyces asetulus W.P. Wu & Y.Z. Diao, sp. nov., Figs. 165-166, MycoBank MB841608.

Etymology: refers to its conidia lacking setulae.

Diagnosis: Similar to *Paragaemannomyces minimus*, but differs in asetouse conidia

Typification: China: Guangdong Province, Dinghushan, on dead bark of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12131).

Colonies effuse, pale brown, sparse. Mycelium immersed or superficial, composed of pale brown, branched, smooth, septate hyphae 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Setae sterile, simple, erect, straight, dark brown to blackish, thick-walled, smooth, 1-2-septate near the base, tapered gradually towards the acute to pointed apices, 85-120 µm long x 4-5 µm wide, with inflated base 9-15 µm wide. Conidiophores absent or present then mononematous, occurring singly or in small groups, arising from aggregated hyphae, simple, flexuous, pale brown, smooth, thick-walled, 0-3 septate. Conidiogenous cells integrated, terminal, monophialidic, globose, 8.5-10 µm long, 8-9 µm wide, with cup-shaped collarette at the apex, 4-10 µm deep, 5-13 µm wide at the apex, 5.5-6 µm wide at the base, proliferating enteroblastically and producing several conidia sub-endogenously at the same level. Conidia acrogenous, solitary, dry, subglobose to napiform, smooth, hyaline, thin-walled, 11-13.5 µm wide, 10-12 µm high, no setulae.

Material examined: China: Guangdong Province, Dinghushan, on dead bark of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12131).

Ecology/Substrate/Host: Saprobe on decaying bark.

Geographical distribution: China.

Notes: *Paragaemannomyces asetulus* differs from other known species with *Obeliospora* anamorph by having conidia without setulae. In addition, its conidia are larger than those in *P. minimus* but significantly smaller than those in *P. basispirus* and *P. triappendiculatus* (Nawawi and Kuthubutheen 1990, 1994; Wu and McKenzie 2003; Cantillo-Pérez et al. 2017).

Paragaemannomyces basispirus (Nawawi & Kuthub) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841980.

≡ *Obeliospora basispira* Nawawi & Kuthub., Mycotaxon 37: 397, 1990.

Material examined: China: Guangdong Province, Dinghushan, on rotten wood of unidentified plant, 10 Oct. 1998, W.P. Wu (Wu2086); On dead branches, China: Hunan Province, Muang Shan, April 2002 W.P. Wu (Wu6082).

Ecology/Substrate/Host: Saprobe on submerged leaves.

Geographical distribution: China, Malaysia.

Description and illustration: Nawawi and Kuthubutheen (1990); Wu and McKenzie (2003).

Notes: *Obeliospora basispira* was described as a saprobe occurring on submerged decaying wood in a freshwater stream in Malaysia (Nawawi and Kuthubutheen 1990). The general appearance of this fungus from Chinese collection agrees well with the original description. However, most conidia have 9 appendages, while this was described as 6-8 in the type collection by Nawawi and Kuthubutheen (1990).

Paragaemannomyces microappendiculatus (Cantillo & Gusmão) W.P. Wu & Y.Z. Diao comb. nov., MycoBank MB841981.

≡ *Obeliospora microappendiculata* Cantillo & Gusmão, Nova Hedwigia 106:327, 2018.

Ecology/Substrate/Host: Saprobe on submerged leaves.

Geographical distribution: Brazil.

Description and illustration: Cantillo-Pérez et al. (2018).

Notes: *Paragaemannomyces microappendiculatus* differs from other described species by absence of setae, shorter conidial appendages, longer conidiophores and wider size range of conidiogenous cells and collarettes

(Cantillo-Pérez et al. 2017). The conidia of *P. microappendiculatus* have similar size with those of *P. triappendiculatus* (Kuthubutheen and Nawawi 1994) and also have three appendages but minor in length and hemiglobose in shape (conical to pyramidal in *P. triappendiculatus*).

Paragaeumannomyces minimus (W.P. Wu & McKenzie) W.P. Wu & Y.Z. Diao, comb. nov. Figs. 165-166, MycoBank MB841728.

≡ *Obeliospora minima* W.P. Wu & McKenzie, Fung. Diver. 12: 223, 2003

Colonies effuse, pale brown, sparse. Mycelium immersed or superficial, composed of pale brown, branched, smooth, septate hyphae 2-3 µm wide, loosely aggregated at the base of setae and conidiophores. Teleomorph: Unknown. Anamorph: Setae sterile, simple, erect, straight, dark brown to blackish, thick-walled, smooth, 1-septate near the base, tapered gradually towards the acute to pointed apices, 70-120 µm long x 4-5 µm wide, with inflated base 7-10 µm wide. Conidiophores absent or present then mononematous, occurring singly or in small groups, arising from aggregated hyphae, simple, rarely branched except occasionally at the base, flexuous, pale brown, smooth, thick-walled, 0-1 septate. Conidiogenous cells integrated, terminal, monophialidic, doliiform, 10-12 µm long, 6-8 µm wide, with cup-shaped collarette at the apex, 5-7 µm wide and 2.5-3 µm deep, proliferating enteroblastically and producing several conidia sub-endogenously at the same level. Conidia acrogenous, solitary, dry, conical to pyramidal, smooth, hyaline, thin-walled, 8-10 µm wide, 7-9 µm high and furnished with 3 thin, hyaline setulae 7-12 µm long. Conidium secession schizolytic.

On PDA, the fungus grows slowly and reach up to 1 cm in 20 days, effuse, hairy, with white grey to dark brown aerial hyphae, dark brown to black in the reverse side. From the aerial mycelium, abundant setae and conidiogenous cells are produced. Setae cylindrical, single or in clusters, straight or slightly flexuous, 2-4-septate, with obtuse or acute apex, (50-) 80-173 (-200) x 3-5 µm. The conidiogenous cells are directly formed from superficial hyphae or with 1-2 supporting cells, dark brown, doliiform, ellipsoid to subglobose, smooth-walled, 10-15 x 6-8 µm, sometimes with 1-2 percurrent proliferations, monophialidic, collarettes funnel-shaped, 5-7 µm wide, 3-4.5 µm deep; conidia varies a lot on shape, ellipsoid, conical to pyramidal, smooth, hyaline, 9-11 µm high, 7-9 µm wide, without setulae, or with 1-3 setulae and 2-4 µm long.

Material examined: China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 6 Oct. 1998, W.P. Wu, (Wu1924b); China: Guangdong Province, Dinghushan, on rotten wood in water, Oct. 9 1998, W.P. Wu (Wu4509); China: Guangdong Province, Guangzhou, Baiyunshan, on rotten wood of unidentified plant, 5 March 2012, W.P. Wu (Wu12055); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on decaying seed of unidentified tree, 17 Oct 2020, W.P. Wu (Wu17576, Wu17577); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on rotten wood, 2 Jan. 1997, W.P. Wu (Wu1268c Holotypus); China: Ningxia Province, Shiwandashan, on dead bark of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1594a). Living strain: 78408, 78519 and 78520 (from Wu17577).

Ecology/Substrate/Host: Saprobe on dead branches of plants.

Geographical distribution: China.

Description and illustration: Wu and McKenzie (2003).

Notes: *Paragaeumannomyces minimus* differs from the described species by its shorter conidiophores and its much smaller conidia with shorter appendages (Nawawi & Kuthubutheen, 1990; Kuthubutheen & Nawawi, 1994; Wu & McKenzie, 2003; Cantillo-Pérez et al. 2017). In *P. basispirus*, the conidiophores are well-developed with 3-5 septa, and conidia are larger (15-19 x 13-15 µm), subglobose to napiform, and furnished with 4-8 hair-like appendages up to 46 µm long. *P. triappendiculatus* (conidia 21-28 µm high, 21-24 µm wide, setulae 44-55 µm long) has similar conidial morphology to *P. minimus*, but it has longer setae, conidiophores, conidiogenous cells and conidia. Furthermore, the setae and conidiophores in *P. triappendiculatus* have more septa than those of *P. minimus*.

The living strain was obtained and studied from the freshmen Wu17577. The fungus on natural substrate is identical to the description from the type specimen. In pure culture, the fungus varies a lot on setae, conidiogenous cells and especially shape, size, and setulae of the conidia. Both ITS and LSU sequences were obtained from two single spore isolate and phylogenetic analysis showed that they are closely related to all members of *Paragaeumannomyces*.

Both LSU and ITS sequences were obtained from the type specimen and its phylogenetic affinity to *Chaetosphaeria* and other genera in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the collection Wu17577, the closest matches in NCBI's GenBank nucleotide database were members of *Paragaeumannomyces* and *Chaetosphaeria* in *Chaetosphaeriaceae*, including *Paragaeumannomyces panamensis* (GeneBank KY212752, identities 423/454 (93%), 2 gaps (0%)), *Paragaeumannomyces rubicunda* (GeneBank AY906954, identities 416/461 (90%), 4 gaps (0%)), *Paragaeumannomyces raciborskii* (GeneBank AY906953, identities 418/466 (90%), 9 gaps (1%)).

Paragaeumannomyces nawawii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 167, MycoBank MB841609.

Etymology: named after the mycologist A. Nawawi, who made great contribution to the dematiaceous phialidic fungi.

Typification: China: Guangdong Province, Guangzhou, South China Botanical Garden, on rotten palm material, 12 Dec 2013, W.P. Wu (Holotype WFH Wu12655).

Colonies effuse, pale brown, sparse. Mycelium immersed or superficial, composed of pale brown, branched, smooth, septate hyphae 2-4 μm wide. Teleomorph: Unknown. Anamorph: Setae sterile, simple, erect, straight, dark brown to blackish, thick-walled, smooth, 1-3-septate near the base, tapered gradually towards the acute to pointed apices, 60-105 μm long $\times$ 4-5 μm wide, with inflated base 10-13 μm wide. Conidiophores absent or present then mononematous, occurring singly or in small groups, arising from aggregated hyphae, simple, flexuous, pale brown, smooth, thick-walled, 0-2 septate. Conidiogenous cells integrated, terminal, monophialidic, globose, 7.5-10 μm long, 5.9-6.5 μm wide, with funnel-shaped collarette at the apex, 1-2.5 μm deep, 4-5 μm wide at the apex, 2.5-3 μm wide at the base, proliferating enteroblastically and producing several conidia sub-endogenously at the same level. Conidia acrogenous, solitary, dry, subglobose to napiform, smooth, hyaline, thin-walled, 8-9 μm wide, 6-9 μm high, no setulae or with very short appendage of 1-1.5 μm long.

Material examined: China: Guangdong Province, South China Botanical Garden, on rotten palm material, 12 Dec 2013, W.P. Wu (Holotype WFH Wu12655).

Ecology/Substrate/Host: Saprobe on rotten palm material.

Geographical distribution: China.

Notes: *Paragaeumannomyces nawawii* W.P. Wu & Y.Z. Diao and *P. asetulus* W.P. Wu & Y.Z. Diao are two species with similar conidial morphology, especially absence of setulae in conidia (Nawawi and Kuthubutheen 1990, 1994; Wu and McKenzie 2003; Cantillo-Pérez et al. 2018). *P. nawawii* is in general with smaller size in both conidiogenous cells and conidia than those in *P. asetulus*. In addition, very short appendages are found in some of the conidia in *P. nawawii*, while they are not seen in *P. asetulus*.

Paragaeumannomyces nitidus (Kuthub., G.M. Liew & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841982.

$\equiv$ *Obeliospora nitida* (Kuthub., G.M. Liew & Nawawi) Cantillo & Gusmão, Nova Hedwigia 106:329, 2017. [MB#820846]

$\equiv$ *Nawawia nitida* Kuthub., G.M. Liew & Nawawi, Can. J. Bot. 70:96, 1992. [MB#359496]

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen et al. (1992).

Notes: Cantillo-Pérez et al. (2017) considered the shape (doliiform, with distinctly flared, conspicuous, cup-shaped collarettes) of conidiogenous cell morphology as an effective diagnostic feature to distinguish *Nawawia* and *Obeliospora*, and transferred *N. nitida* Kuthub. to the latter genus (Nawawi 1973; Marvanová 1980; Goh et al. 2014a). *P. nitidus* differs from other known *Obeliospora* species by lacking setae, and relatively larger conidia with longer appendages (Kuthubutheen and Nawawi 1991; Kuthubutheen et al. 1992; Wu and McKenzie 2003; Cantillo-Pérez et al. 2017).

Paragaeumannomyces triappendiculatus (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841729.

$\equiv$ *Obeliospora triappendiculata* Kuthub. & Nawawi, Mycol. Res. 98:678, 1994.

Typification: Malaysia: Pahang, Tasik Cini, on rotten branches, July 1991, A.J. Kuthubutheen, IMI355822 (Holotype).

Ecology/Substrate/Host: Saprobe on submerged leaves.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen & Nawawi (1994).

Notes: *Paragaeumannomyces triappendiculatus* (conidia 21-28 μm high, 21-24 μm wide at the widest points; setulae 44-55 μm long) resembles *P. minimus* (conidia 8-10 μm high, 7-9 μm wide at the widest points; setulae 7-12 μm long), but differs on size of conidia and conidial setulae (Kuthubutheen and Nawawi 1994; Wu and McKenzie, 2003; Cantillo-Pérez et al. 2017).

Cryptophiale and related genera with lateral or intercalary phialides

Most of the 91 accepted chaetosphaeriaceous genera produce unbranched conidiophores with terminal conidiogenous cells, while only a few genera are with branched conidiophores and lateral or intercalary conidiogenous cells. These genera are *Brachydictyoachaeta*, *Codinaeopsis*, *Cryptophiale*, *Cryptophialoidea*, *Dictyoachaetopsis*, *Chloridium*, *Menispora*, *Kionochaeta*, *Kionochaetiella*, *Paraceratocladium*, *Paracryptophiale*, *Zanclospora*, and several known *Chaetosphaeria* species.

Phylogenetically all these genera are well-defined monophyletic genera, however they are polyphyletic and distributed in five different clades in the phylogenetic trees (Fig. 3, Fig. 168). Species of *Dictyoachaetopsis* and

Codinaeopsis are grouped together with *Codinaea* without or with setae, and they were dealt together with *Codinaea*. Several *Chloridium* species with branched conidiophores are congeneric with non-branched *Chloridium* species and clustered together with *Sporoschisma*. Species of *Menispora* and *Arcuatosporea* showed a close phylogenetic relationship. Species of *Brachydictyoachaeta*, *Kionochaeta* and *Sporendocladia* are closely related to true *Chaetosphaeria* and *Dictyoachaeta* species; and all other genera (*Cryptophiale*, *Cryptophialoidea*, *Paraceratocladium*, *Paracryptophiale*, *Zanclospora*), together with several other branched or non-branched genera (*Aunstrupia*, *Conicomycetes*, *Linkosia*, *Morrisiella*, *Riisgaardia*, some *Chaetosphaeria* with branched conidiophores), formed an independent phylogenetic group with strong bootstrap support value. Some of these genera, such as *Brachydictyoachaeta*, *Chloridium*, *Codinaeopsis* and *Dictyoachaetopsis*, are dealt in other sessions, while all other genera are described and illustrated in this chapter.

Morphologically most of these genera are also well-delimited by a combination of setae, conidiophores, conidiogenous cells and conidia. The living strains of many studied species were also studied on PDA (Fig. 169), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to all genera with lateral or intercalary conidiogenous cells

1. Phialides always integrated in the conidiophores, apical 2
1. Phialides always borne laterally on conidiophores, in whorls, singly or on short branches, sometimes incorporated in the conidiophores, apical or intercalary 3
2. Conidia cylindrical, formed in chain.....*Sporendocladia*
2. Conidia ellipsoid, subglobose, formed in wet spore mass *Chloridium**
3. Conidiophores adhering and twining around the setae; conidiogenous cells mostly intercalary 4
3. Conidiophores not adhering and twining around the setae; conidiogenous cells terminal 5
4. Setae branched, conidia obclavate *Paraceratocladium*
4. Setae unbranched, conidia cylindrical with rounded apex *Paraceratocladia*
5. Conidia forming at multiple conidiogenous loci with the collarette, hyaline or pale brown, short ellipsoid, aseptate; phialides in whorls or single *Chloridium**
5. Conidia forming at a single conidiogenous locus without the collarette 6
6. Phialides borne singly, on 1-3 supporting cells or on short branches of the conidiophores, collarette inconspicuous or strongly recurved toward the conidiophore axis; conidia hyaline, oblong, fusiform, with or without setulae, 0-3-septate *Menispora*
6. Apex of the phialide not strongly recurved toward the conidiophore axis 7
7. Phialides in palisade along the main axis of the conidiophores 8
7. Phialides not in a palisade 10
8. Collarettes inconspicuous; phialides arising around the whole conidiophore, surrounded by a shield-like aggregation of sterile cells 9
8. Collarettes distinct; phialides formed in a palisade or small bundles on one side of the conidiophores, no shield-like structure present *Cryptophialoidea*
9. Conidia dictyosporous with both transversely and longitudinal septa, ellipsoid, apical cell with a single apical appendage *Paracryptophiale*
9. Conidia aseptate or with transversely septa only, various in shape from falcate, fusiform, cylindrical, to globose, without or with appendage *Cryptophiale*
10. Phialides exclusively borne singly or in whorls along the main axis of conidiophore or its branches; conidiophore branched or unbranched; conidia hyaline, various in shape 11
10. Phialides borne on branches or rarely singly 12
11. Phialides exclusively borne singly or in whorls along the main axis of conidiophore or its branches; conidiophore branched or unbranched; conidia hyaline, various in shape *Zanclospora*
11. Phialides borne singly along the main axis of conidiophores or directly from superficial hyphae; setiform conidiophores with swollen apex; conidia falcate *Brachydictyoachaeta*
12. Conidiophores not setiform, branched; Conidia short ellipsoidal, aseptate; phialides arising in whorls along the conidiophore or on its verticillate branches *Phaeostalagmus*
12. Conidiophores setiform, branched, fertile or sterile at apex 13
13. Phialides born on single or poorly branched conidiophores; Conidia falcate or fusiform, symmetrical, or asymmetrical, +/- setulae *Codinaeopsis/Dictyoachaetopsis*
13. Phialides on closely or loosely packed branches along the main axis of conidiophores; conidia fusiform, falcate, rod-shaped, without setulae 14
14. Conidiophores branches or unbranched; phialides on closely packed branches along the main axis of conidiophores; conidia fusiform, falcate, lunate *Kionochaeta*
14. Conidiophores unbranched; phialides irregularly distributed along the main axis of conidiophores, loosely borne; conidia rod-shaped *Kionochaetiella*

(* only some of *Chloridium* are with branched conidiophores)

Cryptophiale Piroz., Can. J. Bot. 46: 1123, 1968

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, curved towards the apices, unbranched, dark brown, smooth, thick-walled, septate, bulbous to irregular at the base, tapered gradually towards the fertile region. Fertile region subapical or apical, cylindrical, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidiogenous event no. 15 ('phialidic') (Kirk et al., 2001). Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, smooth, aseptate or septate, clavate, uncinata, filiform, cylindrical, falcate, subulate, fusiform, globose to subglobose, with or without apical appendage.

Type species: *Cryptophiale kakombensis* Piroz.

Ecology/Substrate/Host: Saprobe on decaying plant material of many different plant species.

Geographical distribution: Broadly distributed, especially in subtropical and tropical areas.

Description and illustration: Pirozynski (1968); Ellis (1976).

Notes: *Cryptophiale* Piroz. was introduced by Pirozynski (1968) to accommodate *C. kakombensis* Piroz. and *C. udagawae* Piroz. & Ichinoe, both of which have setiform, simple or apically branched conidiophores and lateral 'phialidic' conidiogenous cells, which are shielded by a plate of modified cells and hyaline, aseptate or septate conidia formed in a slimy mass. *Cryptophiale* is most similar to *Cryptophialoidea* Kuthub. & Nawawi and *Paracryptophiale* Kuthub. & Nawawi. It differs from *Paracryptophiale* by dictyospores in the latter genus; differs from *Cryptophialoidea* by its conidiogenous cells encircling the conidiophores, protected by shield cells, while they are on one side of the conidiophore and are not covered by sterile shield cells in the latter genus (Whitton et al. 2012).

A lot of 21 species have been described under the genus, and these species are with similar setiform conidiophores and conidiogenous cells, but vary a lot in morphology of setiform conidiophores and conidia (shape, size and septation) which are often used for distinguishing different species (Pirozynski 1968; Kuthubutheen and Sutton, 1971, 1975, 1985; Sutton and Hodges 1977; Farr 1980; Kuthubutheen 1987; Sutton et al. 1989; Bhat and Kendrick 1993; McKenzie 1993a, b; McKenzie and Kuthubutheen 1993; Goh and Hyde 1996b; Umali et al. 1999). Among them, two species *C. secunda* Kuthub. & B. Sutton and *C. manifesta*, were transferred into *Cryptophialoidea* (Kuthubutheen and Nawawi 1987, 1994). The genus *Cryptophiale* was also reviewed by Goh and Hyde (1996a) who accepted 16 species. Keys to distinguish them were provided by Farr (1980), Kuthubutheen (1987), Sutton et al. (1989), and Goh and Hyde (1996b).

Hyde et al (1999) connected two *Cryptophiale* species with their *Chaetosphaeria* teleomorph, *Cryptophiale* cf. *udagawae* Piroz. with *Chaetosphaeria hongkongensis* K.D. Hyde, Goh, J.E. Taylor & J. Frohl., *Cryptophiale kakombensis* Piroz. with *Chaetosphaeria saltuensis* K.D. Hyde, Goh, J.E. Taylor & J. Frohl. These connections were just based on observation of co-occurrence of both anamorph and teleomorph on the same specimen, rather than pure culture study. However, recent molecular studies based on rDNA analysis of *C. udagawae* and *C. hamulata* Whitton, K.D. Hyde & McKenzie clearly show that the genus *Cryptophiale* belongs to Chaetosphaeriaceae (Hyde et al., 2018; Yang et al., 2018a). Although many of them seem to be culturable, few species have living strains available for molecular study and this is needed to further clarify their phylogenetic relationship.

In our phylogenetic analysis (Fig. 3 and Fig. 335), all studied species under *Cryptophiale* Piroz., *Cryptophialoidea* Kuthub. & Nawawi and *Paracryptophiale* Kuthub. & Nawawi are clustered together with strong support and this is aligned with the previous studies (Yang et al. 2018a; Ling et al. 2019). The species included in the analysis are *Cryptophiale fruiticetum* Whitton, McKenzie & K.D. Hyde, *C. guadalcanalensis* Matsush., *C. kakombensis* Piroz., *Cryptophialoidea fasciculata* Kuthub. & Nawawi and *Paracryptophiale pirozynskii* W.P. Wu & McKenzie. From the analysis it is clear that all these anamorphic fungi are phylogenetically not related to *Chaetosphaeria*. This support to maintain the genus *Cryptophiale* and *Paracryptophiale* as separate genera. The distinction among *Cryptophiale* and *Cryptophialoidea* is poorly supported from our phylogenetic analysis. In contrast to the molecular analysis, these genera are morphologically well defined and can be easily distinguished. *Cryptophialoidea* differs from *Cryptophiale* in having obvious monophialidic conidiogenous cells arranged only on one side of the conidiophore and not covered by a shield of sterile cells (Kuthubutheen and Nawawi 1987; Whitton et al. 2012). *Paracryptophiale* resembles *Cryptophiale* in having setiform conidiophores and typical *Cryptophiale*-like conidiogenous cells aggregated into a fertile region with shield cells, but differs by the dictyosporous conidia by *Paracryptophiale*, and the separation of them as two distinct genera is also supported in the phylogenetic analysis (Kuthubutheen and Nawawi 1994a; Wu and McKenzie, 2003).

A significant number of species have been already known under these genera, and future molecular study with inclusion of more these species will support to clarify their phylogenetic relationship and delimitation of generic concept (Goh and Hyde 1996b; Delgado et al, 2005; Marques et al. 2008; Wu and McKenzie 2003; Whitton et al. 2012; Yang et al. 2018a).

Species of *Cryptophiale* are commonly found all over the world on different plant litter, including leaf litter, bark, decaying seed, rotten wood, and dead branches. Some species are also aquatic and found from submerged wood (Lu et al. 2000). Several species have been recorded in China, including Hong Kong and Taiwan. The living strains of many studied species were also studied on PDA (Fig. 336), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to species of *Cryptophiale* (C.), *Cryptophialoidea* (Cr.) and *Paracryptophiale* (P.) (revised after Goh and Hyde 1996b; Delgado et al. 2005; Marques et al. 2008; Whitton et al. 2012).

1. Conidiophore apex branching	2
1. Conidiophore apex simple or rarely 1-times dichotomous	6
2. Conidia 1-2-septate, 28-32 x 2-3 µm, apex tapered to a 10-18 µm appendage; conidiophore 1-3 times dichotomous	<i>C. cucullata</i>
2. Conidia 1-septate	3
3. Conidiophores surrounded by shorter (95-145 µm), 3-7 times dichotomously branched, sterile setae; conidia 14-24 x ±1.5 µm, tapered to a narrow apex; conidiophores 1-2 times dichotomous	<i>C. fruticetum</i>
3. Conidiophores not surrounded by sterile setae	4
4. Conidiogenous cells not encircling the conidiophores; conidia 18.5-22.5 x 1-1.5 µm, falcate, 1-septate; conidiophores 1-3 times dichotomous	<i>Cr. ramosa</i>
4. Conidiogenous cells encircling the conidiophores	5
5. Conidia 15-25 x 1.5-3 µm, falcate and tapered to a short narrow appendage, 1-septate; conidiophores up to 250 µm long, 1-3 times dichotomous	<i>C. udagawae</i>
5. Conidia 16-24 x 1.3-2 µm, falcate tapered to an obtuse apex, 1-septate; conidiophores up to 240 µm long, 1-2 times dichotomous	<i>C. guadalcanalense</i>
6. Conidia dictyosporous	7
6. Conidia not dictyosporous	8
7. Conidia 15-20 x 8.5-11.5 µm, with apical appendage up to 12.5 µm long; conidiophores intermixed with sterile setae	<i>P. pirozynskii</i>
7. Conidia 28-35 x 14-16 µm, with apical appendage 4-6 µm long; no setae	<i>P. kamaruddinii</i>
8. Fertile regions with lateral branches	9
8. Fertile regions without lateral branches	10
9. Fertile region subapical, lateral branches 30-45 µm long, gently incurved, smooth; conidia falcate, aseptate, 9-14 x 1.5-2 µm	<i>C. apicalis</i>
9. Fertile region median, lateral branches 45-90 µm long, distinctly curved, coarsely verrucose; conidia falcate, aseptate, 9-12 x 1.5-2 µm	<i>C. verrucosa</i>
10. Conidia more than 1-septate	11
10. Conidia aseptate or 1-septate	13
11. Conidia elongate-filiform, 7-10-septate, 72-95 x 2.5-3 µm; fertile region subapical; conidiophores up to 360 µm long	<i>C. pandanicola</i>
11. Conidia less than 70 µm long	12
12. Conidia elongate fusoid, 3-8-septate, 30-62 x 2.5-4 µm; fertile region subapical; conidiophores up to 450 µm long	<i>C. multiseptata</i>
12. Conidia elongate fusoid, 4-7-septate, apex tapered to a narrow appendage, 55-67 x 7.5-9 µm; fertile region apical to subapical; conidiophores up to 240 µm long	<i>C. enormis</i>
13. Conidia aseptate	14
13. Conidia 1-septate	16
14. Conidia globose to subglobose, 1.5-2 µm diam., fertile region subapical; conidiophores 69-100 µm long	<i>C. sphaerospora</i>
14. Conidia not globose	15
15. Conidia filiform, curved, 5.5-12 x ±0.25 µm; fertile region median; conidiophores up to 175 µm	<i>C. pusilla</i>
15. Conidia fusoid, apex tapered to a narrow, curved appendage (10-25 µm), 20-28 x 4-4.25 µm; fertile region apical; conidiophore up to 230 µm long	<i>C. caudata</i>
16. Fertile region extending to apex; conidia fusoid, ends rounded, 9.5-18 x 2-2.25 µm	<i>C. novae-caledoniae</i>
16. Always with part of the conidiophore apex extending beyond the fertile region	17
17. Fertile region subapical	18
17. Fertile region median	22
18. Conidia falcate, both ends attenuated and acute, 22-27.5 x 1.7-2 µm; conidiophores up to 260 µm long	<i>C. kakombensis</i>
18. Conidia base rounded, tapered towards the apex	19
19. Conidia more or less cylindrical and straight, 14-26.5 x 1.5-2.5 µm; conidiophores up to 470 µm long	<i>C. orthospora</i>

19. Conidial apex distinctly curved	20
20. Conidia cylindrical, tapering towards the apex, both ends obtuse, apex strongly curved to hooked, 14-23 x 1.5-2 µm; conidiophores up to 200 µm long	<i>C. iriomoteanum</i>
20. Conidia with apical appendage	21
21. Conidia fusoid, apex attenuated to a narrow, flexuous appendage (7-12 µm), 23-27 x 2-3 µm; conidiophores up to 425 µm long	<i>C. aristata</i>
21. Conidia falcate, apex attenuated to a narrow, strongly curved to hooked appendage, 14-24 x 1.5-2; conidiophores up to 235 µm long	<i>C. hamulata</i>
22. Conidiogenous cells encircling the conidiophores	23
22. Conidiogenous cells not encircling the conidiophores	25
23. Conidiogenous cells with clearly visible funnel-shaped collarettes; conidia falcate, base obtuse, apex tapered and acute 22-29 x 1.5-2 µm; conidiophores up to 270 µm long	<i>Cr. fasciculata</i>
23. Conidiogenous cells without visible funnel-shaped collarettes	24
24. Fertile region below median, conidiophores extending 100-245 µm beyond the fertile region; conidia falcate, acute at the apex, obtuse at the base, 12-16.5 x 1-1.5 µm	<i>C. insularis</i>
24. Conidia fusoid to falcate, base acute or rounded, apex acute, straight or curved, 12-16 x ±1.2 µm; conidiophores extending 18-32 µm beyond the fertile region	<i>C. minor</i>
25. Conidia falcate, base acute, apex attenuated and strongly curved or hooked, 28-35 x ±1.2 µm; conidiophores up to 300 µm long	<i>Cr. uncispora</i>
25. Conidia not hooked at the apex	26
26. Conidia falcate, both ends acute, 20-27 x 1.5-2.5 µm; conidiophores up to 260 µm	<i>Cr. secunda</i>
26. Conidia straight or falcate, 22-27 x 1.5-2 µm; conidiophores up to 250 µm	<i>Cr. manifesta</i>

Cryptophiale aristata Kuthub. & B. Sutton, Trans. Br. Mycol. Soc. 84: 303, 1985.

Teleomorph: Unknown. Anamorph: Conidiophores subulate, dark brown, smooth, thick-walled, septate, solitary, setiform, simple, 260-390 µm long, 8-10 µm wide towards the base, 6.5-8 µm wide towards the apex, conidiogenous zone at about the upper third of conidiophore, conidiophore scarcely extending (6-8 µm) beyond the conidiogenous zone, fertile zone more or less cylindrical 55-93 µm long consisting of two rows of phialides one on each side of the conidiophore and obscured by a shield of sterile, flat, lobed, pale brown cells 5-7 x 2-3 µm, 6-9-septate in fertile region, 5-6-septate in non-fertile region. Conidiogenous cells monophialidic, discrete, in rows, obscured by a shield of sterile cells, determinate, subspherical or lageniform. Conidia hyaline, smooth, 1-septate, simple, semi-endogenous, somewhat fusiform, 18-24 x 1.2-1.5 µm.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, China, Malaysia.

Description and illustration: Kuthubutheen and Sutton (1985); Whitton et al. (2012).

Notes: No specimen was examined by us and the above description is based on the documentation by Whitton et al. (2012). The fungus was reported on decaying leaves of *Pandanus tectorius* from Hong Kong (Whitton 1999; Whitton et al. 2012). No living strain is available for phylogenetic study.

Cryptophiale fruticetum Whitton, McKenzie & K.D. Hyde, Fungal Diversity Series 22: Fungi Associated with Pandanaceae: 172, 2012. Fig. 170

Colonies effuse, hairy, conspicuous, consisting of tall, dichotomously branched, fertile setiform conidiophores, surrounded by short, sterile, dichotomously branched setae. Teleomorph: Unknown. Anamorph: Setae solitary, scattered, shorter than the fertile conidiophores, smooth, brown or fading slightly towards the apices, consisting of a cylindrical to slightly tapered stem and a 3-7 dichotomously branching head, stem 2-4-septate, thickened walls and septa, tapering towards acute apices in the branching region, basal cell bulbous and often forms a knot with the superficial hyphal tissue, always sterile, overall length 95-145 µm, 4-5.2 µm wide towards the base, 3.5-4.2 µm wide at the neck. Conidiophores solitary, scattered, macronematous, mononematous, erect, typically straight, sometimes curved or flexuous, dark brown to very dark brown, smooth, thickened walls and septa, 135-230 µm long between the base and the fertile region, 4-6 septa below the fertile region, cell length below the fertile region 16-45 µm, basal cell bulbous and surrounded by a knot of hyphal tissue, dichotomously branching towards the apex and generally above the fertile region, 1-2 dichotomous divisions, cylindrical or slightly tapering towards the apex, tapering to acute apices in the branching portion, overall length 205-300 µm, 6-8 µm wide towards the base. Fertile region subapical, cylindrical, 44-72 µm long, 12-14 µm wide, advancing partially up the first dichotomous division, the remainder of the branching apex projects above the fertile region, cell length 4.5-10 µm, 5-7 µm wide at the neck. Conidiogenous cells polyphialidic, comprising a series of H-shaped cells which branch, and clasp around the conidiophores, each H-cell generally producing 8 phialides, 4 clasping each side, 6-9 H-cells per fertile region, no septa visible in H-cells, H-cells arising from a single, small, clearly visible pore on one side of the conidiophore, pores situated centrally on the conidiophore cells. Conidia 14-24 x ±1.5 µm, hyaline,

smooth, falcate, aseptate, aggregated into slimy masses, distal end narrower and drawn into a short appendage, basal end obtuse

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey to grey brown, reverse brown to dark brown.

Typification: China: Hong Kong, Hong Kong Island, Pokfulam, in forest off Hatton Road above Hong Kong University, on decaying leaves of *Pandanus furcatus*, 25 August 1997, S.R. Whitton HKU(M)12898 (IFRD9007, holotype)

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Wu17557, Wu17558, Wu17591); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of unidentified tree, 25 Dec. 2012, W.P. Wu (Wu12473); China: Guangxi Province, Shangsi, Shiwandashan, on dead leaves of ?*Magnolia* sp., 2 Jan 1998, W.P. Wu (Wu1941a); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of ?*Acer* sp., 2 Jan. 1997, W.P. Wu (1313c); China: Guangxi Province, Shangsi, Shiwandashan, On dead leaves of unidentified tree, 2 Jan 1998, W.P. Wu (Wu1337g, 1337i). Living strain: 42861 (from Wu1337g); 43035 and 43158 (from Wu1491a), 43148 (from Wu1337i), 44035 (from Wu1601a), 55340 (from Wu12473); 78386 and 78405 (from (Wu17558), 78391 and 78392 (from Wu17591),

Ecology/Substrate/Host: Saprobe on dead material of plants, including *Pandanus furcatus*.

Geographical distribution: China.

Description and illustration: Whitton et al. (2012).

Notes: This species, originally described from decaying leaves of *Pandanus furcatus* Hong Kong, resembles *C. udagawae* in conidiophore, fertile region, and conidiophore branching (Goh and Hyde 1996a). However, conidial size differs slightly (20-35 x 1.5-3 µm, *C. udagawae*). The most striking difference between *C. fruticetum* and all previously reported species of *Cryptophiale* is the presence of true, sterile setae which are scattered around the base of the fertile setiform conidiophores (Whitton et al. 2012).

The LSU and ITS sequences were for the first time obtained from several strains of this species and its phylogenetic affinity to *Cryptophiale* in Chaetosphaeriaceae was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu15778, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Kionochaeta ivoriensis* (GeneBank NR160149, identities 430/480 (90%), 12 gaps (2%)), *Cryptophialoidea fasciculata* (GeneBank MH758195, identities 430/483 (89%), 13 gaps (2%)), *Cryptophiale udagawae* (GeneBank MW133882, identities 434/485 (89%), 26 gaps (5%)).

***Cryptophiale guadalcanalensis* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 15, 1971.**

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae, 1.5-2 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight or flexuous, sub-fasciculate, arising singly from flat, conical, swollen basal cells up to 18 µm wide, thick- and smooth-walled, dark brown, 8-13-septate, 160-220 µm long and 6-9 µm wide; tapered gradually towards the fertile region, finally abruptly tapered to an acute apex, which is 1-2 times dichotomously furcated. Branches slightly paler in color, acutely pointed above. The setiform axis of the conidiophores typically remain sterile in the lower part and at the furcated apex, but the upper one-half or one-third becomes fertile and modified into a complicated conidiogenous apparatus. Fertile region subapical, cylindrical, 60-750 x 14-16 µm, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, smooth, 1-septate, narrowly spindle-shaped, falcate, 16-24 x 1.3-2 µm, with the basal end rounded and the apex acute but without appendage.

Colonies on PDA effuse, colonies 0.8-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Zhejiang Province, Huaan County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16067); China: Hainan Province, Sanya, Yangtaishan, on dead leaves of unidentified tree, 28 Dec. 2020, W.P. Wu (Wu17646, 17647, Wu17649). Living strain: 76456 (from Wu16067), 78468, 78469, 78470 and 78530 (from Wu17647); 78472 and 78473 (from Wu17649), 78509, 78528 and 78529 (from Wu17646).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, China, Malaysia.

Notes: *Cryptophiale guadalcanalensis* was originally described from decaying leaves from Guadalcanal Island and it differs from the most closely related species *C. udagawae* by conidia without apical appendage (Matsushima 1971; Kuthubutheen and Sutton 1985; Marques et al. 2008). On the examined specimen Wu16067, the setiform conidiophores and conidia are aligned in the original description. Its occurrence on *Rosa chinesis* in China was reported by Ma et al. (2010), who reported the branched setae, and 1-septate, subulate and non-appendaged conidia (setae 185.5-211.5 x 7.5-9 µm, fertile region 60-75 x 15-15.5 µm, conidia 17-25 x 0.5-2.5 µm).

The LSU and ITS sequences were for the first time also obtained from the single spore isolate of this species and its phylogenetic affinity to *Cryptophiale* in Chaetosphaeriaceae was confirmed. Phylogenetically, on a

megablast search using the ITS sequence from the specimen Wu16067, the 17389 closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Cryptophiale udagawae* (GeneBank MW133882, identities 440/492 (89%), 22 gaps (4%)), *Cryptophialoidea sasciculata* (GeneBank MH758195, identities 429/487 (88%), 24 gaps (4%)), *Kionochaeta ivoriensis* (GeneBank NR160149, identities 434/501 (87%), 35 gaps (6%)).

Cryptophiale iriomoteanum Matsush., *Icones Microungorum a Matsushima Lectorum*: 41, 1975.

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight, or flexuous, subfasciculate, arising singly from flat, conical, swollen basal cells, thick- and smooth-walled, dark brown, 9-12-septate, tapered gradually towards the fertile region, finally abruptly tapered to an acute apex, 130-185 x 4.5-7.5 μm . The setiform axis of the conidiophores remain sterile in the lower part, but the upper one-third or more becomes fertile and modified into a complicated conidiogenous apparatus. Fertile region subapical, cylindrical, 40-90 x 13-16.5 μm , the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, narrowly obclavate, apex uncinata, smooth, 1-septate, 9.5-22 x 1.0-3.5 μm .

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Japan.

Description and illustration: Matsushima (1975); Ma et al. (2015).

Notes: No specimen was examined by us and the above description is based on description provided by Ma et al. (2010, 2015). *Cryptophiale iriomoteanum* differs from other known species by its unbranched setiform conidiophores and 1-septate, narrowly obclavate conidia with uncinata apex (Matsushima, 1975). Its occurrence on submerged wood in a stream was reported in Hong Kong (Lu et al. 2000). Ma et al. (2010) reported this species on dead branches of *Rosa chinensis* from mainland China.

Cryptophiale kakombensis Piroz., *Can. J. Bot.* 46: 1124, 1968.

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae, 1.5-2 μm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight or flexuous, subfasciculate, arising singly from flat, conical, swollen basal cells up to 20 μm wide, thick- and smooth-walled, dark brown, xx-septate in the basal part of the non-fertile region, tapered gradually towards the fertile region, finally abruptly tapered to an acute apex, 170-230 x 6-7 μm . The setiform axis of the conidiophores typically remain sterile in the lower part, but the upper one-third or more becomes fertile and modified into a complicated conidiogenous apparatus. Fertile region subapical, cylindrical, 83-100 x 15-20 μm , the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, lunate, falcate, smooth, 1-septate, 24-27 x 1.3-1.6 μm , with both the basal end and apex acute.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, on dead leaves of ?*Quercus* sp., 2 Jan 1998, W.P. Wu (Wu1961a). Living strain: 44818 (from Wu1961a).

Ecology/Substrate/Host: Saprobe on dead material of many plants.

Geographical distribution: widely distributed species, especially in tropical and subtropical area.

Description and illustration: Pirozynski (1968); Piccolo Grandi & Silva Attli (1996).

Notes: *Cryptophiale kakombensis* Piroz. differs from other known species by its unbranched setiform conidiophores, 1-septate and lunate conidia (Pirozynski 1968; Goh and Hyde 1996b; Marques et al. 2008; Arias et al. 2018). Its occurrence in Taiwan was also reported (Matsushima 1985).

Cryptophiale orthospora McKenzie, *Mycotaxon* XLIX: 309, 1993.

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae, 1.5-2 μm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight or flexuous, subfasciculate, arising singly from flat, swollen basal cells up to 20 μm wide, thick- and smooth-walled, dark brown, 9-11-septate, tapered gradually towards the fertile region, tapered to an acute apex, 220-250 x 5-8 μm . The setiform axis of the conidiophores typically remain sterile in the lower part, but the upper one-third or more becomes fertile and modified into a complicated conidiogenous apparatus. Fertile region subapical, cylindrical, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, obclavate, smooth, 1-septate, (14-)17-20 x 1.5-2 μm , with the basal end rounded and apex acute.

Material examined: China, Hainan Province, on dead branches of unidentified plant, 15 Dec. 2000, W.P. Wu (Wu5552a).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, China, New Caledonia, New Zealand

Description and illustration: McKenzie (1993b).

Notes: *Cryptophiale orthospora* differs from other known species by its unbranched setiform conidiophores and 1-septate, obclavate conidia (Sutton 1989; Goh and Hyde, 1996; Kuthubutheen and Sutton 1985; Marques et al. 2009). *C. novae-caledoniae* McKenzie & Kuthub. is another species with unbranched setiform conidiophores and obclavate conidia with 1 septum, but the conidia in this species are much smaller (McKenzie and Kuthubutheen 1993).

Cryptophiale sphaerospora Umali & D.D. Zhou, Mycoscience 40: 189, 1999.

Ecology/Substrate/Host: Saprobe on dead material of plant including *Schizostachyum dumetorum*.

Geographical distribution: China.

Description and illustration: Umali, Zhou, Goh & Hyde (1999).

Notes: *Cryptophiale sphaerospora* differs from all other species in the genus by smaller and globose conidia (Umali et al. 1999). No specimen was observed by us and the above description is based on the original description provided by Umali et al. (1999).

Cryptophiale udagawae Piroz., Can. J. Bot. 46: 1126, 1968.

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae, 1.5-2 μm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight or flexuous, subfasciculate, arising singly from flat, conical, swollen basal cells up to 20 μm wide, thick- and smooth-walled, dark brown, 5-8-septate, tapered gradually towards the fertile region, finally abruptly tapered to an acute apex, which is 1-3 times dichotomously furcated. Branches slightly paler in color, 15-40 μm long, 4-6 μm wide at the base, acutely pointed above. The setiform axis of the conidiophores typically remain sterile in the lower half and at the furcated apex, but the upper one-half or one-third becomes fertile and modified into a complicated conidiogenous apparatus. Fertile region subapical, cylindrical, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidia produced in slime head and adhering to the fertile part of the conidiophores in a lateral droplet, hyaline, smooth, 1-septate, narrowly spindle-shaped, falcate, 16-25 x 1.5-2 μm , with the basal end rounded and the apex drawn into a short appendage which is rather more curved than the rest of the conidium.

Colonies on PDA effuse, colonies 0.5-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, reverse brown to dark brown.

Material examined: China: Guangdong Province, Dinghushan, on dead leaves of unidentified plant, 10 Oct. 1998, W.P. Wu (Wu1961b); China: Guangdong Province, Dinghushan, on rotten hard wood, 11 Oct. 1998, W.P. Wu (Wu1997g); China: Guangdong Province, Lufushan, on dead branches of unidentified plant, 15 Oct. 1998, W.P. Wu (Wu2012d); China: Guangdong Province, on dead stem of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2050c); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1854f); China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Wu12168); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec 2018, W.P. Wu (Wu16255, Wu16253); China: Guangdong Province, Guangzhou, South China Botanical Garden, on rotten bark of unidentified tree, 2 Dec 2018, W.P. Wu (Wu16259); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of *Acacia* sp., 17 Oct 2020, W.P. Wu (Wu17559); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Wu17507); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of *Cinnamomum* sp., 2 Jan. 1997, W.P. Wu (1289a); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Cinnamomum* sp., 30 Dec. 1997, W.P. Wu (Wu1559c); China: Guangxi Province, Shiwandashan, on dead bark of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1592d); China: Guangxi Province, Shiwandashan, on dead bark of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1594f); China: Guangxi Province, Nanning, on dead leaves of *Eucalyptus* sp., 3 Jan 1998, W.P. Wu (Wu1612f); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Magnolia* sp., 28 Dec. 1997, W.P. Wu (Wu1491a); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Magnolia* sp., 29 Dec. 1997, W.P. Wu (Wu1207b); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Quercus* sp., 31 Dec. 1997, W.P. Wu (Wu1606h); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead leaves of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1320d); China: Guangxi Province, Shiwandashan, on dead branches of unidentified plant, 30 Dec. 1997, W.P. Wu (Wu1540c); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified tree, 28 June 2018, Yu Zhang (Wu15244). Living strain: 42912 (from Wu1289a), 43716 (from Wu1612f), 44893 (from (Wu2012d), 44819 (1961b), 43906 (from 1663c), 44516, 43932 and 43927 (from 1594f), 43716 (from 1612f), 44893 (from 2012d), 54346 (from Wu12168), 75981 (from Wu15244), 76687 (from Wu16253), 76688 (from Wu16255), 76588 (from Wu16259), 78261 (from Wu17507), 78323 (from Wu17559).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: This species is probably most widely distributed species of the genus, especially in tropical and subtropical area.

Description and illustration: Pirozynski (1965); Kuthubutheen and Sutton (1985); Yang et al. (2018a).

Notes: *Cryptophiale udagawae* differs from other known species by its setiform conidiophores with dichotomous furcated apex, 1-septate and spindle-shaped or falcate conidia with a short apical appendage. Among the known species, *C. udagawae*, *C. guadalcanalense* Matsush. and *C. cucullata* Kuthub. are the three species with dichotomously furcated apex of conidiophores. *C. udagawae* can be distinguished from them by 2-septate conidia and fertile region reached to branches of conidiophores in *C. cucullata*, by unappendaged conidia in *C. guadalcanalense* (Pirozynski 1965; Matsushima 1975; Kuthubutheen 1987). This species is the most commonly found species in China and variation on conidiophores and conidia were seen among different collections. Its occurrence on decaying material of different plants including palm tree was reported from mainland, Hong Kong, and Taiwan (Matsushima 1980; Lu et al. 2000; Ma et al. 2010). The ITS sequences were obtained from the single spore isolate of many specimens, they show little variation among those from different specimens, and almost identical with the available sequences in GenBank.

Paracryptophiale Kuthub. & Nawawi, Mycol. Res. 98: 125, 1994

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae. Teleomorph: unknown. Anamorph: Setae erect or slightly curved at base, simple, brown to dark brown, septate, smooth, tapering towards acute apex. Conidiophores macronematous, mononematous, erect, curved towards the apices, unbranched, dark brown, smooth, thick-walled, septate, bulbous to irregular at the base, tapered gradually towards the fertile region but becoming slightly wider in the fertile region, finally abruptly tapered to an acute apex. Fertile region apical, cylindrical, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells. Conidiogenous event no. 15 ('phialidic') (Kirk et al., 2001). Conidia hyaline, smooth, dictyospores with both transversely and longitudinal septa, constricted at transverse septa, ellipsoid, apical cell with a single, apical appendage.

Type species: *Paracryptophiale kamaruddinii* Kuthub. & Nawawi

Ecology/Substrate/Host: Saprobe on decaying plant material.

Known distribution: China, Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1994); Wu and McKenzie (2004); Seifert et al. (2011).

Notes: The genus *Paracryptophiale* was erected by Kuthubutheen and Nawawi (1994) for a dematiaceous hyphomycete, *P. kamaruddinii*, which is similar to *Cryptophiale* in having setiform conidiophores and lateral 'phialidic' conidiogenous cells, which are shielded by a plate of modified cells. It, however, differs from *Cryptophiale* by its appendaged dictyospores. Two species have been known in the genus (Kuthubutheen and Nawawi 1994; Wu and Sutton, 2004).

The striking feature of this fungus, the shield-like outgrowth of cells associated with the conidiogenous apparatus, is found in only one other genus, *Cryptophiale* (Pirozynski 1968; Ellis 1971, 1976; Carmichael et al. 1980; Seifert et al. 2011). Development of conidiophores and conidiogenous cells in *Cryptophiale* were described by Pirozynski (1968) and the same development was found in *Paracryptophiale*.

Key to known species of *Paracryptophiale*

1. Conidia 15-20 x 8.5-11.5 µm; apical appendage up to 12.5 µm long *P. pirozynskii*
1. Conidia 28-35 x 14-16 µm; apical appendages 4-6 µm long *P. kamaruddinii*

Paracryptophiale pirozynskii W. Wu & B. Sutton, Fung. Div. 14:265, 2004. Figs. 171-172

Colonies effuse, hairy, inconspicuous. Mycelium partly superficial and partly immersed, sparse, composed of branched, septate, brown, smooth hyphae, 2-5 µm diam. Teleomorph: Unknown. Anamorph: Setae erect or slightly curved at base, simple, brown to dark brown, 3-8 septate, smooth, tapering towards acute apex, 175-225 µm long, 5-7.5 µm wide at the base. Conidiophores macronematous, mononematous, erect, curved towards the apices, unbranched, dark brown, smooth, thick-walled, up to 12 septate, bulbous to irregular at the base, tapered gradually towards the fertile region but becoming slightly wider in the fertile region, finally abruptly tapered to an acute apex, up to 500 µm long, up to 30 µm wide at the base, tapering to 5-10 µm wide below the fertile region. Fertile region apical, cylindrical, 37.5-50 µm long x 17.5-22.5 µm wide, the conidiogenous cells obscured by a shield of sterile, flat, lobed, pale brown cells varying from 4 µm diam. up to 10 µm long x 2.5-5 µm wide. Conidiogenous event no. 15 ('phialidic') (Kirk et al., 2001). Conidia hyaline, smooth, 2-3 transversely septate and 1-3 longitudinal septa, constricted at transverse septa, ellipsoid, 15-20 x 8.5-11.5 µm, apical cell with a single, apical appendage up to 12.5 µm long.

On PDA the fungus grows slowly and forms a compact colony with a diameter of 10 mm in 14 days at 25°C. The colony is at first colorless but soon becomes olivaceous green to dark gray with a thin margin. The aerial mycelium is grey and composed of pale brown to medium brown, septate, smooth hyphae. No sporulation was observed on PDA within 4 weeks.

Material examined: China: Guangdong Province, Dinghushan, 10 Oct. 1998, Wen Ping Wu (Wu2008 holotype in Herbarium of Novozymes China, Beijing). China: Guangdong Province, Dinghushan, 9 Oct. 1998, W.P. Wu (Wu2050). Living strain: ex-type strain CGMCC 3.20706 = NN 44888; 44902 (from Wu2008a).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Wu and Sutton (2004).

Notes: *Paracryptophiale pirozynskii* W.P. Wu & Y.Z. Diao & B. Sutton is congeneric to *P. kamaruddinii* Kuthub. & Nawawi, but differs from it by the presence of sterile setae mixed together with conidiophores, smaller conidia ($28\text{--}35 \times 14\text{--}16\text{ }\mu\text{m}$ in *P. kamaruddinii*), and longer appendages ($4\text{--}6\text{ }\mu\text{m}$ in *P. kamaruddinii*) (Kuthubutheen and Nawawi 1994; Wu and Sutton, 2004). The conidia of *P. pirozynskii* germinated readily on potato dextrose agar (PDA) producing germ-tubes from several cells.

The LSU and ITS sequences were for the first time also obtained from the single spore isolate of this species and its phylogenetic affinity to *Cryptophiale*, *Cryptophialoidea* and *Kionochaeta* in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the holotype specimen Wu2008, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Cryptophiale udagawae* (GeneBank MW133882, identities 339/368 (92%), 10 gaps (2%)), *Cryptophialoidea sasciculata* (GeneBank MH758195, identities 342/377 (91%), 8 gaps (2%)), *Kionochaeta ivoriensis* (GenBank MH860988, identities 442/519 (85%), 40 gaps (7%)), *Zanclospora iberica* (GenBank KY853481, identities 340/391 (87%), 22 gaps (5%)).

Cryptophialoidea Kuthub. & Nawawi, Trans. Br. Mycol. Soc. 89: 581, 1987.

Colonies effuse, pale to olivaceous brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, flexuous, subulate, brown, smooth, setiform, solitary, simple, thick-walled, septate with septa arranged more closely in the conidiogenous zone; conidiogenous zone about halfway up consisting of a single row of phialides closely arranged on only one side of the conidiophore. Conidiogenous cells monophialidic, phialides extruded through minute pores on only one side of the conidiophore, discrete, determinate, lageniform; phialides with collarettes. Conidia hyaline, smooth, septate, simple, in mucous mass.

Type species: *Cryptophialoidea secunda* (Kuthub. & Sutton) Kuthub. & Nawawi (= *Cryptophiale secunda* Kuthubutheen & Sutton)

Ecology/Substrate/Host: Saprobe on decaying plant material.

Geographical distribution: Broadly distributed, especially in subtropical and tropical areas.

Description and illustration: Kuthubutheen and Nawawi (1987).

Notes: *Cryptophialoidea* Kuthub. & Nawawi was erected to accommodate *Cryptophiale secunda* Kuthub. & Sutton and *C. uncispora* Kuthub. & Nawawi. The absence of the shield of sterile cells and the location of a single row of phialides on one side only of setiform conidiophores are unique for them and unlike any other species of *Cryptophiale* known (Pirozynski 1968; Kuthubutheen and Sutton 1985; Kirk and Sutton 1985; Kuthubutheen and Nawawi 1987). Three additional species have been added into the genus since then, including *C. fasciculata* Kuthub. & Nawawi, *C. manifesta* (B. Sutton & Hodges) Kuthub. & Nawawi and *C. ramosa* Delgado, J. Mena & Gené. The known species in the genus are distinguished by morphology of setiform conidiophores, fertile region, conidiogenous cells and conidia (Delgado et al. 2005; Marques et al. 2008, 2013). Based on the phylogenetic analysis of *Cryptophialoidea fasciculata*, the genus is closely related to *Cryptophiale* and assigned into *Chaetosphaeraceae* (Yang et al. 2018a; Liu et al. 2019; Lin et al. 2019).

The genus was recorded from Taiwan with a single species, *C. secunda* on decaying twig (Chang 1990). Here we reported its occurrence with another species, *C. fasciculata*, in mainland China.

Key to accepted species of *Cryptophialoidea*

1. Setiform conidiophores 1-3 times dichotomously branched.....*C. ramosa*
1. Setiform conidiophores unbranched.....2
2. Conidiogenous cells polyphialidic.....*C. manifesta*
2. Conidiogenous cells monophialidic.....3
3. Conidia falcate.....4
3. Conidia uncinata.....*C. uncispora*
4. Phialides arranged in discrete bundles.....*C. fasciculata*
4. Phialides not arranged in bundles.....*C. secunda*

Cryptophialoidea fasciculata Kuthub. & Nawawi, Mycol. Res. 98: 686, 1994. Figs. 173

Colonies effuse, hairy, scattered, dark brown to black, glistening, with slimy mass of conidia on one side of the conidiophores. Mycelium mostly immersed, composed of smooth, septate, branched, pale brown to mid brown

hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, setiform, erect, solitary, straight or flexuous, thick-walled, smooth, septate, subulate, dark brown, 140-182 x 3.5-4.5 µm, basal cell swollen and 9-16 µm wide, main stipe in the lower part 50-80 µm high, middle fertile region 86-137 µm high, upper sterile part 35-65 µm high, terminating with a sterile obtuse apex. Conidiogenous region about halfway up and restricted only to the middle third of the conidiophore, comprising a row of phialides that are mostly closely arranged in 5-9 discrete bundles and that all open on only one side of the conidiophore, 86-137 µm. Conidiogenous cells monophialidic, intercalary, determinate, lageniform, extruded through minute pores on only one side of the conidiophores, light olivaceous brown, 11-14 x 2.5-3.5 µm, with a funnel-shaped collarete which are 1.5-2 µm wide and up to 1 µm deep. Conidia hyaline, smooth-walled, 1-euseptate, falcate, with the base slightly narrower than the apex, sometimes guttulate, 14-20 µm long, 1.5 µm wide in the widest part, tapering gradually toward the apex.

Material examined: On dead leaves of *Acacia* sp., China: Guangdong Province, Shenzhen, Yangtaishan Park, 17 Oct. 2020, W.P. Wu (Wu17487, Wu17489). Living strain: 78247, 78248, and 78249 (from Wu17487), 78251 and 78327 (from Wu17489).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Malaysia, Thailand.

Description and illustration: Kuthubutheen and Nawawi (1994); Yang et al. (2018a).

Notes: *Cryptophialoidea fasciculata* Kuthub. & Nawawi was originally described from Malaysia and it differs from other known species by unbranched conidiophores, phialides arranged in discrete bundles, and falcate conidia with 1 septum (Kuthubutheen and Nawawi, 1994). The fungus was also discovered and described from Thailand and the phylogenetic analysis showed its close relationship with members of *Cryptophiale* (Yang et al. 2018a). This is first record from China. The conidia from the Chinese collection are somewhat smaller than those in the original description (22-29 x 1.5-2 µm) and the Thailand collection (26.5-33.5 x 1.2-2.4 µm) (Kuthubutheen and Nawawi 1994; Yang et al. 2018a). The LSU and ITS sequences were also obtained from the single spore isolate of several specimens by us and its phylogenetic affinity to *Cryptophialoidea* and *Cryptophiale* in Chaetosphaeriaceae was confirmed.

Cryptophialoidea secunda (Kuthub. & B. Sutton) Kuthub. & Nawawi, Trans. Br. Mycol. Soc. 89:583, 1987.

≡ *Cryptophiale secunda* Kuthub. & Nawawi, Trans. Br. Mycol. Soc. 84: 303, 1985.

= *Chaetosina unilateralis* P.M. Kirk, Mycotaxon 23:217, 1985.

Teleomorph: Unknown. Anamorph: Setiform conidiophores macronematous, mononematous, straight, erect, subulate, bent, brown, smooth, solitary, simple, thick-walled, septate, with septa arranged more closely in the conidiogenous zone, up to 200 µm long, 5.5-6.5 µm at the base tapering towards the apex; Conidiogenous zone about halfway up the conidiophore, more or less cylindrical and consisting of a single row of phialides closely arranged on only one side of the conidiophore. Conidiogenous cells monophialidic, extruded through minute pores, discrete, determinate, lageniform, phialides with collarettes, light olivaceous brown, individual phialide 7.5-10 x 3.7-4.7 µm. Conidia hyaline, smooth, 1-septate, simple, falcate, 20-27.5 µm x 1.4-2.3 µm.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Kenya, Malaysia.

Illustrations: Kuthubutheen and Sutton (1985); Chang (1990).

Notes: *Cryptophialoidea secunda* (Kuthub. & B. Sutton) Kuthub. & Nawawi differs from other species in the genus by unbranched conidiophores, monophialidic conidiogenous cells, and 1-septate and falcate conidia (Kuthubutheen and Nawawi 1987; Kirk, 1985). This species was reported by Chang (1990). No specimen was examined by us, the above documentation is based on the description by Chang (1990).

Paraceratocladium R.F. Castañeda, Fungi Cubanese II: 8, 1987

Colonies effuse, brown to dark brown, hairy. Mycelium partly immersed and partly superficial, composed of brown, septate, smooth-walled hyphae. Teleomorph: unknown. Anamorph: Setae simple or branched, cylindrical, erect, straight, or flexuous, smooth or verruculose, septate. Conidiophores macronematous to semimacronematous, mononematous, irregularly branched, septate, flexuous, ascendant, adhering and twining around the setae, smooth-walled, pale brown. Conidiogenous cells monophialidic or polyphialidic, discrete, mostly intercalary, lageniform, ampulliform, collarete conspicuous, pale brown. Conidia in dry or slimy head, cylindrical, aciculate, or falcate, aseptate or septate, hyaline, smooth, thin-walled.

Type species: *Paraceratocladium silvestre* R.F. Castañeda.

Ecology/Substrate/Host: Saprobe on decaying plant material, including leaves of tree and culm of grass.

Geographical distribution: Brazil, China and Cuba. Probably widely distributed in subtropical and tropical areas.

Description and illustration: Castañeda-Ruiz (1987); Seifert et al. (2011).

Notes: The genus *Paraceratocladium* was erected by Castañeda-Ruiz (1987) with two species, *P. silvestre* and *P. polysetosum* R.F. Castañeda. Both species were found colonizing plant debris from Cuba. The genus was characterized by conidiophores which arise from the substrate and entwine on dematiaceous, erect setae, by monophialidic conidiogenous cells with a conspicuous collarette, and by 1-septate conidia (Castañeda-Ruiz 1987; McKenzie and Hyde 1997; Dulymamode et al. 1998; Whitton et al. 2001). The most closely related genus is *Ceratocladium* but can be easily distinguished from the latter species by its conspicuously collarette and septate conidia (Carmichael et al. 1980; Seifert et al., 2011).

Four additional species, including *P. bacilliformis* Caldach, Gene, Stichigel & Guarro on decaying rotten twigs in Brazil, *P. malaysianum* Goh & K.D. Hyde found on submerged wood in Malaysia, *P. seychellarum* Whitton, McKenzie & K.D. Hyde found on decaying leaves of *Pandanus seychellarum* in Seychelles, and *P. triseptata* Dulom., W. Wu & Peerally occurring on leaves of *Pandanus palustris* in Mauritius, have been included into the genus (Dulymamode et al. 1998; Goh and Hyde 2000; Whitton et al. 2001; Caldach et al. 2002b). *P. triseptata* differs from the rest species of the genus by its polyblastic conidiogenous cells and 3-septate conidia. The other species can be distinguished by their conidial morphology (Castañeda-Ruiz 1987; Caldach et al. 2002b). Key to accepted species was provided by Goh and Hyde (2000) and Whitton et al. (2001).

Two species, *P. silvestre* R.F. Castañeda and *P. polysetosum* Castañeda, were found from China. The living strains were obtained by single spore isolation, and both LSU and ITS sequences were also obtained from them. Phylogenetic analysis showed that *Paraceratocladium* R.F. Castañeda, typified by *P. silvestre* R.F. Castañeda, is closely related to *Cryptophiale* Piroz., *Cryptophialoidea* Kuthub. & Nawawi and *Paracryptophiale* Kuthub. & Nawawi. Morphologically all these fungi producing setae or setiform conidiophores, monophialidic or polyphialidic conidiogenous cells with funnel-shaped collarettes, and hyaline, aseptate or septate conidia, but differ in morphology of setae, conidiophores and conidiogenous cells (Pirozynski 1968; Castañeda-Ruiz 1987; Kuthubutheen and Nawawi 1987, 1994; McKenzie and Hyde 1997; Dulymamode et al. 1998; Whitton et al. 2001; Seifert et al. 2011). Furthermore, the two studied species, *P. silvestre* R.F. Castañeda and *P. polysetosum* R.F. Castañeda, are polyphyletic, and the genus name *Paraceratocladia* is introduced to accommodate *P. polysetosum*. Morphologically *P. silvestre* produces simple and unbranched setae, ascendant conidiophores without spike-like structure, and hyaline, 1-septate, aciculate conidia (26-29 x 2-3 µm); while in *P. polysetosum*, the setae are branched with several secondary branches, the conidiophores with spike-like structure, and hyaline, aseptate, cylindrical conidia with slightly swollen and rounded ends (16-18 x 1.5-2.2 µm).

The other three known species under the genus *Paraceratocladium*, including *P. bacilliforme* M. Caldach, Stichigel, Gené & Guarro, *P. malaysianum* Goh & K.D. Hyde, *P. seychellarum* Whitton, McKenzie & K.D. Hyde, *P. triseptata* Dulom., W.P. Wu & Y.Z. Diao & Peerally are morphologically similar to *P. silvestre*, but remained to be studied for their phylogenetic relationship.

Key to species of *Paraceratocladium* (P) and *Paraceratocladia* (Pl)

1. Setae branched; conidia cylindrical, ovoid, or ellipsoid, apex rounded or slightly constricted.....2
1. Setae simple; conidia narrowly-fusoid, slightly curved, apex attenuated and blunt or acute.....3
2. Setae up to 450 µm long; conidia 1-septate, 14-17 x 2 µm *Pl. polysetosum*
2. Setae 85-385 µm long; conidia aseptate, 3-5.2 x 1.2-1.5 µm.....*P. seychellarum*
3. Setae 350-500 µm long; conidia 40-46 µm long.....*P. malaysianum*
3. Setae mostly less than 350 µm long, conidia less than 35 µm long4
4. Conidia aseptate, 3-4.5 x 0.5-1 µm *P. bacilliforme*
4. Conidia septate5
5. Conidia 1-septate, 21-32 x 1-2.5 µm.....*P. silvestre*
5. Conidia 3-septate, 28-34 x 1.5-2.5 µm.....*P. triseptatum*

***Paraceratocladium silvestre* R.F. Castañeda, Fungi Cubenses II: 9, 1987. Fig. 174**

Colonies effuse, brown to dark brown, hairy. Mycelium partly immersed and partly superficial, composed of brown, septate, smooth-walled, 1-3 µm wide hyphae. Teleomorph: Unknown. Anamorph: Setae simple, cylindrical, erect, straight, or flexuous, brown, thick-walled, smooth, 5-7-septate, 200-250 x 5-6 µm. Conidiophores macronematous to semimacronematous, mononematous, irregularly branched, septate, flexuous, ascendant, adhering and twining around the setae, smooth-walled, pale brown, up to 230 µm long, 2-3 µm wide. Conidiogenous cells monophialidic or polyphialidic, discrete, mostly intercalary, ampulliform, collarette conspicuous, pale brown, collarette 2-3 µm deep, 2-2.5 µm wide at apex, with narrow sporulating locus of 1-1.5 µm wide. Conidia in slimy head, 1-septate, aciculate, straight, or slightly curved, hyaline, smooth, thin-walled, 26-29 x 2-3 µm.

Colonies on PDA effuse, colonies 0.7-0.9 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, reverse brown to dark brown.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of unidentified tree, 2 March 2012, W.P. Wu (Wu12472); China: Guangdong Province, Guangzhou, South China Botanical Garden,

on rotten wood of unidentified tree, 2 Dec 2018, W.P. Wu (Wu16259, Wu16260 and Wu16261); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead culm of grass, 17 Oct 2020, W.P. Wu (Wu17499, Wu17500); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Wu17502, Wu17503); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaves of unidentified broad leaf tree, 17 Oct 2020, W.P. Wu (Wu17502, Wu17503, Wu17508); China: Guangdong Province, Dinghushan, On dead branches of unidentified plant, 11 Oct. 1998, W.P. Wu (WU1995c); China: Guangdong Province, Dinghushan, on dead branches of *Eucalyptus* sp., 11 Oct. 1998, W.P. Wu (WU0232Aa); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, On dead leaves of ?*Acer* sp., 2 Jan. 1997, W.P. Wu (WU1261b); China: Guangxi Province, Shiwandashan, On dead leaves of ?*Cinnamomum* sp., 30 Dec. 1997, W.P. Wu (WU1559f); China: Guangxi Province, Shiwandashan, On dead leaves of ?*Quercus* sp., 31 Dec. 1997, W.P. Wu (WU1609f); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead stem and leaves, 2 Jan. 1997, W.P. Wu (WU1281); China: Guangxi Province, Shiwandashan, on dead leaves of unidentified plant, 30 Dec. 1997, W.P. Wu (WU1554i); Living strain: 42906 (from Wu1261b), 44059 (from 1609f), 55375 (from Wu12472), 76689 (from Wu16259), 76589 (from Wu16261), 78342 and 78396 (from Wu17499), 78344 (from Wu17500), 78387 and 78388 (from Wu17502), 78258 (from Wu12503), 78262 (from Wu17508).

Ecology/Substrate/Host: Saprobe on dead material of plants including *Cinnamomum* sp. and *Eucalyptus* sp.

Geographical distribution: China, Cuba.

Description and illustration: Castañeda-Ruiz (1987); Castañeda-Ruiz et al. (2002).

Notes: *Paraceratocladium silvestre* R.F. Castañeda differs from the rest species of the genus by its obclavate and 1-septate conidia. In the original description given by Castañeda-Ruiz (1987), it was said the conidiogenous cells are monophialidic, however, the polyblastic conidiogenous cells were constantly found from some Chinese collections, for example Wu0232a. This species seems to be broadly distributed and grows on different substrate, including dead leaves of *Acer*, *Cinnamomum*, *Eucalyptus*, *Quercus* and *Rhododendron*, unidentified grass, and *Pandanus furcatus*. Its occurrence in Hong Kong was also reported (Whitton et al. 2001).

Both LSU and ITS sequences were for the first time generated from the living strains of this species and phylogenetic analysis showed it is closely related to other members of Chaetosphaeriaceae. On a megablast search using the ITS sequences from the strain obtained from the specimen 1261b, the closest matches in NCBI's GenBank nucleotide database were members of *Cryptophialoidea*, *Zanclospora*, *Kinochaeta* and *Nawawia* in *Chaetosphaeriales*, including *Cryptophialoidea fasciculata* (GenBank MH758195, identities 406/467 (87%), 17 gaps (3%)), *Zanclospora iberica* (GenBank NR154543, identities 412/472 (87%), 19 gaps (4%)), *Kinochaeta ivoriensis* (GenBank MH860988, identities 400/465 (86%), 19 gaps (4%)), *Nawawia filiformis* (GenBank MH758196, identities 402/470 (86%), 13 gaps (2%)).

Paraceratocладиella W.P. Wu & Y.Z. Diao, gen. nov., MB841537.

Etymology: refers to its morphological similarity to the genus *Paraceratocladium*.

Type species: *Paraceratocладиella polysetosum* (R.F. Castañeda) W.P. Wu & Y.Z. Diao ($\equiv$ *Paraceratocladium polysetosum* R.F. Castañeda).

Colonies effuse, brown to dark brown, hairy. Mycelium partly immersed and partly superficial, composed of brown, septate, smooth-walled hyphae. Teleomorph: Unknown. Anamorph: Setae simple or branched, cylindrical, erect, straight, or flexuous, smooth or verruculose, septate. Conidiophores macronematous to semimacronematous, mononematous, irregularly branched, septate, flexuous, ascendant, adhering and twining around the setae, smooth-walled, pale brown. Conidiogenous cells monophialidic or polyphialidic, discrete, mostly intercalary, lageniform, ampulliform, collarette conspicuous, pale brown. Conidia in dry or slimy head, cylindrical, aciculate, or falcate, aseptate or septate, hyaline, smooth, thin-walled.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Cuba.

Notes: The genus *Paraceratocладиella* is created to accomendate *P. polysetosum* Castañeda which is morphologically similar with other members of *Paraceratocladium* Castañeda, but differs in forming branched setae and cylindrical conidia with slightly swollen ends (Castañeda-Ruiz 1987; McKenzie and Hyde 1997; Dulymamode et al. 1998; Whitton et al. 2001). This is supported by the molecular phylogenetic analysis.

Paraceratocладиella polysetosa (R.F. Castañeda) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 175, MycoBank MB841730.

$\equiv$ *Paraceratocladium polysetosum* R.F. Castañeda, Fungi Cubenese II: 9, 1987.

Colonies effuse, brown to dark brown, hairy. Mycelium partly immersed and partly superficial, composed of brown, septate, smooth-walled, 1-3 μ m wide hyphae. Teleomorph: Unknown. Anamorph: Setae simple or branched, cylindrical, erect, straight, or flexuous, brown, thick-walled, smooth, 4-6-septate, 270-350 x 6-7 μ m;

branches pale brown, smooth, 1-2-septate, 45-100 x 2.5-3 µm. Conidiophores macronematous to semimacronematous, mononematous, irregularly branched, septate, flexuous, ascendant, adhering and twining around the setae, smooth-walled, pale brown, up to the same length as setae, 2-3 µm wide, with intercalary conidiogenous cells and spike-like structure. Conidiogenous cells monophialidic or polyphialidic, discrete, mostly intercalary, lageniform or ampulliform, collarette conspicuous, pale brown, 8-10 x 3-4 µm, collarette 1.5-2.5 µm deep, 3-3.5 µm wide at apex, with narrow sporulating locus of 1.5-2.5 µm wide. Conidia in slimy head, 1-septate, cylindrical, obtuse at base, constructed just below apex, straight or slightly curved, hyaline, smooth, thin-walled, 16-18 x 1.5-2.2 µm.

Colonies on PDA effuse, colonies 0.6-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse brown to dark brown.

Material examined: China: Guangxi Province, Shiwandashan, on dead leaves of *Rhododendron* sp., 29 Dec. 1997, W.P. Wu (Wu1523a). Living strain: CGMCC 3.20634 (=NN 44119) (from Wu1523a).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Brazil, Cuba, China.

Description and illustration: Castañeda-Ruiz (1987).

Notes: *Paraceratocladia polysetosum* differs from the known species in the closely related genus *Paraceratocladium* by its branched setae, intercalary conidiogenous cells and spike-like structure in conidiophores, cylindrical and 1-septate conidia (Castañeda-Ruiz 1987; Barbosa and Gusmão 2003). Only one collection was made in China.

The LSU and ITS sequences were for the first time also obtained from the single spore isolate of this species and its phylogenetic affinity to several genera in Chaetosphaeriaceae was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu1523a, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Kionochaeta ivoriensis* (GeneBank NR160149, identities 411/467 (88%), 15 gaps (3%)), *Nawawia filiformis* (GeneBank MH758196, identities 397/450 (88%), 13 gaps (2%)), *Zanclospora iberica* (GeneBank NR154543, identities 397/450 (88%), 13 gaps (2%)), *Chaetosphaeria lateriphiala* (GeneBank JN673039, identities 399/452 (88%), 16 gaps (3%)).

Zanclospora S. Hughes & W.B. Kendr., N.Z. J. Bot. 3: 151, 1965

Colonies effuse, hairy, golden-yellow, yellow-brown, tawny, reddish-brown or dark brown with white to light straw conidial masses. Anamorph: Conidiophores macronematous, mononematous, erect, setiform, cylindrical to cylindrical-fusiform, septate, brown, paler towards the apex, occasionally dark brown and opaque, apex acute, subacute or obtuse, sterile or developed into a phialide, conidiophores simple or branched; branches setiform, fertile, resemble the main stalk or shorter, sterile inserted into the conidiophore. Conidiogenous cells monophialidic, determinate, sessile, discrete, lateral, appressed to the conidiophore, arise just below the septa, arranged in whorls forming one or two compact fertile regions, occasionally integrated, terminal, at the conidiophore apex, ovoid to lageniform, subhyaline to light brown, smooth, collarettes inconspicuous to short-flared. Macroconidia falcate, almost horseshoe shaped, obovoid, occasionally bacilliform, straight, gently or strongly curved, aseptate, hyaline, smooth, without setulae or sheaths, accumulating in a slimy mass.

Type species: *Zanclospora novae-zelandiae* S. Hughes & W.B. Kendr.

Ecology/Substrate/Host: Saprobe on decaying plant material.

Geographical distribution: Broadly distributed, especially in subtropical and tropical areas.

Description and illustration: Hughes and Kendrick (1965); Reblová et al. (2021).

Notes: *Zanclospora* was erected by Hughes and Kendrick (1965) to accommodate two dematiaceous hyphomycetous species, *Z. novae-zelandiae* S. Hughes & W.B. Kendr. (the type species) and *Z. brevispora* S. Hughes & W.B. Kendr. collected on lignicolous substrates in New Zealand. The genus is characterized by simple or branched and setiform conidiophores, discrete and phialidic conidiogenous cells arranged in multiple verticils on conidiophores, and falcate or narrowly obovoid, hyaline and aseptate conidia (Hughes and Kendrick 1965; Seifert et al. 2011; Almeida et al. 2013; Hernández-Restrepo et al. 2017; Reblová et al. 2021a). The accepted species are mainly distinguished by morphology of setiform conidiophores, fertile region, conidiogenous cells and conidia (Subramanian and Vittal, 1973; Sutton and Hodges, 1975; Zucconi and Rambelli, 1982; Morgan-Jones et al., 1992; Calduch et al., 2002a; Cooper, 2005; Almeida et al., 2013; Hernández-Restrepo et al., 2017; Villavicencio et al., 2020; Reblová et al., 2021a). A comparison of all accepted species was provided by Reblová et al. (2021).

There are three known teleomorph-anamorph connections between *Zanclospora* and *Chaetosphaeria* Tul. & C. Tul. *Chaetosphaeria brevispora* Shoemaker was connected to *Z. brevispora* var. *brevispora* by Hughes & Kendrick (1967), and *C. lateriphiala* F.A. Fernández & Huhndorf and *C. minuta* F. A. Fernández & Huhndorf were connected to two unidentified species of *Zanclospora* (Fernández & Huhndorf 2005, Fernández et al. 2006). Recent phylogenetic analysis showed that the genus *Zanclospora* belongs to Chaetosphaeriaceae (Hernández-Restrepo et al. 2017; Reblová et al. 2021).

In our phylogenetic tree generated by using the combined LSU and ITS data, members of *Zanclospora* are clustered as sister group with several other genera and species with lateral phialides, including *Cryptophiale*, *Cryptophialoidea*, *Paracryptophiale* and *Chaetosphaeria minuta*. This result is aligned with the previous studies (Fernández and Huhndorf 2005; Fernández et al. 2008; Lin et al. 2019; Luo et al., 2019; Réblová et al. 2021a). Within the *Zanclospora* clade, the three species of *Zanclospora* S. Hughes & W.B. Kendr., *Z. novae-zelandiae* (the type species), *Z. brevispora* S. Hughes & W.B. Kendr. and *Z. iberica* Hern.-Restr., J. Mena & Gené are grouped together with *Chaetosphaeria jonesii* R.H. Perera, Maharachch. & K.D. Hyde, *C. lateriphiala* F.A. Fernández & Huhndorf, *C. sylvatica* F.A. Fernández & Huhndorf, *C. tropicalis* F.A. Fernández & Huhndorf. This clade in the ML tree represents an independent phylogenetic group from other *Chaetosphaeria* including the type species.

Zanclospora has a temperature, tropical and subtropical distribution, and recorded on leaf litter, decaying wood and bark (Hughes and Kendrick 1965; Almeida et al. 2013). *Z. novae-zelandiae* was reported on decaying twigs from Taiwan (Chang 1990) and *Z. brevispora* var. *brevispora* was reported on submerged wood in Hong Kong (Tsui et al. 2000). Only two species, *Z. brevispora* and *Z. novae-zelandiae*, were discovered by us from mainland China.

***Zanclospora brevispora* S. Hughes & W.B. Kendr., N.Z. Jl. Bot. 3: 156. 1965. Figs. 176**

Colonies on natural substrate effuse, brownish, composed of mostly branched setiform conidiophores bearing straw-colored globules of conidiogenous cells. Teleomorph: Unknown. Anamorph: Conidiophores setiform, simple, arise singly from swollen cells of the repent hyphae, 180–255 µm high, straight, brown to dark brown, paler toward the distal end, septate, smooth-walled, basal cell 13–18 µm wide, 4.5–5.5 µm wide just above the basal cell, tapering gradually to 2.5–4 µm toward the rounded apex; the lower part of the main stipe sterile, 5–6-septate, dark brown, thick-walled; the middle fertile region 130–173 µm long, pale brown to brown, 7–8 septate, cell 5.5–8.5 x 4.5–5.5 µm; the upper part are sterile, pale brown, 3–6 septate, 2.5–4 µm wide. Conidiogenous cells phialidic, occur in whorls of up to 7, arise just below the distal septa of a series of up to 8 cells of the phialophore below the generally sterile apex, sessile, straight, narrowly ovoid to ovoid, generally tightly adpressed to the phialophore, pale brown, 6.5–9.5 µm long, 3.0–3.5 µm wide, with an apical, hyaline to subhyaline, more or less funnel-shaped collarette 2.0–2.5 µm wide and 1.0–2.0 µm deep. Conidia hyaline, curved, and narrowly obovoid, being blunt at the distal end and tapered at the other, aseptate, 5–7 x 1.8–2.2 µm, produced in slime and finally enveloping the phialides as straw-colored mass.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on rotten seed pod of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17551, Wu17552, Wu17589). Living strain: 78357 (from Wu17551a), 78358 (from Wu17351b), 78359 (from Wu17352c) and 78360 (from Wu17352d), 78402, 78403 and 78404 (from Wu17589).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Brazil, Brunei, China, Cuba, Kenya, New Zealand, Seychelles and Thailand.

Description and illustration: Hughes and Kendrick (1965); Almeida et al. (2013).

Notes: *Zanclospora brevispora* S. Hughes & W.B. Kendr. differs from other species in the genus by simple and unbranched setiform conidiophores, subapical fertile regions, and ovoid and smaller conidia (Hughes and Kendrick 1965; Mercado-Sierra et al. 1997; Whitton et al. 2012; Almeida et al. 2013; Hernández-Restrepo et al. 2017). It differs from *Z. brevispora* var. *transvaalensis* by fertile regions with more conidiogenous cells and shorter, regularly curved conidia (Morgan-Jones et al. 1992). *Zanclospora austroamericana* is also similar to *Z. brevispora* var. *brevispora*, but differs by having two fertile regions and larger, falcate conidia (Sutton and Hodges 1975). Its occurrence in China was previously reported by Tsui et al. (2000).

The LSU and ITS sequences were also obtained for the first time from the single spore isolate of this species and its phylogenetic affinity to *Zanclospora*, *Nawawia*, *Chaetosphaeria*, *Cryptophiale*, *Cryptophialoidea* and *Kionochaeta* in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the specimen Wu17551, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Nawawia filiformis* (GeneBank DQ124120, identities 435/468 (93%), 1 gap (0%)), *Chaetosphaeria jonesii* (GeneBank NR154841, identities 419/454 (92%), 0 gap (0%)), *Chaetosphaeria iberica* (GeneBank NR154543, identities 406/454 (89%), 5 gaps (1%)), *Zanclospora iberica* (GeneBank KY853481, identities 370/410 (90%), 3 gaps (0%)), *Cryptophialoidea sasciculata* (GeneBank MH758195, identities 398/3468 (85%), 18 gaps (3%)), *Cryptophiale udagawae* (GeneBank MW133882, identities 404/479 (84%), 28 gaps (5%)).

***Zanclospora novae-zelandiae* S. Hughes & W.B. Kendr., N.Z. J. Bot. 3: 152. 1965.**

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae of 2–3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, subulate, smooth, up to 15-septate, thick-walled, brown to dark brown or blackish-brown, setiform,

unbranched, 200-300 x 6-8 μm , apex acute. Fertile usually sub-medium or slightly below medium, comprising irregularly arranged branches bearing the conidiogenous cells. Conidiogenous cells cylindrical, lageniform, pale brown to brown, thin- and smooth-walled, with an indistinct collarette at the apex. Conidia acrogenous, formed in a liquid droplet, falcate, slightly curved, attenuated at both ends, hyaline, aseptate, smooth, 20.5-34.5 x 2-2.5 μm .

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1337b); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on wood of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1338c). Living strain: 44417 (from Wu1337b).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Brazil, China, Japan, New Zealand, USA.

Description and illustration: Hughes and Kendrick (1965); Matsushima (1975); Almeida et al. (2013).

Notes: *Zanclospora novae-zelandiae* S. Hughes & W.B. Kendr. was originally described from New Zealand and the setiform conidiophores are simple or branched (Hughes and Kendrick, 1965). This species was also recorded on decaying twigs from Taiwan (Chang 1990).

Zanclosporiella W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB842076

Etymology: refers to its morphological similarity with *Zanclospora*.

Diagnosis: similar to *Zanclospora*, but differs in aseptate ascospore and unilateral phialides produced along the midsection of setiform conidiophores

Type species: *Zanclosporiella minuta* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao ($\equiv$ *Chaetosphaeria minuta* F.A. Fernández & Huhndorf).

Teleomorph: Ascomata globose to sub-globose, dark brown, solitary to densely gregarious, superficial on a thin subiculum, distinctly papillate. Ascomatal wall in surface view, opaque in water, textura angularis in lactophenol, composed of pseudoparenchymatic cells. Ascomatal apex papillate, opaque. Paraphyses unbranched, septate, tapering. Asci cylindro-clavate, short stalked, unitunicate, thin-walled, apical ring not observed, with 8 ascospores irregularly arranged. Ascospores hyaline, fusiform to narrow-ellipsoid, one-septate. Anamorph: Conidiophores single, unbranched, multiseptate, brown, tapering to an apical phialide, several unilateral phialides produced along the midsection; Conidiogenous cells are phialides, ovoid, brown, produced along the conidiophore midsection, collarettes small, funnel-shaped, with several collarettes in a sympodial arrangement, or sometimes with percurrent proliferations. Conidia narrow fusiform, hyaline, one-celled

Ecology/Substrate/Host: Saprobe on decaying wood of branches.

Geographical distribution: Panama.

Description and illustration: Fernández and Huhndorf (2005).

Notes: The new genus is created for *Chaetosphaeria minuta* F.A. Fernández & Huhndorf, which in our phylogenetic analysis is grouped together with *Zanclospora* but in an unrelated linkage. The diagnostic characters for the genus is hyaline, fusiform to narrow-ellipsoid, aseptate ascospore, and *Zanclospora*-like anamorph with solitary setiform conidiophores, several unilateral phialides produced along the midsection, and hyaline aseptate, fusiform conidia. It differs from *Zanclospora* in aseptate ascospore and unilaterally arranged phialides in one side along the midsection of conidiophores (Fernández and Huhndorf 2005; Réblová et al., 2021a).

Zanclosporiella minuta (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB842077

$\equiv$ *Chaetosphaeria minuta* F.A. Fernández & Huhndorf, Fung. Div. 18: 35, 2005.

Teleomorph: Ascomata globose to sub-globose, dark brown, 106-119 μm in diam., 100-109 μm in height, solitary to densely gregarious, superficial on a thin subiculum, distinctly papillate. Ascomatal wall in surface view, opaque in water, textura angularis in lactophenol, 11.5-15.5 μm thick, composed of pseudoparenchymatic cells. Ascomatal apex papillate, opaque. Paraphyses unbranched, septate, 1.9-2.5 μm wide, tapering. Asci cylindro-clavate, short stalked, 105-150 x 8.5-15 μm , unitunicate, thin-walled, apical ring not observed, with 8 ascospores irregularly arranged. Ascospores hyaline, fusiform to narrow-ellipsoid, 9.5-10.5 x 2.5-3.5 μm . Anamorph: Conidiophores single, unbranched, multiseptate, brown, 90-120 x 4.8-5.2 μm , narrowing to 2.7-3.4 μm , tapering to an apical phialide, several unilateral phialides produced along the midsection; Conidiogenous cells are phialides, ovoid, brown, produced along the conidiophore midsection, 13-14 μm long, collarettes small, funnel-shaped, with several collarettes in a sympodial arrangement, or sometimes with percurrent proliferations. Conidia narrow fusiform, hyaline, one-celled, 7.5-9.6 x 1.5-2 μm on natural substrate, 12-14.3 x 2.2-2.7 μm on CMA.

Typification: Panama, Barro Colorado Island National Monument, Fausto trail, 50 to 150 m, 15 Sept 1997, on branch, S.M. Huhndorf, F.A. Fernández SMH3396 (F; holotype).

Ecology/Substrate/Host: Saprobe on decorticated wood of branches.

Geographical distribution: Panama.

Description and illustration: Fernández and Huhndorf (2005).

Notes: The fungus was well documented by Fernández and Huhndorf (2005). Variation on conidiophores and conidia were observed from the material on natural substrate and relevant living culture on CMA.

Kionochaeta P.M. Kirk & B. Sutton, Trans. Br. Mycol. Soc. 85: 712, 1985

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, comprising an erect, straight, or slightly curved, subulate, smooth, septate, thick-walled, brown to dark brown or blackish-brown setiform element with or without associated lateral setiform branches. Fertile usually sub-medium, rarely also apical, comprising either compact or loosely and irregularly or penicillately arranged branches bearing the conidiogenous cells. Conidiogenous cells ampulliform, lageniform or cylindrical, pale brown to brown, thin- and smooth-walled. Conidial ontogeny holoblastic by apical wall building. Conidial maturation synchronous with conidial ontogeny. Conidial secession schizolytic. Proliferation of two types: 1). Enteroblastic without progression leading to periclinal thickening; 2). Enteroblastic percurrent with progression leading to a new conidiogenous locus. Conidia acrogenous, solitary, borne in a liquid droplet, hyaline, aseptate, smooth, ellipsoid, fusiform, falcate or clavate, rarely with a single simple setula at each end.

Type species: *Kionochaeta ramifera* (Matsush.) P.M. Kirk & B. Sutton (= *Chaetopsina ramifera* Matsush.).

Ecology/Substrate/Host: Saprobe on decaying plant material of many different plant species.

Geographical distribution: Broadly distributed, especially in subtropical and tropical areas.

Description and illustration: Kirk and Sutton (1985); Seifert et al. (2011).

Notes: The genus *Kionochaeta* was introduced by Kirk and Sutton (1985) to accommodate a few dematiaceous species originally placed under *Chaetopsina* Rambelli but with brown conidiophores and phylogenetically in *Chaetosphaeriales*. Only a few dematiaceous hyphomycetous genera including *Cryptophialoidea* Kuthub. & Nawawi, *Zanclospora* S. Hughes & W.B. Kendr. and *Cryptophiale* Piroz. showed some morphological similarity with *Kionochaeta*, but the four genera differ markedly in arrangement of the conidiogenous cells. In *Cryptophiale* and *Cryptophialoidea* they are unilateral on a setiform branched or unbranched conidiophore and are obscured (*Cryptophiale*) or not obscured (*Cryptophialoidea*) by shield of sterile cells. In *Zanclospora* and *Kionochaeta* there is no sterile shield, even though in the latter genus the branches supporting the conidiogenous cells may be lateral. In *Zanclospora* the conidiogenous cells are sessile and arranged in whorls on a conidiophore which is not setiform (Carmichael et al. 1980; Kirk and Sutton 1985; Rambelli 1987; Kuthubutheen and Nawawi 1988; Okada et al. 1997; Seifert et al. 2011).

Several species have been added into the genus since then and made the genus with 14 legitimate names. The identification keys to the accepted species were provided by different authors (Rambelli and Lunghini 1979; Kirk and Sutton 1985; Kuthubutheen and Nawawi 1988; Crous et al. 1994; Goh and Hyde 1997; Castañeda-Ruiz et al. 1998; Yanna and Hyde 2002; Seifert et al. 2011; Lin et al. 2019).

Recent phylogenetic analysis based on the combined SSU, ITS and LSU sequence data showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (Okada 1997; Lin et al. 2019). The group one, consisting of *K. castaneae* C.G. Lin & J.K. Liu, *K. microspora* C.G. Lin & K.D. Hyde, *K. ramifera* (Matsush.) P.M. Kirk & B. Sutton (the type species) and *K. spissa* P.M. Kirk & B. Sutton, is clearly separate from the second group comprising the ex-type strain of *K. ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton (CBS 374.76). Our phylogenetic study also supports this, and a new genus is established to accommodate *K. ivoriensis* which is phylogenetically not related to the type species of the genus *Kionochaeta*. Furthermore, in our phylogenetic tree generated from the combined LSU and ITS sequences (Fig. 3 and Fig. 177), all other species of *Kionochaeta* are grouped together and formed a strongly supported sister group with other *Chaetosphaeria* species.

The living strains of many studied species were also studied on PDA (Fig. 178), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Kionochaeta beijingensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 179-180, MycoBank MB841610.

Etymology: refers to the locality where this fungus was collected.

Typification: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Holotype WFH Wu17342; ex-type strain CGMCC 3.20752 = NN 77954).

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae of 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight or slightly curved, subulate, smooth, septate, thick-walled, brown to dark brown or blackish-brown, setiform, with a whorl of 6-12 divergent, sterile lateral branches inserted just below the middle, up to 200-275 µm long, 8-12 µm wide; apical part above the fertile region 90-125 µm long, 3-6-septate, with acute apex; lower part below the fertile region 60-75 µm, 2-4 septate, 6.5-8 µm wide; lateral branches pale brown to brown, smooth, 0-2 septate, 30-45 x

3-4 μm , apex acute. Fertile usually sub-medium, comprising either compact or irregularly arranged branches bearing the conidiogenous cells, 35-40 μm high, 10-15 μm wide, covered with wet spore mass. Conidiogenous cells ampulliform, lageniform, pale brown to brown, thin- and smooth-walled, 5-7.5 x 2.5-3 μm , with an indistinct collarette at the apex. Conidia acrogenous, formed in a liquid droplet, narrowly falcate, or slightly fusiform, curved, acute at both ends, hyaline, aseptate, smooth, 5-7 x 1 μm .

Colonies on PDA effuse, colonies 1-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Wu17305a); China: Jiangsu Province, Wuxi, Wuxi Forest Park, On dead fruit of *Liquidambar formosana*, 25 Aug 2019, W.P. Wu (Wu16801, 16898); China: Zhejiang Province, Huaian County, Qiandaohu, On dead fruit of *Quercus* sp., 18 Oct 2018, W.P. Wu (16120, 16121); China: Zhejiang Province, Huaian County, On dead leaves of unidentified tree, 18 Oct 2018, W.P. Wu (Wu16141); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead fruit of unidentified tree, 3 Oct 2020, W.P. Wu (Wu16898, Wu16917); China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Holotype WFH Wu17342). Living strains: ex-type strain 77954, 77984 (from Wu17305a); 78026 (from Wu17342b), 77345 (from Wu16898a), 77458 and 77459 (from Wu16917), 77198 and 77153 (from Wu16801), 76398 (from Wu16121), 76428 and 76464 (from Wu16120) and 76429 (from Wu16141).

Ecology/Substrate/Host: Saprobe on dead material of plants including *Quercus* sp., *Liquidambar formosana*.
Geographical distribution: China.

Notes: *Kionochaeta beijingensis* is characterized by setiform conidiophores with a whorl of 6-12 divergent, sterile lateral branches inserted just below the middle and aseptate, falcate conidia 5-7 x 1 μm . Its most closely related species is *K. ramifera* and *K. castaneae* on appearance of conidiophores, secondary branches and fertile regions, and conidial morphology (Matsushima 1971; Sutton and Hodges 1977, 1978; Persiani et al. 1984; Kirk 1985; Kirk and Sutton 1985; Kuthubutheen and Nawawi 1988; Goh and Hyde 1997; Lin et al. 2019). They can only be distinguished by the relatively small-sized conidia in *K. beijingensis* than those in *K. ramifera*. Furthermore, the ITS sequences obtained from several strains of each species are with significant difference.

Phylogenetically, *K. beijingensis* is closely related to members of *Chaetosphaeriaceae*. On a megablast search using the ITS sequences from the strain obtained from the specimen Wu17342, the closest matches in NCBI's GenBank nucleotide database were members of *Kionochaeta*, *Chaetosphaeria*, *Dictyochaeta* and *Chloridium* in *Chaetosphaeriales*, including *Kionochaeta microspora* (GeneBank NR166293, identities 493/504 (98%), 3 gaps (0%)), *Kionochaeta castaneae* (GeneBank NR166294, identities 494/518 (95%), 4 gaps (0%)), *Chaetosphaeria dilabens* (GeneBank MH861683, identities 485/560 (87%), 26 gaps (4%)).

***Kionochaeta castaneae* C.G. Lin & J.K. Liu, Mycosphere 10: 675, 2019**

Colony on natural substrate effuse, brown, scattered. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, setiform, caespitose, erect, straight or slightly curved, dark brown, smooth, thick-walled, 250-350 x 7-9 μm ; branches dark brown, cylindrical, septate, sterile, 45-110 x 2.5-5.5 μm , apex acute. Fertile region immediately at the middle part of the conidiophores, consisting of a mass of short branches on which conidiogenous cells are borne. Conidiogenous cells monophialidic, discrete, determinate, intercalary, rarely terminal, narrowly ellipsoid, pale brown, 5-9 x 2-2.8 μm . Conidia produced in slime and adhering to the fertile region, hyaline, smooth, lunate, cylindrical, aseptate, 5-7 x 1.2-1.8 μm .

Colonies on PDA effuse, colonies 0.4-0.6 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey brown to brown, reverse brown to dark brown.

Material examined: China: Hunan Province, Zhangjiajie, on dead leaves of unidentified tree, 15 Oct. 2010, W.P. Wu (Wu11052). Strain studied: 53349 (from Wu11052)

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Lin et al. (2019).

Notes: *Kionochaeta castaneae* is similar with *K. ramifera*, but differs in producing setiform conidiophores with fewer branches and smaller conidia (Matsushima 1971; Lin et al. 2019). In addition, their ITS sequences are also with significant difference.

***Kionochaeta pughii* Kuthub. & Nawawi, Trans. Br. Mycol. Soc. 90: 437, 1988.**

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1988); Chang (1990).

Notes: No specimen was examined by us and the above description is based on documentation of the collection from Taiwan (Chang 1990). *K. pughii* is very similar to *K. ramifera* (Matsush.) P.M. Kirk & B. Sutton and can only be distinguished by the fertile tips with several conidiogenous cells of the main and branches setiform conidiophores (Kuthubutheen and Nawawi 1988; Kirk and Sutton 1985; Chang 1990).

Kionochaeta ramifera (Matsush.) P.M. Kirk & B. Sutton, Trans. Br. Mycol. Soc. 85: 715, 1985.

≡ *Chaetopsina ramifera* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 13, 1971.

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae of 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight or slightly curved, subulate, smooth, 6-10-septate, thick-walled, brown to dark brown or blackish-brown, setiform, with a whorl of 2-5 divergent, sterile lateral branches inserted just below the middle, up to 400 µm long, 8-12 µm wide, apex acute; branches pale brown to brown, smooth, 1-3-septate, 50-100 x 3-5 µm. Fertile usually sub-medium, comprising either compact and irregularly arranged branches bearing the conidiogenous cells. Conidiogenous cells ampulliform, lageniform, pale brown to brown, thin- and smooth-walled, 4-6 x 3-4 µm, with an indistinct collarette at the apex. Conidia acrogenous, formed in a liquid droplet, narrowly falcate, or slightly fusiform, curved, acute at both ends, hyaline, aseptate, smooth, 6-10 x 1-1.5 µm.

Colonies on PDA effuse, colonies 0.5-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1854g); China: Guangdong Province, Dinghushan, on rotten wood, 11 Oct. 1998, W.P. Wu (Wu2004b, Wu2046b); China: Guangxi Province, Damingshan, on dead branches of unidentified plant, 19 Dec. 1997, W.P. Wu (Wu1435); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branch of *Rhododendron* sp., 2 Jan. 1997, W.P. Wu (Wu1220a); China: Guangxi Province, Shiwandashan, on dead leaves of ?*Magnolia* sp., 28 Dec. 1997, W.P. Wu (Wu1491b); China: Sichuan Province, Ya An, Yucheng, Bifengxia City, on dead leaves of unidentified tree, 15 Dec 2013, W.P. Wu (Wu13250); Living strain: 43657 (Wu1491b), 44897 (from Wu2046b), 57586 (from Wu13250), CBS102618 (ex-type strain).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, Brazil, China, Papua-New Guinea, Kenya, USA, West Malaysia.

Description and illustration: Kirk and Sutton (1985); Kuthubutheen and Nawawi (1988); Chang (1990); Lin et al. (2019).

Notes: *Kionochaeta ramifera* (Matsush.) P.M. Kirk & B. Sutton differs from other known species in the genus by its setiform conidiophores with a whorl of a few divergent, sterile lateral branches inserted just below the middle and aseptate, falcate conidia in bigger size (Matsushima 1971; Sutton and Hodges 1976; Persiani et al. 1984; Kirk 1985; Kirk and Sutton 1985; Goh and Hyde 1997; Lin et al. 2019). Five known *Kionochaeta* species have accessory lateral setiform branches, including *K. australiensis* Goh & K.D. Hyde, *K. castaneae* C.G. Lin & J.K. Liu, *K. keniensis* (P.M. Kirk) P.M. Kirk & B. Sutton, *K. pughii* Kuthub. & Nawawi and *K. ramifera*. *Kionochaeta ramifera* differs from *K. keniensis* by its aseptate conidia and from *K. australiensis* and *K. pughii* by its accessory lateral branches being sterile. The recently described species *K. castaneae* shows most similarity with *K. ramifera* on appearance of conidiophores, fertile regions and conidia, they can only be distinguished by fewer branches of setae and the relatively small-sized conidia in *K. castaneae* than those in *K. ramifera* (5.1-6.5 x 1.2-1.8 µm vs. (5-) 8-12 x 1-1.5(-1.8) µm) (Lin et al. 2019). Its occurrence in Taiwan (conidia 3.8-5.5 x 0.4-0.8 µm) was also reported (Chang 1990).

Kionochaeta spissa P.M. Kirk & B. Sutton, Trans. Br. Mycol. Soc. 85: 715, 1985.

= *Kionochaeta microspora* C.G. Lin & K.D. Hyde, Mycosphere 10: 678, 2019.

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae of 2-3.5 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, subulate, smooth, 6-9-septate, thick-walled, brown to dark brown or blackish-brown, setiform, unbranched, 220-300 x 5-8 µm, apex acute, with a swollen base of 10-15 µm wide. Fertile usually sub-medium or slightly below medium, comprising either compact or irregularly arranged branches bearing the conidiogenous cells. Conidiogenous cells ampulliform, lageniform, pale brown to brown, thin- and smooth-walled, 4-6 x 2.5-3 µm, with an indistinct collarette at the apex. Conidia acrogenous, formed in a liquid droplet, narrowly clavate to fusiform, slightly curved, rounded at the apex, attenuated at the base, hyaline, aseptate, smooth, 5-6 x 1-1.5 µm.

Colonies on PDA effuse, colonies 6-13 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, grey to soil brown, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17253); Guangdong Province, Guangzhou, South China Botanical Garden, on dead bark, 3 April 2012 W.P. Wu (Wu12335); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead fruit of unidentified tree, 28 Feb. 2016, W.P. Wu (Wu16237); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Eucalyptus* sp., 3 April 2012, W.P. Wu

(Wu 12267); China: Guangdong Province, Guangzhou, Orchard Garden, On dead leaves of *Eucalyptus* sp., 29 Dec. 2012, W.P. Wu (Wu 12453); China: Guangxi Province, Damingshan, on dead branches of unidentified plant, 18 Dec. 1997, W.P. Wu (Wu1383e); China: Guangxi Province, Shiwandashan, On dead leaves and fruits of *Quercus* sp., 28 Dec. 1997, W.P. Wu (Wu1483e); China: Guangxi Province, Shiwandashan, on dead bark of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (WU1592a); China: Guangxi Province, Shiwandashan, on dead bark of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1594); China: Guangxi Province, Shiwandashan, on dead leaves of palm, 28 Dec. 1997, W.P. Wu (Wu1494c, this is *K. spissa*); China: Guangxi Province, Nanning, On dead fruit sheath of Leguminosae, 3 Jan 1998, W.P. Wu (Wu1661a); China: Guangxi Province, Shiwandashan, On dead leaves of palm, 28 Dec 1997, W.P. Wu (Wu1494c); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. Wu (Wu16860, Wu16869); China: Sichuan Province, Ya An, Yucheng, Bifengxia City, on dead leaves of unidentified tree, 15 Dec. 2013, W.P. Wu (Wu13195); China, Yunnan, Kunming, Botanical Garden, On dead fruit of *Quercus* sp., 22 Oct. 1999, Wu and Yan Huang (Wu2601b); China: Yunnan Province, Simao, on dead leaves of *Quercus* sp., 13 Oct. 1999, W.P. Wu & Yan Huang (WU2777a); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Zhang Yu (Wu15164, 15165); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16170). Living strain: 43042 (from Wu1483e), 46111 (from Wu2777a), 43916 (from Wu1592a), 42953 (from Wu1494c), 54396 (from Wu12335), 55371 (from Wu12453), 57546 (from Wu13195), 43882 (from 1661a), 75999 (from (15165), 54362 (from 12267), 76469 (from Wu16170), 77237 (from Wu16860), 76572 (from Wu16237), 76000 (from Wu16165), 77237 (from Wu16860), 77245 (from Wu16869a), 77666 (from Wu17253), 78506 (from Wu17602).

Ecology/Substrate/Host: Saprobe on dead material of many plant species including *Cyclobalanopsis* sp., *Eucalyptus* sp., *Quercus* sp.

Geographical distribution: Australia, China, India, Kenya, Malaysia, USA, and many other countries.

Description and illustration: Kirk and Sutton (1985); Dorai and Vittal (1987).

Notes: *K. spissa* differs from other known species in the genus by its unbranched setiform conidiophores and aseptate, obclavate conidia (Kirk and Sutton, 1985). *K. ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton has the similar conidiophores and conidia, but its conidiogenous cells are more or less sessile and scattered on conidiophores and conidia are slightly shorter (Kirk and Sutton, 1985). On morphology of conidiophore, conidiogenous cells and conidia, *K. spissa* is also similar to *K. microspora* C.G. Lin & K.D. Hyde, which was distinguished by having a fertile region at the apex of the setiform conidiophores without accessory lateral branches and aseptate conidia (Kuthubutheen and Nawawi 1988, Subramanian 1993, Castañeda-Ruiz et al. 1998, Yanna and Hyde 2002). Among the many specimens studied here, both types of conidiophores as described in *K. spissa* and *K. microspora* were observed from several specimens and their ITS sequences obtained from many collections are identical to those from the ex-type strain of *K. microspora*. With this result, we treat *K. microspora* as a synonym of *K. spissa*. Fertile regions in both apical and middles of the same conidiophores were also reported in other *Kionochaeta*, including *K. australiensis* Goh & K.D. Hyde, *K. pughii* Kuthub. & Nawawi and *K. nanophora* Kuthub. & Nawawi and an indication of any value of this character for species delimitation (Kuthubutheen and Nawawi 1988; Goh and Hyde 1997).

Phylogenetically, *K. spissa* is closely related to members of *Chaetosphaeriaceae*. On a megablast search using the ITS sequences from the strain obtained from the specimen Wu12267, the closest matches in NCBI's GenBank nucleotide database were members of *Kionochaeta*, *Chaetosphaeria*, *Dictyochaeta* and *Chloridium* in *Chaetosphaeriales*, including *Kionochaeta microspora* (GeneBank NR166293, identities 444/444 (100%), 0 gaps (0%)), *Kionochaeta castaneae* (GeneBank NR166294, identities 428/447 (96%), 4 gaps (0%)), *Chaetosphaeria innumera* (GeneBank AY906956, identities 377/435 (87%), 23 gaps (5%)).

***Kionochaetiella* W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841538**

Etymology: refers to its similarity to the genus *Kionochaeta*.

Diagnosis: similar to *Kionochaeta* in producing setiform conidiophores with fertile region in the apex and middle, phialidic conidiogenous cells, and hyaline aseptate conidia, but differs in fertile region irregularly distributed along the setiform conidiophores, and rod-shaped conidia. Phylogenetically they belong to different groups.

Type species: *Kionochaetiella ivoriensis* (Rambelli & Lunghini) W.P. Wu & Y.Z. Diao.

Teleomorph: Unknown. Anamorph: Conidiophores setiform, rigid, erect, or slightly curved, dark brown, thick-walled, septate, apex acute and sterile or fertile; fertile region irregularly distributed, apical or along the setae, consisting of brown, branched hyphae and conidiogenous cells. Conidiogenous cells mono- or poly-phialides, grow along the axis of the setiform conidiophores with an irregular distribution. Conidia hyaline, smooth, aseptate, rod-shaped, with rounded apex and truncated base.

Ecology/Substrate/Host: Saprobe on bark of tree.

Geographical distribution: Italy.

Description and illustration: Rambelli and Lunghini (1976).

Notes: Phylogenetic analysis showed that *Chaetopsina ivoriensis* Rambelli & Lunghini is separated from the type species of *Kionochaeta*, thus the new genus is created to accommodate it.

Kionochaetiella ivoriensis (Rambelli & Lunghini) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841731.

≡ *Chaetopsina ivoriensis* Rambelli & Lunghini, Giornale Botanico Italiano 110: 253, 1976.

≡ *Kionochaeta ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton, Trans. Br. Mycol. Soc. 85 (4): 713, 1986.

Teleomorph: Unknown. Anamorph: Conidiophores setiform, rigid, erect, or slightly curved, dark brown, thick-walled, 7-11-septate, 70-150 x 4.5-5.5 µm; apex acute and sterile or fertile; basal cell swollen, 12.5-14 µm wide; fertile region irregularly distributed, apical or along the setae, consisting of brown, branched hyphae and conidiogenous cells. Conidiogenous cells mono- or poly-phialides, 3.5-5 x 2.5-4.5 µm, grow along the axis of the setiform conidiophores with an irregular distribution. Conidia hyaline, smooth, aseptate, rod-shaped, 3.5-5 x (1.2-)2 (-2.5) µm, with rounded apex and truncated base. In pure culture the phialides are directly produced from the hyphae and variable in shape and size.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey brown to brown, with pale colored margin, reverse brown to dark brown.

Material examined: ex-type strain CBS374.76 (=JCM9876, =NN74400).

Ecology/Substrate/Host: Saprobe on bark of tree.

Geographical distribution: Italy.

Description and illustration: Rambelli and Lunghini (1976); Kirk and Sutton (1985).

Notes: The exo-type strain CBS374.76 of *Chaetopsina ivoriensis* Rambelli & Lunghini was studied by us, and its ITS sequence is identical to the one deposited in the GeneBank. Morphologically it differs from *Kionochaeta* species in morphology of fertile region and shape of conidia (Rambelli and Lunghini 1976; Kirk and Sutton 1985; Lin et al. 2019).

Phaeostalagmus W. Gams, Stud. Mycol. 13: 90, 1976 (MB#9321)

Colonies darkly pigmented and very slow growing. Teleomorph: Unknown. Anamorph: Conidiophores stipes dark brown, erect, with branching, giving rise either to whorls of phialides or a series of branches which eventually terminate in verticillate phialides. Phialides flask-shaped, pigmented, with a pronounced flaring collarete. Conidia hyaline, aseptate, ellipsoidal.

Type species: *Phaeostalagmus cyclosporus* (Grove) W. Gams.

Ecology/Substrate/Host: Saprobe on decaying plant material.

Geographical distribution: Broadly distributed.

Description and illustration: Gams and Holubová-Jechová (1976); Hughes (1978); Wang and Sutton (1982); Minter and Holubová-Jechová (1981); Sutton and Melnik (1992).

Notes: The genus *Phaeostalagmus* was created to accommodate two characteristic dematiaceous species *P. cyclosporus* (Grove) W. Gams and *P. tenuissimus* (Corda) W. Gams (Gams & Holubová-Jechová, 1976). Since then, 5 additional species have been described including *P. altissimus* C.J.K. Wang & B. Sutton, *P. arbusculus* C.J.K. Wang & B. Sutton, *P. novae-zelandiae* S. Hughes, *P. peregrinus* Minter & Hol.-Jech. and *P. rossicus* B. Sutton & Melnik, and they can be distinguished by manner of arrangement of conidiogenous cells on conidiophores, and conidial morphology (shape and size) (Ellis 1971; Gams and Holubová-Jechová 1976; Hughes 1978; Wang and Sutton 1982; Minter and Holubová-Jechová 1981; Sutton and Melnik 1992). In the phylogenetic analysis, it is clearly shown that the type species of *Phaeostalagmus*, *P. cyclosporus* (Grove) W. Gams, belongs to Chaetosphaeriaceae.

Key to known species of *Phaeostalagmus*

1. Most phialides formed directly on the conidiophore in whorls of 2-52
1. Most phialides formed on branches on the conidiophore4
2. Phialides 10-13 x 3-4 µm, collarete inconspicuous, conidia 3-4 x 1.2-1.8 µm*P. tenuissimus*
2. Phialides >15 µm long, collarete funnel-shaped, conidia >4 µm long in average3
3. Phialides concolorous, 16-27 x 3-4 µm; conidia 4-8 x 1-2.3 µm*P. peregrinus*
3. Phialides darker in upper part, 18-30 x 2.5-3.5 µm; conidia 5-6 x 1.2-1.5 µm*P. minimus*
4. Conidia >5 µm long5
4. Conidia <5 µm long6
5. Phialides up to 5 in clusters, 12.5-18 x 2.5-3.5 µm; conidia 5-7 x 1.8-2 µm*P. novae-zelandiae*
5. Phialides 1-2 in clusters, 21-28 x 2.5-4 µm; conidia 5.5-12.5 x 1.25-2 µm*P. rossicus*
6. Most branches & phialides formed alternately on the conidiophore; phialides 12-16.5 x 2.5-3 µm, conidia cylindrical to allantoid, hyaline, 2-3 x 1 µm *P. arbusculus*

6. Most branches & phialides formed oppositely on the conidiophore 7
 7. Conidiophores up to 500 µm high, phialides lageniform, 6-12 x 1.7-2.5 µm, conidia ellipsoidal, ovoidal to cylindrical, hyaline, 1.5-3 x 1-2 µm *P. cyclosporus*
 7. Conidiophores up to 1000 µm high, phialides cylindrical, 10-15 x 2-3 µm. Conidia obovate, brown, 2 x 1.5 µm *P. altissimus*

Phaeostalagmus minimus W.P. Wu & Y.Z. Diao, sp. nov., Fig. 181, MB841611.

Etymology: refers to its small conidia.

Diagnosis: differs from other known species by smaller conidia.

Typification: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leave of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFHH Wu12182).

Colonies effuse, pale brown, hairy. Mycelium partly superficial, partly immersed, consisting of pale brown to dark brown, septate hyphae, 1.5-4 µm wide. Teleomorph: Unknown. Anamorph: Conidiophores arising from pale brown, thick- and smooth-walled hyphae, mononematous, macronematous, single or aggregated in cluster, with a very dark, 5-9-septate, erect or slightly curved main axis, 250-350 long, 3-4 µm in the middle, up to 7 µm wide near the base, basal cell swollen and up to 12 µm wide, bearing a few phialides formed directly on the upper part below the septa of the conidiophores, occasionally with one supporting cell which are intermediate pigmentation and bearing 1-3 phialides. Phialides integrated, lateral or terminal, determined, pale brown, formed alternatively on main axis, flask-shaped, with a long narrow neck and darker flaring collarette, smooth, thin-walled, 18-30 x 2.5-3.5 µm; collarettes 2-2.5 µm wide, 1.5-2 µm long, 1-1.5 µm at the base. Conidia aggregated in slimy heads at the apex of the phialides, cylindrical, hyaline, aseptate, 5-6 x 1.2-1.5 µm.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leave of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFHH Wu12182); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leave of unidentified tree, 4 March 2012, W.P. Wu (Wu12260).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: *Phaeostalagmus minimus* clearly belongs in the genus *Phaeostalagmus* W. Gams in dark-colored conidiophores, phialidic conidiogenous, hyaline and aseptate conidia in wet spore mass (Gams and Holubová-Jechová 1976). It differs from the known species in the genus by a combination of arrangement of phialides on conidiophores and conidial morphology (shape and size) (Ellis 1971; Gams and Holubová-Jechová 1976; Hughes 1978; Wang and Sutton 1982; Minter and Holubová-Jechová 1981; Sutton and Melnik 1992). Among the known species, only *P. tenuissimus* and *P. peregrinus* produce lateral and terminal phialides directly from conidiophores and without supporting cell. *P. tenuissimus*, with shorter phialides (10-13 x 3-4 µm) and smaller conidia (3-4 x 1.2-1.8 µm), can be easily distinguished from *P. minimus* (Gams and Holubová-Jechová 1976). *P. peregrinus* and *P. minimus* have similar sized phialides, but the former has unicolorous phialides and slightly big conidia (4-8 x 1-2.3 µm) (Minter and Holubová-Jechová 1981).

Sporendocladia Arnaud ex Nag Raj & W.B. Kendr., A Monograph of *Chalara* and Allied Genera: 162, 1975.

Colonies effuse, superficial, brown. Anamorph: Conidiophores solitary to aggregated, erect or flexuous, branched at the apex, septate, brown, smooth. Conidiogenous cells integrated, determinate, ampulliform, lageniform, obclavate, pale brown to brown, with a deep, cylindrical or subcylindrical collarette. Conidia holoblastic, cylindrical, hyaline, aseptate, smooth, truncate at both ends, extruded in long chain. Teleomorph: Unknown.

Type species: *Sporendocladia fumosa* (Ell. & Everh.) Wingfield (= *Spicaria fumosa* Ell. & Everh.; = *S. castaneae* Arnaud in Nag Raj & W.B. Kendr.)

Ecology/Substrate/Host: Saprobe on decaying plant material.

Geographical distribution: Broadly distributed, including Asia, Europe and US.

Description and illustration: Nag Raj and Kendrick (1976); Sutton (1975); Wingfield et al. (1987); Mouton and Wingfield (1993); Seifert et al. (2011).

The genus *Sporendocladia* Arnaud in Nag Raj & W.B. Kendr. morphologically resembles *Chalara* (Corda) Rabenh. but can be distinguished by its conidiophores with branched fertile region. Morphologically several other dematiaceous genera, including *Leptographium* Lagerb. & Melin, *Phialocephala* W.B. Kendr., share the similar morphological characters such as terminal and branched conidiophores, lageniform or subcylindrical and phialidic conidiogenous cells, and hyaline, aseptate and cylindrical conidia with somewhat truncated ends, they can be distinguished by a combination of morphology and phylogeny (Kendrick 1961; Sutton 1975; Wingfield et al. 1987; Mouton and Wingfield 1993; Crous & Wingfield, 2014; Seifert et al. 2011).

A total of 8 species names have been published for the genus *Sporendocladia*, including *S. fumosa* (Ell. & Everh.) M. Wingf., *S. bactrospora* (W.B. Kendr.) M. Wingf., *S. castaneae* G. Arnaud ex. Nag Raj & W.B. Kendr.,

S. foliicola (P.M. Kirk) M. Wingf., *S. ivoriensis* (Zucconi & Onofri) W. Wingf., *S. kionochaetoides* B. Sutton and *S. truncata* (B. Sutton) M. Wingf. These species can be distinguished by colony on nature substrate, the conidiogenous branches and conidial morphology (Arnaud 1954; Sutton 1975; Nag Raj and Kendrick 1975; Wingfield et al. 1987; Sutton 1993). Among them, *S. castaneae* is a synonym of *S. fumosa* (Wingfield et al., 1987).

However, the phylogenetic analysis indicated that the genus *Sporendocladia* is polyphyletic. The type species, *S. fumosa*, belongs to Chaetosphaeriaceae, while at least three other species, *S. foliicola*, *S. bactrospora* and *S. kionochaetoides* are placed distantly from each other in the phylogenetic tree created by rDNA sequences. *S. foliicola* and *S. kionochaetoides* are grouped together with members of *Leotiales*, while *S. bactrospora* belongs to *Microascales* (Gruenig et al. 2002; Jacobs et al., 2003; Roux et al. 2014). Here we accepted the narrow concept of the genus as typified by *S. fumosa* in Chaetosphaeriaceae. Most other species should be excluded from the genus.

Sporendocladia fumosa (Ell. & Everh.) M.J. Wingf., Trans. Br. Mycol. Soc. 89: 515, 1987.

= *Spicaria fumosa* Ell. & Ev., Bull. Torrey Bot. Club 10: 97, 1883.

= *Phialocephala fumosa* (Ell. & Ev.) Sutton. Trans. Br. mycol. Soc. 64: 411, 1975.

= *Sporendocladia castaneae* Arnaud, Bull. Soc. Mycol. Fr. 69: 279 (1954), nom. inval.

= *Sporendocladia castaneae* Arnaud ex Nag Raj & B. Kendrick, A monograph of *Chalara* and allied genera, p. 162, 1975.

Material examined: China: Yunnan Province, Kunming, Heilongtan Park, 19 Oct 2003, on dead fruit of *Quercus* sp., W.P. Wu (Wu7123). Living strain CBS518.93, 47731 (from Wu7123).

Geographical distribution: China, France, Switzerland, UK.

Description and illustration: Nag Raj and Kendrick (1976); Sutton (1975); Crous and Wingfield (1994).

Notes: *S. fumosa* (Ellis & Everh.) M.J. Wingf. is characterized by cylindrical, brown, and septate conidiophores with branches at the top, *Chalara*-like conidiogenous cell, and hyaline, aseptate, cylindrical, truncated conidia formed in false chain. This fungus is commonly found on cupules of *Castanea sativa* in Europe. The single strain from China has only 6 bp difference from the ITS sequence with those obtained from Europe strain (CBS518.93).

Sporendocladia beijingensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 182-183, MB841612.

Etymology: refers to the locality where this fungus was collected.

Typification: China: Beijing, Huairou, Hongluosi, on dead cupules of *Quercus* sp., 11 Jun 2020, W.P. Wu (Holotype WFH WuBJ19-3; ex-type strain CGMCC 3.20738 = NN 77249).

Colony on natural substrate effuse, black. Mycelium partly immersed and partly superficial, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, unbranched, solitary, erect, straight, smooth, dark brown, becoming paler towards the apex, thick-walled, (80-)170-520 µm high, 3.5-4.5 µm wide at the first septum above the swollen base, 3-10-septate, 3-4 µm wide below the conidiogenous branches. Conidiogenous apparatus consisting of branches with terminal phialides in a loose arrangement with a 1-3-verticillate branching pattern; primary branches cylindrical, 4-5 µm long, 2-2.8 µm wide, brown, smooth, thick-walled, giving rise to secondary branches or terminal phialides. Conidiogenous cells thick-walled, light brown, smooth, lageniform, 8-11 x 2-2.5 µm, consisting of an ellipsoid venter and a cylindrical collarette, transition from venter to collarette gradually, with funnel-shaped collarette, up to 1 µm wide. Conidia catenate, arranged in false chains with only basal dehiscence scars, not in a mucous droplet, aseptate, smooth, hyaline, cuneiform with rounded apices and truncate bases, widest at their apices, tapering inconspicuously to narrower bases, 2-3 x 1-1.2 µm.

Colonies on PDA effuse, colonies 0.8-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, with grey to dark brown pitch, with pale colored margin, reverse pale brown.

Material examined: China: Beijing, Huairou, Hongluosi, on dead cupules of *Quercus* sp., 11 Jun 2020, W.P. Wu (Holotype WFH WuBJ19-3; ex-type strain NN 77249); China: Beijing, Huairou, Hongluosi, on dead cupules of *Quercus* sp., 29 July 2020, W.P. Wu (Wu17295, Wu17298, Wu17304, Wu17315, Wu17340, Wu17341, Wu17349, Wu17355, Wu17373); China: Yunnan Province, Kunming, Heilongtan, on dead fruit of *Quercus* sp., 18 Oct. 2003, W.P. Wu (Wu7123). Living strain: 78004 and 78005 (from Wu17295), 78010 (from Wu17304), 78008 (from Wu78008).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: *Sporendocladia beijingensis* W.P. Wu & Y.Z. Diao resembles the type species *S. fumosa* (Ellis & Everh.) M.J. Wingf. in appearance of conidiophores, conidiogenous apparatus, conidiogenous cells and conidia. In fact, they are hardly distinguished from each other by morphology, however their ITS sequence has 8 bp difference.

Phylogenetically, *Sporendocladia beijingensis* is related to members of Chaetosphaeriaceae. On a megablast search using the ITS sequences from the strain obtained from the specimen WuBJ19-3, the closest matches in

NCBI's GenBank nucleotide database were members of *Sporendocladia* and *Chaetosphaeria* in *Chaetosphaeriaceae*, including *Sporendocladia fumosa* (GenBank MH862436, identities 495/503 (98%), 2 gaps (0%)), *Chaetosphaeria myriocarpa* (GenBank MH859991, identities 468/537 (87%), 37 gaps (6%)).

Parasporendocladia W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841540.

Etymology: refers to its similarity to the genus *Codinaea*.

Type species: *Phialocephala bactrospora* W.B. Kendr.

Colonies effuse, superficial, brown. Anamorph: Conidiophores solitary to aggregated, erect or flexuous, branched at the apex, septate, brown, smooth. Conidiogenous cells integrated, determinate, ampulliform, lageniform, obclavate, pale brown to brown, with a deep, cylindrical or subcylindrical collarete. Conidia holoblastic, cylindrical, hyaline, aseptate, smooth, truncate at both ends, extruded in long chain. Teleomorph: Unknown.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Brazil, Japan, Europe.

Parasporendocladia bactrospora (W.B. Kendr.) W.P. Wu & Y.Z. Diao, sp. nov., MycoBank MB841745.

≡ *Phialocephala bactrospora* W.B. Kendr., Can. J. Bot. 39: 1083, 1961.

≡ *Sporendocladia bactrospora* (W.B. Kendr.) M.J. Wingf., Trans. Br. Mycol. Soc. 89:515, 1987.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Brazil, Japan, Europe.

Description and illustration: Kendrick (1961); Matsushima (1975); Barbosa et al. (2009).

Notes: Morphologically it is difficult to be distinguished from *Sporendocladia* and *Phialocephala*, but the phylogenetic analysis shows that *Phialocephala bactrospora* belongs to *Microascales*, while the type species of genus *Phialocephala* W.B. Kendr., *P. dimorphospora* W.B. Kendr., belongs to *Mollisiaceae* in *Helotiales*; and the type species of *Sporendocladia*, *S. fumosa*, belongs to *Chaetosphaeriaceae* (Wingfield et al. 1987; Mouton and Wingfield 1993; Jacobs et al. 2001, 2003; Day 2012; Seifert et al. 2013; Roux et al. 2014; Tanney et al. 2016). Thus, a new genus, *Parasporendocladia* W.P. Wu & Y.Z. Diao, is created to accommodate *Phialocephala bactrospora*. Morphologically it is also similar with *Custingophora*, but phylogenetically different.

Lareunionomyces foliicola (P.M. Kirk) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841751.

≡ *Phialocephala foliicola* P.M. Kirk, Mycotaxon 23: 337, 1985.

≡ *Sporendocladia foliicola* (P.M. Kirk) M.J. Wingf., Trans. Br. Mycol. Soc. 89: 515, 1987

Typification: Kenya: Mt. Kenya, Castle Forest, on dead leave, 25 Jan. 1984, P.M. Kirk, IMI285199a.

Geographical distribution: Kenya.

Description and illustration: Kirk (1985).

Notes: *Phialocephala foliicola* was described for a leaf litter fungi from Kenya and it is characterized by single and dark colored conidiophores consisting of a main stipe with only 1 septum and a apical verticillate sporulating apparatus, which is 1-3 times branched and terminating with 1-2 phialides with graduation transition from venter to collarete, and hyaline, aseptate, cylindrical conidia (4-6 x 1.5-2 µm) with rounded apex and produced in wet spore mass (Kirk, 1985). Wingfield, Van Wyk & Wingfield (1987), based on the conidial development, transferred it to *Sporendocladia*. The phylogenetic analysis based on the rDNA ITS sequences showed that *P. foliicola* was not clustered together with other *Phialocephala* species (Gruenig et al., 2002).

On a megablast search using the ITS sequences from the strain CBS201.95 the closest matches in NCBI's GenBank nucleotide database were members of *Lareunionomyces* Crous & M.J. Wingf. in *Helotiales*. Thus, it is officially transferred to the genus *Lareunionomyces* (Crous et al. 2016). It differs from other known species in the genus *Lareunionomyces* by the main stipe of the conidiophores with only 1 septum, and verticillate sporulating head with only 1-3 branches, and conidial size (Crous et al, 2016, 2018, 2019).

Lareunionomyces kionochaetoides (B. Sutton) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841746.

≡ *Sporendocladia kionochaetoides* B. Sutton, Mycol. Pap. 167:58, 1993.

Typification: On dead stem of *Rubus ellipticus* (*Rosaceae*), Malawi: Mt. Mulanje, Chambe hut track, south-east on track to Lichenya, S1550, E03450, 2000 m a.s.l., 13 Apr. 1991, B.C. Sutton MM28 (IMI347108b, holotypus).

Geographical distribution: Malawi.

Description and illustration: Sutton (1993).

Notes: *Sporendocladia kionochaetoides* was described for a microfungi from Malawi and it is characterized by single and dark colored conidiophores consisting of a main stipe with only 1-2 septum and a apical verticillate sporulating apparatus, which is 2-3 times branched and terminating with 1-2 phialides with graduation transition from venter to collarete, and hyaline, aseptate, cylindrical conidia (3.5-4 x 1.5-2 µm) with truncated ends and

produced in wet spore mass (Sutton 1993). These characters match well to the genus *Lareunionomyces* Crous & M.J. Wingf. in *Helotiales*. Thus, it is officially transferred to the *Lareunionomyces* (Crous et al. 2016, 2018, 2019).

Undetermined species:

Sporendocladia ivoriensis (Zucconi & Onofri) M.J. Wingf., Trans. Br. Mycol. Soc. 89: 509, 1987.

≡ *Phialocephala ivoriensis* Zucconi & Onofri, Mycotaxon 20: 189, 1984.

Typification: Tai, Ora Eboris, on dead leaves, 23 Mar. 1981, H.B.R. 126A (Holotypus).

Geographical distribution: Tai.

Description and illustration: Onofri & Zucconi (1984).

Notes: *Phialocephala ivoriensis* Zucconi & Onofri morphologically resembles member of *Sporendocladia*. No DNA sequence data is available for the phylogenetic analysis; thus, its taxonomic position still remains to be explored when the living strain and DNA sequences data will be provided.

Sporendocladia truncata (B. Sutton) M.J. Wingf., Trans. Br. Mycol. Soc. 89: 517, 1987.

≡ *Phialocephala truncata* B. Sutton, Trans. Br. Mycol. Soc. 64: 414, 1975.

Geographical distribution: UK.

Description and illustration: Sutton (1975).

Notes: *Phialocephala truncata* B. Sutton morphologically resembles member of *Sporendocladia* and *Neolauriomyces*. No DNA sequence data is available for the phylogenetic analysis; thus, its taxonomic position still remains to be explored when the living strain and DNA sequences data will be provided.

Sporoschisma and related genera

Among the 91 accepted chaetosphaeriaceous genera, 8 genera produce multiseptate and dark colored conidia from the terminal phialide of solitary conidiophores. These genera are *Anacacumisporium*, *Cacumisporium*, *Exserticlava*, *Monosporoschisma*, *Phaeodischloridium*, *Sporoschisma* and *Stephembruneria*.

Phylogenetically all these genera are well-defined monophyletic genera, but polyphyletic in the phylogenetic trees generated by using the combined data set of ITS and LSU (Fig. 3). Morphologically most of these genera are also well-delimited by a combination of setae, conidiophores, conidiogenous cells and conidia. The living strains of many studied species were also studied on PDA, some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to anamorphic genera with colored and multiseptate conidia:

1. Sterile capitate hyphae present among conidiophores 2
1. Sterile capitate absent 3
2. Collarettes deep, cylindrical; conidia cylindrical, septate, darkly pigmented *Sporoschisma*
2. Collarettes shallow, funnel-shaped; conidia ellipsoidal to cylindrical *Monosporoschisma*
3. Conidia star-shaped, with a few arms and each arm bearing one appendage *Phaeonawawia*
3. Conidia not star-shaped 4
4. Conidiogenous cell with multispore-producing loci within the collarette 5
4. Conidiogenous cell with single sporulating loci within the collarette 6
5. The meristematic tip within collarette often protruding beyond the collarette *Cacumisporium*
5. The meristematic tip within collarette not protruding beyond the collarette *Exserticlava*
6. Conidia with one filamentous appendage at both end *Anacacumisporium*
6. Conidia without appendage 7
7. Collarette narrow, cylindrical; conidia ellipsoidal *Stephembruneria*
7. Collarette broad, funnel-shaped; conidia cylindrical *Phaeodischloridium*

Anacacumisporium Y.R. Ma & X.G. Zhang, Crypt. Mycol. 37: 52, 2016.

Colonies effuse, dark brown, hairy. Mycelium partly superficial, partly immersed in the substratum. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, unbranched, straight, or flexuous, cylindrical, thick-walled, smooth, septate, brown at the base, colorless towards the apex, determinate in length. Conidiogenous cells integrated, terminal and/or intercalary, cylindrical, brown, pale brown or subhyaline, smooth or verrucose, phialidic, mono-polyblastic; collarette narrow or flaring, not apparently proliferating. conidia solitary, dry, apical and/or lateral, simple, smooth, typically reniform, ellipsoidal to fusiform, but sometimes cylindrical, rarely obclavate, brown to dark brown or bicolored, with an appendage at each end. Conidial secession schizolytic.

Type species: *Anacacumisporium appendiculatum* Y.R. Ma & X.G. Zhang.

Ecology/Substrate/Host: Saprobe on dead branches of tree.

Geographical distribution: China.

Description and illustration: Ma et al. (2016).

Anacacumisporium appendiculatum Y.R. Ma & X.G. Zhang, Crypt. Mycol. 37: 52, 2016.

Typification: China: Hainan Province, Ledong, Jianfengling National Forest Park, on dead branches of unidentified broadleaf tree, 17 May 2014, Yingrui Ma (Holotype HSAUP H4589). Ex-type culture HSAUPmyr4589, HMAS 245593 (living cultures).

Geographical distribution: China.

Description and illustration: Ma et al. (2016).

Notes: *Anacacumisporium* Y.R. Ma & X.G. Zhang is a recently established genus with *A. appendiculatum* Y.R. Ma & X.G. Zhang as the type species, a microfungi found on dead branches of unidentified trees in tropical area of Hainan Province, China. The genus is characterized by mononematous, macronematous conidiophores, terminal phialidic conidiogenous cells and euseptate conidia produced in slimy mass and with an appendage at both ends (Ma et al. 2016). The genus remains monotypic. Morphologically *Anacacumisporium* is similar to *Cacumisporium* in cylindrical conidiophores bearing terminal phialidic conidiogenous cells with broad sporulating loci, and septate and brown conidia, but conidia of *Cacumisporium* are without setulae (DiCosmo et al. 1983; Gams and Holubová 1976; Castañeda-Ruiz 2007; Seifert et al. 2011). Its affinity to *Chaetosphaeriaceae* was confirmed by the molecular phylogenetic analysis (Ma et al. 2016).

Cacumisporium Preuss, Linnaea (Berl.) 24: 130, 1851.

Lignicolous on rotten wood, colonies effuse, hairy, brown to grayish brown. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae. Teleomorph: Ascomata superficial, solitary or in groups of 3-5, subglobose to conical, papillate, papilla perforated by a rounded pore in old perithecia, ostiolate, dark brown to black, glistening, glabrous or covered with conidiophores of the anamorph, slightly rugose. Perithecial wall brittle, consisting of two layers; an outer layer of thin-walled, dark brown, opaque, polyhedral to brick-like cells, and an inner layer of thin-walled, compressed, hyaline cells. Ostiolar canal periphysate. Paraphyses copious, branching, septate, protruding beyond the tips of the asci. Asci clavate-cylindrical, narrowly rounded at the tip, with a J-, refractive apical annulus. Ascospores cylindrical to cylindrical-fusiform or fusiform, occasionally tapering towards one end, 5-septate, not constricted or very slightly constricted at the septa, smooth-walled, hyaline, 2-3-seriate, overlapping in the upper part of the ascus, germinating by germ tubes at the ends. Anamorph: Conidiophores macronematous, mononematous, erect, straight, or slightly curved, simple, cylindrical, septate, brown, paler towards the apex, smooth. Conidiogenous cells integrated, determinate, monoblastic, cylindrical, pale brown to medium brown, smooth, with a pale brown, funnel- or cup-shaped and flaring collarette. Conidia holoblastic, aggregated in slimy heads, allantoid, ellipsoidal, fusiform, or oblong rounded at the apex, truncate at the base, at first colorless with large guttulate, later brown and transversely septate, smooth.

Type species: *Cacumisporium tenebrosus* Preuss. (= *Cacumisporium capitulatum* (Corda) S. Hughes; anamorph of *Chaetosphaeria decastyla* (Cooke) Réblová & W. Gams).

Ecology/Substrate/Host: Saprobe on decaying plant material, including rotten wood.

Geographical distribution: Broadly distributed.

Description and illustration: Goos (1969a); Ellis (1976); Seifert et al. (2011).

Notes: The genus *Cacumisporium* Preuss, as typified by *Cacumisporium tenebrosus* Preuss. (= *Cacumisporium capitulatum* (Corda) S. Hughes), is characterized by simple, dark brown and septate conidiophores, conidiogenous cells with broad and cupulate phialidic collarettes, and the brown septate conidia aggregated in slime heads (Goos 1969a; Seifert et al. 2011). The genus currently comprises eight accepted species: *C. capitulatum* (Corda) S. Hughes, *C. fusiforme* Z.H. Xu, Jian Ma, X.G. Zhang & R.F. Castañeda, *C. pleuroconidiophorum* (Davydkina & Melnik) R.F. Castañeda, Heredia & Iturr (= *C. curvularioides* R.F. Castañeda & W.B. Kendr.), *C. sigmoideum* Mercado & R.F. Castañeda, *C. spooneri* P.M. Kirk, and *C. rugosum* K.M. Tsui, Goh, K.D. Hyde & Hodgkiss, *C. tropicale* R.F. Castañeda, Gusmão & Stchigel and *C. uniseptatum* Wongsawas, H.K. Wang, K.D. Hyde & F.C. Lin (Ellis 1976; Kirk, 1992; Castañeda-Ruiz and Kendrick 1991; Mercado Sierra and Castañeda-Ruiz 1987; Tsui et al. 2001b; Castañeda-Ruiz et al. 2007a, b; Wongsawas et al. 2009; Xu et al. 2019). These species can be distinguished by their conidial morphology, including color, size and septation and a synopsis for all of these species was given by Tsui et al. (2001). A key to all these species was provided by Xu et al. (2019).

Conidiogenous cells of *Cacumisporium* have been considered to be sympodial-phialides resembling species of *Chloridium* Link ex Fr., in which conidia are produced in sympodial succession from a conidiogenous cell above a phialidic collarette (Goos, 1969a; Hammill 1972, Cole and Samson 1979; Réblová and Gams 1999). Similar phialidic collarettes in *C. rugosum* were found. This is consistent with that illustrated by Goos (1969a, b)

for *C. capitulum*. However, several recently described species are with typical holoblastic and sympodial conidiogenous cells, similar to those in *Minimelanolocus* (Seifert et al. 2011). Phylogenetic analysis is needed to elucidate the relationships of the published species and might result in reclassification of several species.

The type species, *Cacumisporium capitulum* is the anamorph of *Chaetosphaeria decastyla* (Cooke) Réblová & W. Gams, which has been confirmed by pure culture and molecular phylogenetic analysis (Réblová and Gams 1999).

Among the known species of *Cacumisporium*, only the type species is with available LSU and ITS sequences for molecular phylogenetic analysis. The phylogenetic relationship among the described species is still to be studied in future. The genus *Cacumisporium* has been reported in China with three species, *C. fusiforme*, *C. rugosum* and *C. sigmoideum*. Here the type species, *C. capitulum*, is added as a new record for China.

Key to known species of *Cacumisporium*

1. Conidia 1-septate, hyaline or versicolorous, ovoid, cylindrical to clavate 2
1. Conidia multiseptate, various shaped 3
2. Conidiogenous cells with 5-12 densely annellate proliferation; conidia hyaline, 12.5-15.5 x 4-5 µm ... *C. acutata*
2. Conidia 1-septate, versicolorous, ovoid, 18-26 x 11-16 µm *C. uniseptatum*
3. Conidia 7-septate, narrowly ellipsoid to somewhat fusiform, 26-32 x 3-5 µm *C. spooneri*
3. Conidia 3(-4)-septate 4
4. Conidia rugose to verrucose, obovoid to broadly ellipsoid, 28-35 x 14-20 µm. *C. rugosum*
4. Conidia smooth 5
5. Conidia botuliform, 16-22 x 4.5-5 µm *C. capitulum*
5. Conidia obturbinate, sigmoid or fusiform, at least 6 µm diam. 6
6. Conidia concolorous, broad fusiform, navicular, ellipsoid, 12-17 x 6-8 µm *C. tropicale*
6. Conidia versicolor 7
7. Conidia with one swollen cell strongly pigmented, 18-28 x 8-9 µm *C. pleuroconidiophorum*
7. Conidia with two cells strongly pigmented 8
8. Conidia fusiform, 23.5-33.5 x 7.5-9 µm, 3(-4)-euseptate, with a rounded apex *C. fusiforme*
8. Conidia falcate, mostly sigmoid, 26-41 x 7.6-10 µm, 3-septate, apex acute..... *C. sigmoideum*

Cacumisporium acutatum (Réblová & W. Gams) W.P. Wu & Y.Z. Diao, comb. nov., Mycobank MB841732.

≡ *Chaetosphaeria acutata* Réblová & W. Gams, Czech Mycol. 51: 9, 1999.

Anamorph: Conidiophores macronematous, mononematous, solitary, erect, unbranched, cylindrical, 125-190 µm long and (4-)5-6.5 µm wide in the middle, tapering to 3-4 µm, straight or slightly flexuous, dark brown, paler towards the apex, smooth, often with 1 percurrent proliferation. Phialides terminal, cylindrical, the percurrently proliferating part above the collarete 4-10.5 µm long and 3.5-5 µm wide, with 5-12 densely annellate proliferations. Primary collarettes hyaline, 4.5-5.5(-6) µm wide and 1 µm deep. Conidia (11-)12.5-15.5(-16.5) x 4-5 µm, cylindrical to clavate, straight or slightly curved, tapering and truncate at the proximal end, rounded at the distal end, 1-septate, not constricted, smooth-walled, hyaline.

Typification: Czech Republic: Southern Bohemia, Šumava mountain, glacial cirque of the lake Certovo jezero near Zelezná Ruda, on wood of *Fagus sylvatica*, 28 Aug. 1997, M.R. 994/97 (PRM842979, holotype).

Ecology/Substrate/Host: Saprobe on wood of *Fagus sylvatica*.

Geographical distribution: Czech Republic, France, Ukraine.

Description and illustration: Réblová and Gams (1999).

Notes: On our phylogenetic analysis, *Chaetosphaeria acutata* Réblová & W. Gams is grouped together with *Cacumisporium capitulum* (Corda) S. Hughes with strong support. Morphologically, *C. acutata* produces solitary cylindrical conidiophores, terminal monophialidic conidiogenous cells with 5-12 densely annellate proliferations and inconspicuous collarettes, and 1-septate and slightly curved conidia, which are very similar to those seen in *C. capitulum* (Goos 1969a; Réblová and Gams 1990). *C. acutata* differs from *C. capitulum* in that the conidia in *C. capitulum* are 3-septate, hyaline at the beginning, and eventually becoming brown with the two central cells, while the conidia in *C. acutata* are hyaline. No specimen was examined by us and the above description is based on publication by Réblová and Gams (1990).

Cacumisporium capitulum (Corda) S. Hughes, Can. J. Bot. 96: 743, 1958. Fig. 184

≡ *Helminthosporium capitulum* Corda, Icones Fungorum Hucusque Cognitorum 2: 13, t. 10:58, 1838.

≡ *Acrothecium capitulum* (Corda) Ferraris, Flora Italica Cryptogamica, Hyphales: 454, 1912.

= *Cacumisporium tenebrosum* Preuss, Linnaea 24: 130, 1851.

= *Chaetosphaeria decastyla* (Cooke) Réblová & W. Gams, Czech Mycol. 51: 19, 1999.

= *Sphaeria decastyla* Cooke, Grevillea 7 (42): 52, 1878.

= *Acanthostigma decastylum* (Cooke) Sacc., Sylloge Fungorum 2: 210, 1883.

= *Melanomma macrosporum* Sacc., Hedwigia 14: 73 (1875)
= *Zignoëlla macrospora* (Sacc.) Sacc., Michelia 1: 346 (1878)

Colonies effuse, hairy, brown to grayish brown. Mycelium partially superficial and partially immersed, composed of pale brown to brown, septate, branched, septate hyphae, 2–4 µm wide. Conidiophores macronematous, mononematous, erect, straight, or slightly curved, simple, cylindrical, 5–9-septate, brown to dark brown, paler towards the apex, smooth- and thick-walled, 100–250 x 5–7 µm, with a flattened basal cell of 10–15 µm wide, terminating in a conidiogenous cells. Conidiogenous cells integrated, determinate, monoblastic, cylindrical, pale brown to medium brown, smooth or verruculose, thin-walled, with a pale brown, with funnel- or cup-shaped and flaring collarette, sometimes with conidiogenous loci proliferating percurrently, 35–45 x 4–5.5, collarette 4–7 µm wide. Conidia holoblastic, aggregated in slimy heads around the apex of conidiophores, allantoid, ellipsoidal, fusiform or oblong rounded at the apex, truncate at the base, 3-septate, at first colorless with large guttulate, later brown in the 2 medium cells and subhyaline in each end cell, smooth, 12–22 x 3.5–5 µm.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on rotten wood, 26 Dec. 2012, W.P. Wu (Wu12395); China: Jilin Province, Changbaishan, on rotten wood, 20 Aug. 1998, W.P. Wu (Wu1741a, Wu1801b); China: Yunnan Province, On rotten wood, 28 June 2004, W.P. Wu (Wu7048). Living strain: 44541 (from Wu1741a), 55410 (from Wu12395).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, France, Italy, UK, USA.

Description and illustration: Goos (1969a); Hughes (1958); Matsushima (1975); Ellis (1976); Réblová and Gams (1999).

Notes: Four specimens of *Cacumisporium capitulatum* (Corda) S. Hughes were examined from China and they have some variation on morphology of conidiophore, conidiogenous cells and conidia. Most these specimens bear the fungus with typical characteristics of the species as described by Goos (1969a), Ellis (1971) and Réblová and Gams (1999); while on the specimen Wu1801b the conidiogenous cells are verruculose, with broad apical collarette and without percurrent proliferation, and the conidia are slightly larger in average (18–22 x 4.5–5.5 µm).

Cacumisporium fusiforme Z.H. Xu, Jian Ma, X.G. Zhang & R.F. Castañeda, Mycotaxon 134: 276, 2019. (MB 829269)

Teleomorph: Unknown. Anamorph: Conidiophores simple, erect, straight, or flexuous, smooth, septate, cylindrical, often with 1–2 enteroblastic percurrent extensions, dark brown at the base, pale brown or subhyaline at the apex, 73–185 x 4–7 µm. Conidiogenous cells polyblastic, integrated, terminal, sympodial elongated, with flattened or inconspicuous denticles at the conidiogenous loci, brown, pale brown to subhyaline, 35–61.5 x 5.5–6.5 µm. Conidial secession schizolytic. Conidia solitary, acrogenous, fusiform, occasionally curved, 3(–4)-euseptate, end cells subhyaline or pale brown to pale yellow, middle cells yellow-brown, smooth, 23.5–33.5 x 7.5–9 µm, apex rounded, base truncate, 2–2.5 µm wide, accumulating in brown, somewhat mucilaginous masses.

Typification: China: Jiangxi Province, Jiulianshan National Nature Reserve, on dead branches of an unidentified broadleaf tree, 3 Nov. 2014, J. Ma (Holotype, HJAUP M0307).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Xu et al. (2019).

Notes: *C. fusiforme* Z.H. Xu, Jian Ma, X.G. Zhang & R.F. Castañeda is a recently described species from China and it is most similar to *C. sigmoideum* Mercado & R.F. Castañeda, which is distinguished by its falcate, mostly sigmoid, 3-euseptate and larger (26–41 x 7.6–10.2 µm) conidia with an acute apex (Mercado-Sierra & Castañeda, 1987; Xu et al., 2019). This is one of those species under *Cacumisporium* with similar conidiogenesis to *Minimelanolocus*. Living strain needs to be obtained for molecular study to elucidate its phylogenetic relationship with the type species *Cacumisporium capitulatum* and other similar fungi.

Cacumisporium rugosum K. M. Tsui, Goh, K. D. Hyde & Hodgkiss, Mycologia 93: 389, 2001

Teleomorph: Unknown. Anamorph: Conidiophores 200–350 x 7.5–10 µm, with a swollen base ca 12 µm wide, erect, cylindrical, straight, unbranched, dark brown, paler towards the apex, 4–6-septate, often with 1–2 percurrent proliferations, smooth-walled. Conidiogenous cells terminal, integrated, polyblastic, producing conidia in sympodial succession above cylindrical, phialidic collarettes. Conidia acrogenous, holoblastic, 28–35 x 14–20 µm, obovoidal to broadly ellipsoidal, 3-euseptate, with two central dark brown cells and pale brown proximal and distal cells, rugose to verrucose throughout except at the proximal cells. Conidial secession schizolytic, frills of the conidial wall remain on the conidiogenous cells.

Typification: China: Hong Kong: Lantau Island, Tung Chung River, on submerged wood, 28 Jul 1997, K. M. Tsui, KM208 (Holotype, HKU(M) 5548), culture of holotype (HKUCC 2299).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Tsui et al. (2000).

Notes: *Cacumisporium rugosum* K. M. Tsui, Goh, K. D. Hyde & Hodgkiss resembles *C. capitulatum* (Corda) S. Hughes in having 3-septate conidia but is unique in producing brown and rugose conidia (Tsui et al. 2000). Other *Cacumisporium* species differ distinctly from *C. rugosum* on conidial septation, shape and size. As in *C. capitulatum*, phialidic collarettes and conidiogenesis in *C. rugosum* were also found and holoblastic conidia are formed from the apex of polyblastic conidiogenous cells borne on the brown and septate conidiophore (Goos 1969a; Tsui et al. 2000).

Cacumisporium sigmoideum Mercado & R.F. Castañeda, *Acta Bot. Cubana* 50: 1, 1987.

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, solitary, erect, straight, unbranched, septate, smooth, medium brown to dark brown, apex pale brown or subhyaline, 250-340 µm long, basal portion 6-7 µm wide, upper portion attenuated and 5-5.5 µm wide, with multiple percurrent proliferations, rounded at the apex. Conidia acrogenous, solitary, broadly fusiform to ellipsoidal, slightly to moderately curved, 23-30.5 x 8-10 µm, smooth, 3-septate, versicolored, the two central cells larger and pale reddish brown, end-cells smaller and subhyaline or very pale brown, conically rounded at the apex, obconically truncate at the base; conidial secession schizolytic.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, China, Cuba.

Description and illustration: Mercado Sierra and Castañeda-Ruiz (1987); Raja et al. 1997; Hyde and Goh (1998).

Notes: This fungus was reported on decaying twigs from stream in Taiwan, China (Chang 1997). No specimen was examined by us, the above short description is based on the original description.

Exserticlava S. Hughes, *N.Z. J. Bot.* 16: 332, 1978.

Lignicolous. Teleomorph: Ascomata globose to broadly ovoid, dark brown, separate, scattered to gregarious, superficial on the substratum, papillate, with scattered setae, brown, multiseptate, apex capitate, globose to subglobose. Yellow pruina covering apices of setae and surface of ascomata. Ascomatal wall opaque in surface view in water, of textura angularis in lactophenol. Ascomatal apex papillate, short. Paraphyses sparse, simple, septate. Asci cylindrico-clavate, short-stalked, unitunicate, thin-walled, with a distinctive apical ring, with 8 ascospores irregularly arranged. Ascospores fusiform, with rounded end cells, sub-hyaline to light brown, septate. Anamorph: Colonies effuse, brown, hairy. Mycelium partly immersed and partly superficial, composed of smooth, septate, dark-brown, thin- to thick-walled hyphae. Conidiophores cylindrical, solitary, erect, sometimes curved, unbranched, scattered to gregarious, septate, thick-walled, dark brown below, paler above, smooth-walled. Conidiogenous cells integrated, terminal, phialidic, swollen, cupulate, brown, smooth-walled, polyblastic, with multiple conidiogenous loci active within the collarette, collarette conspicuously. Conidia holoblastic, distoseptate or aseptate, spherical to ellipsoidal, oblong-ellipsoid, ovoid, rounded at both ends, brown, smooth- and thick-walled.

Type species: *Exserticlava vasiformis* (Matsush.) S. Hughes

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Broadly distributed and commonly known.

Description and illustration: Hughes (1978); Seifert et al. (2011).

Notes: The genus *Exserticlava* was erected by Hughes (1978) to accommodate *Cordana vasiformis* Matsush. and *C. triseptata* Matsush., two fungal species originally described on wood and bamboo from Japan (Matsushima 1975). It is characterized by simple, erect, septate, smooth conidiophores; polyblastic, funnel-shaped conidiogenous cells with percurrent proliferations; and holoblastic, distoseptate conidia (Hughes 1978; Kirk 1985; Tsui et al. 2001b). Conidiogenesis in *Exserticlava* species is unusual as the outer wall of the conidiophore apex is broken by the initial conidium, leaving a fertile area and collarette developed from the ruptured outer wall. Conidia are produced successively from the fertile conidiogenous loc at the conidiophore apex (Bhat and Sutton, 1985a; Nagakiri and Ito 1995). A total of 7 species, including *Exserticlava aquatica*, *E. globosa* V. Rao & de Hoog, *E. keniensis* K.M. Tsui, Goh & K.D. Hyde, *E. manglietiae* S.C. Ren & X.G. Zhang, *E. triseptata* (Matsush.) S. Hughes, *E. uniseptata* Bhat & B. Sutton, *E. vasiformis* (Matsush.) S. Hughes and *E. yunnanensis* L. Cai & K.D. Hyde have been known in the genus and the species separation is mainly based on shape, septation and size of conidia (Hughes 1978; Bhat and Sutton 1985b; Kirk 1985; Rao and de Hoog 1986; Nagakiri and Ito 1995; Holubová-Jechová 1990; Tsui et al. 2001b; Cai and Hyde 2007; Ma et al. 2011a, b; Carmo et al. 2020). A key to all known species was provided by Tsui et al. (2001).

The genus *Exserticlava* was reported to have *Chaetosphaeria* sexual morph (Hughes 1978; Matsushima 1985; Réblová and Seifert 2003; Fernández & Huhndorf 2005; Seifert et al. 2011). The type species *Exserticlava vasiformis* was found on the holotype specimen of *Chaetosphaeria capitata* but without a common mycelial link between them (Sivanesan and Chang 1995). Fernández and Huhndorf (2005) confirmed the sexual-asexual connection between *C. capitata* and *E. vasiformis* by culturing ascospores *in vitro*. This was further supported by

recent phylogenetic analysis with *E. vasiformis* (Matsush.) S. Hughes and *Chaetosphaeria capitata* Sivan. & H.S. Chang. The second species with sexual and asexual connection is *E. triseptata* with *Chaetosphaeria hiugensis* I. Hino as sexual stage (Matsushima 1985; Réblová 1999a, 2000, 2004; Tsui et al. 2001b; Réblová and Seifert 2003; Fernández & Huhndorf 2005). The sexual states for other species have not been found and are remained to be known only with asexual state.

The recently described monotypic genus *Anaexserticlava* T.S. Santa Izabel, R.F. Castañeda & Gusmão, typed with *A. caatingae* T.S. Santa Izabel, R.F. Castañeda & Gusmão, is morphologically very similar to the type species of *Exserticlava* in holoblastic conidiogenous cells with enteroblastic percurrent extensions and distoseptate conidia, but they can be distinguished by rhexolytic conidial secession and resulted pedicellate conidia in *Anaexserticlava*, while the conidial secession is schizolytic and conidia without pedicellate in *Exserticlava* (Santa Izabel et al. 2015).

Key to accepted species of *Exserticlava*

1. Conidiophores with hyaline apical extension, conidia ellipsoid, 3-septate, 29-34 x 17-21 µm *E. vasiformis*
1. Conidiophores not as above.....2
2. Conidia 3-distoseptate..... 3
2. Conidia 0-1-distoseptate..... 4
3. Conidia ellipsoid, 28-37 x 14-16 µm.....*E. hiugensis*
3. Conidia pale brown, obovoid to obclavate, 23-30 x 19-22 µm *E. keniensis*
4. Conidia aseptate, pale brown, spherical, verrucose, 16-22 x 16-20 µm.....*E. globosa*
4. Conidia 1-septate 5
5. Conidia concolorous6
5. Conidia variolous, with bigger and darker basal cells than apical cells.....*E. yunnanensis*
6. Conidia pale brown, broadly obovoid, 15-20 x 11-14 µm.....*E. uniseptata*
6. Conidia ellipsoid, 14-16 x 9-11 µm.....*E. manglietiae*

Exserticlava exserticlavoides (Réblová & Seifert) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841733.

≡ *Chaetosphaeria exserticlavoides* Réblová & Seifert, Sydowia 55: 316, 2003.

Typification: Thailand: Nakhon Nayok Province, Khao Yai National Park NE of Bangkok, trail to Haew Suwat waterfall, on decayed bamboo culm, 2 Aug. 2001, M. R., G. J. S., R. N. (PRM 900540). Ex-type strain CBS 112963, DAOM 231138.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Thailand.

Description and illustration: Réblová and Seifert (2003).

Notes: The *Exserticlava* anamorph was connected with teleomorph *Chaetosphaeria exserticlavoides* Réblová & Seifert in pure culture by Réblová & Seifert (2003). Conidia of this *Exserticlava* anamorph resembles those from *E. vasiformis*, the type species of the genus *Exserticlava*.

The two species, *E. vasiformis* and *E. exserticlavoides*, differs by conidiogenous cells lacking cup-shaped collarettes in the latter species. They are also very different on ascospore morphology: fusiform, subhyaline to pale brown, 7-10 septate, 48-100 x 3-5 µm in *E. vasiformis*; ellipsoidal to fusiform, subhyaline to pale brown, 3-7-septate, 28-32 x 3.5-4 µm in *C. exserticlavoides* (Réblová and Seifert 2003; Fernández and Huhndorf 2005).

Exserticlava globosa Vasant Rao & de Hoog, Stud. Mycol. 28: 51, 1986.

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, scattered on natural substrate, erect, straight or flexuous, cylindrical, smooth, slightly swollen at the base, 2-6 septate, dark brown, unbranched, up to 270 µm long, up to 13 µm wide at the base, 9 µm wide in the middle, 20 µm wide at the apex, percurrently regenerating. Conidiogenous cells formed enteroblastically by growth of the inner wall, which ruptures the outer wall; the latter remaining as tattered fragment attached to the inner conidiogenous wall, terminal, integrated, clavate, polyblastic with several indistinct, unthicken conidiogenous loci. Conidia holoblastic, acrogenous, solitary, dry, globose to subglobose, most with rather thick medium septa, regularly verruculose, 18-25 x 17-24 µm.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, India.

Description and illustration: Rao and de Hoog (1986); Chang (1995).

Notes : No specimen was examined by the author, the above description is based on description by Chang (1995). Its occurrence on decaying twig in Taiwan and on submerged wood in Hong Kong was also recorded (Chang, 1995; Lu et al., 2000).

Exserticlava manglietiae S.C. Ren & X.G. Zhang, Mycotaxon 118: 350, 2012

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight or flexuous, arising from superficial mycelium, 360 x 490 x 5-8.5 µm, with a relatively swollen base, terminally swollen, 7.5-11 µm wide, straight or slightly curved, erect, cylindrical, smooth, 4-6-septate, thick-walled, brown to dark brown, blackish at lower part, percurrent proliferations. Conidiogenous cells polyblastic, integrated, terminal, determinate, cylindrical, proliferating sympodially without progression and giving rise to a cluster of conidia, brown, thick- and smooth-walled. Conidia acrogenous, holoblastic, solitary, dry, ellipsoid, smooth, thick-walled, 1-distoseptate, very pale brown, base truncate, 14-16 x 9-11 µm.

Material examined: China: Guangdong Province, subtropical forest of Nanling, on dead branches of *Manglietia chingii*, 10 Dec. 2010, Sh. C. Ren (HMAS146154, isotype)

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Ren, Ma & Zhang (2011).

Notes: The isotype material of *Exserticlava manglietiae* S.C. Ren & X.G. Zhang deposited in HMAS was examined by the author. *E. manglietiae*, *E. uniseptata* Bhat & Sutton and *E. yunnanensis* L. Cai & K.D. Hyde are three closely related species with 1-septate and smaller conidia in the genus (Bhat and Sutton 1985a; Cai and Hyde, 2007; Rei et al. 2012). They can be distinguished from each other by conidial septation and size. In *E. manglietiae*, the conidia are very pale brown, ellipsoidal, with one central septum, and measuring of 14-16 x 9-11 µm. Both *E. uniseptata* Bhat & Sutton and *E. yunnanensis* L. Cai & K.D. Hyde produce dark brown and larger conidia in size than those in *E. manglietiae*. In addition, in *E. yunnanensis* the conidia are pyriform-shaped and versicolored conidium, with a large dark basal cell and a small paler apical cell, and in *E. uniseptata* Bhat & B. Sutton, the conidia are with a smaller basal cell than apical cell.

Exserticlava triseptata (Matsush.) S. Hughes, N.Z. J. Bot. 16: 311, 1978.

≡ *Cordana triseptata* Matsush., Microfungi of the Solomon Island and Papua-New Guinea (Kobe): 40, 1975.

= *Chaetosphaeria chlorotunicata* F.A. Fernández & Huhndorf, Fung. Div. 18:18, 2005.

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, cylindrical, smooth, 4-8-septate, thick-walled, brown to dark brown, blackish at lower part, 130-250 x 5-8 µm. Conidiogenous cells clavate, subcylindrical, brown, thick- and smooth-walled, 20-30 µm long, 7-10 µm wide at distal end, 6-7 µm wide at the base, polyblastic, multiple conidiogenous loci active within the collarette. Conidia acrogenous, solitary, brown, 3-distoseptate, smooth, ellipsoidal, broad clavate, oblong-cylindrical, 25-28 x 15-16 µm, both base and apex rounded.

Material examined: China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 29 Dec. 1997, W.P. Wu (Wu1527f).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Japan, Kenya, Malaysia, Micronesia, Puerto Rico, Ponape, Seychelles.

Description and illustration: Hino and Katumoto (1961); Matsushima (1975, 1985); Hughes (1978); Kirk (1985); Kuthubutheen and Nawawi (1994); Hyde and Goh (1998); Tsui et al. (2001); Réblová and Seifert (2003); Fernández and Huhndorf (2005) .

Notes: *Exserticlava vasiformis* (Matsush.) S. Hughes and *E. triseptata* (Matsush.) S. Hughes are two most closely related species on morphology, and can be distinguished by relatively larger conidia in the latter species. *E. vasiformis* is by far the most common species seen in China. Only one scarce collection of *E. triseptata* was made from China and examined. No living strain was obtained with several attempts. Its occurrence on dead culm of *Dendrocalamus* sp. and the submerged wood in Hong Kong was also reported (Lu et al. 2000).

The anamorphic state, obtained from the single ascospore isolate of *Chaetosphaeria chlorotunicata* F.A. Fernández & Huhndorf, was described as *Exserticlava* sp. (conidiophores cylindrical, 223-288 x 11-13 µm on natural substrate, 235-382 µm (up to 650) long on PCA, bearing a terminal monophialidic and funnel-shaped phialides; conidia cylindrical, brown, 3-distoseptate, 31-38 x 16-19 µm on the substrate, 22-30 x 10-15 µm on CMA, with a distinctive basal hilum, centric or slightly eccentric) and it is highly possible this is *E. triseptata* (Fernández & Huhndorf 2005).

Exserticlava uniseptata Bhat & B. Sutton, Trans. Br. Mycol. Soc. 85: 116, 1985.

Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, straight, or flexuous, cylindrical, smooth, swollen at the apex, dark brown, unbranched, septate, up to 290 µm long, 10-15 µm wide at the base, 5-7.5 µm wide in the middle, 9-13 µm wide at the apex, percurrently regenerating. Conidiogenous cells formed enteroblastically by growth of the inner wall, which ruptures the outer wall; the latter remaining as tattered fragment attached to the inner conidiogenous wall, terminal, integrated, clavate, polyblastic with several indistinct, unthicken conidiogenous loci. Conidia holoblastic, acrogenous, solitary, dry, clavate,

broadly rounded at the base, 1-distoseptate, the septum in the lower half of the conidium, medium brown, 14.5-21 x 9.5-15 µm.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Ethiopia.

Description and illustration: Bhat and Sutton (1985a); Chang (1995).

Notes : No specimen was examined by the author. The description is based on description by Chang (1995).

Exserticlava vasiformis (Matsush.) S. Hughes, N.Z. J. Bot. 16: 311, 1978.

≡ *Cordana vasiformis* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea (Kobe): 40, 1975.

= *Chaetosphaeria capitata* Sivan. & H.C. Chang, Mycol. Res. 99: 715, 1995.

Colonies hairy, brown or blackish-brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown to brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, arising from superficial mycelium, erect, straight, or slightly curved, cylindrical, smooth, 2-4-septate, thick-walled, brown to dark brown, 100-110 x 5-7 µm. Conidiogenous cells cupulate, pale brown to brown, thick- and smooth-walled, 12-15 µm long, 13-14 µm wide at distal end, 5-6 µm wide at the base, with a funnel-shaped collarete, and multiple conidiogenous loci active within the collarete, occasionally with overgrowing to form subhyaline, septate, obclavate structure of up to 20 µm wide at the widest part and 6-7 µm wide at distal end. Conidia acrogenous, solitary, brown, 3-distoseptate, smooth, ellipsoidal, oblong-cylindrical, 20-24 x 11-12 µm, both base and apex rounded.

Material examined: China: Guangdong Province, Lufushan, on dead leaves, 15 Oct. 1998, W.P. Wu (Wu1997b); China: Guangdong Province, Dinghushan, on dead material of palm, 9 Oct. 1998, W.P. Wu (Wu1859f); on wood of unidentified plant, China: Guangdong Province, Dinghushan, 9 Oct. 1998, W.P. Wu (Wu1862b); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (WU1863a); China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2070d); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead culm of grass, 4 March 2012, W.P. Wu (Wu12336); China: Guangdong Province, Guangzhou, Baiyunshan, on dead culm of grass, 5 March 2012, W.P. Wu (Wu12018); on dead bark of unidentified tree, China: Guangdong Province, Zhaoqing, Dinghuashan, March 3 2012, W.P. Wu (Wu12127); China: Guangdong Province, Guangzhou, Yuexiu Garden, on dead culm of bamboo, 2 March 2012, W.P. Wu (Wu12224); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of grass, 25 Dec 2012, W.P. Wu (Wu12424); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead branch of unidentified plant, 2 Jan. 1997, W.P. Wu (WU1265a); China: Guangxi Province, Shangsì, Shiwandashan, Wangle, on dead culms of bamboo, 2 Jan. 1997, W.P. Wu (WU1326d); China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 30 Dec. 1997, W.P. Wu (WU1542c); China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 31 Dec. 1997, W.P. Wu (WU1605f); China: Guangxi Province, Nangning, on dead leaves of *Eucalyptus* sp., 3 Jan. 1998, W.P. Wu (WU1612a); China: Guangxi Province, Nangning, on dead branches of unidentified plant, 3 Jan. 1998, W.P. Wu (WU1653j); China: Hainan Province, on rotten wood, Dec. 1999, W.P. Wu (WU5552c); China: Hunan Province, Zhangjiajie, on dead leaves of unidentified tree, 15 Oct. 2010, W.P. Wu (Wu11032b). China: Sichuan Province, Ya An, Yucheng, Wanguan, Bifengxia, on dead leaf sheath of bamboo, 15 Dec 2013, W.P. Wu (Wu13207, 13217). Living strain: 42905 (from Wu1265a).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, Brazil, China, Costa Rica, Puerto Rico, India, Japan, Malaysia, New Zealand, North America.

Description and illustration: Matsushima (1975); Hughes (1978); Crane and Schoknecht (1982); Kuthubutheen and Nawawi (1994); Tsui et al. (2001); Fernández and Huhndorf (2005); Xia (2017).

Notes: *Exserticlava vasiformis* (Matsush.) S. Hughes is the most commonly found species in the genus and has been well documented (Matsushima 1975; Hughes 1978; Kuthubutheen and Nawawi, 1994). It is characteristic that the fungus produces with a terminal funnel-shaped collarete, and multiple conidiogenous loci active within the collarete, from which occasionally with overgrowing to form subhyaline, septate, obclavate structure of up to 20 µm wide at the widest part and 6-7 µm wide at distal end. *E. vasiformis* (conidia 20-24 x 11-12 µm) and *E. triseptata* (Matsush.) S. Hughes (conidia 25-28 x 15-16 µm) are closely related species in producing 3-septate and ellipsoidal conidia, but in *E. triseptata* the conidia are significant larger in size and no overgrowing of conidiogenous cells (Hughes 1978). The teleomorph of *E. vasiformis* has been established as *Chaetosphaeria capitata* Sivan. & H.S. Chang from the single ascospore culture (Fernández and Huhndorf, 2005). In the phylogenetic analysis, *E. vasiformis* was clustered together with other *Chaetosphaeria* with dark brown conidia and it is not closely related to the type species of *Chaetosphaeria*. Its occurrence on many different plants incl. *Arenga engleri*, *Bambusa tuldoidea*, *Miscanthus floridulus*, *Pandanus fructatus* and *Phoenix hanceana* from Hong Kong was reported by Lu et al. (2000). It is also reported from Taiwan (Matsushima 1980).

Exserticlava yunnanensis L. Cai & K.D. Hyde, Mycoscience 48: 292, 2007.

Typification: China: Yunnan Province, on submerged wood in a small forest stream, 14 July 2003, L. Cai, CAI-7FB30.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Description and illustration: Cai and Hyde (2007).

Notes: *Exserticlava yunnanensis* L. Cai & K.D. Hyde differs from other known species in the genus by its 1-septate, pyriform-shaped, and versicolored conidium, with a large dark basal cell and a small paler apical cell. It is most similar to *E. globosa* V. Rao & de Hoog and *E. uniseptate* Bhat & B. Sutton, species that also produce 1-septate conidia. However, conidia of *E. globosa* are globose and concolorous; while conidia of *E. uniseptate* are concolorous with a smaller basal cell than apical cell (Bhat and Sutton 1985a; Rao and de Hoog 1986; Tui et al. 2001).

Monosporoschisma W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841545.

Colonies superficial, effuse, black, hairy to setose, composed of conidiophores and capitate hyphae arising from small stromata. Teleomorph: Unknown. Anamorph: Capitate hyphae present, erect, simple, sterile, brown, septate, with an apical swelling and percurrent proliferations. Conidiophores subcylindrical, erect, single or in small cluster together with capitate hyphae, septate, dark brown to blackish, terminating in a conidiogenous cell. Conidiogenous cells integrated, terminate, phialidic, brown to dark brown, to cylindrical, with short collarettes. Conidia ellipsoidal, oblong, ends rounded, 3-septate, central cells brown to dark brown, end cells pale brown to brown, base with a distinct scar.

Type species: *Monosporoschisma elegans* W.P. Wu & Y.Z. Diao.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Monosporoschisma elegans W.P. Wu & Y.Z. Diao, sp. nov., Figs. 185-186, MB841615.

Etymology: refers to its beautiful conidia.

Typification: China: Hainan Province, on dead material of unidentified palm, 12 Dec. 2000, W.P. Wu & Yan Huang (Holotype WFH Wu5520).

Colonies superficial, effuse, black, hairy to setose, composed of conidiophores and capitate hyphae arising from small stromata. Mycelium partial superficial and partly immersed into substratum, consisting of pale brown to brown, septate, branched hyphae of 2-3 µm wide. Teleomorph: Unknown. Anamorph: Capitate hyphae erect, simple, sterile, brown to dark brown, becoming pale brown towards the apex, 5-8-septate, smooth, 180-230 x 4-5 µm, apex distinctly swollen and 6-7 µm wide, with 1-4 percurrent proliferations. Conidiophores subcylindrical, erect, single or in small cluster together with capitate hyphae, multiseptate but hardly seen due to almost blackish wall, blackish, become paler towards the apex, smooth, 270-325 x 11-13 µm, terminating in a conidiogenous cell. Conidiogenous cells integrated, terminate, phialidic, brown to dark brown, cylindrical, 7.5-8 µm wide, apex truncate, collarettes 2-3 µm deep, 6.5-8 µm wide, slightly narrower at the base, with 1-3 percurrent proliferations. Conidia ellipsoidal, oblong, 3-septate, rounded at both ends, central cells brown to dark brown, end cells pale brown to brown, 30-34 x 13.5-16 µm, base with a distinct scar of 3.5-4 µm wide.

Material examined: China: Hainan Province, on dead material of unidentified palm, 12 Dec. 2000, W.P. Wu & Yan Huang (Holotype WFH Wu5520).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China.

Notes: This unique fungus on decaying leaves of palm resembles *Fusichalara* S. Hughes & Nag Raj, *Sporoschisma* Berk. & Broome and *Sporoschismopsis* Hol.-Jech., but differs from them by the conidiogenesis. In *Fusichalara*, *Sporoschisma* and *Sporoschismopsis*, the conidiogenous cells are composed of distinctly differentiated venter and collarette, where the conidiogenous loci deeply sitting at the base of long collarettes. In *Monosporoschisma elegans*, the conidiogenous cells have typical phialides with inconspicuous collarettes and only very small part of the conidia sitting within the collarette. In addition, *Fusichalara* and *Sporoschismopsis* are lacking capitate hyphae (Holubová-Jechová and Hennebert 1972; Holubová-Jechová 1973; Hughes and Kendrick 1973; Nag Raj and Kendrick 1975; Seifert et al. 2011).

On conidiogenesis and conidial morphology, *Monosporoschisma elegans* also shows some similarity to *Paradiscloridium ychaffrei* Bhat & B. Sutton and *Endophragmia microaquatica* Matsush. However, no capitate hyphae are formed in the last two species (Matsushima 1975; Bhat and Sutton 1985b). The conidial morphology in this species also brings the comparison with *Duosporium cyperi* Thind & Rawala. However, in the latter species the conidiogenous cells are with sympodial proliferations and the conidiogenous loci are very narrower hole surrounded with a distinct scar (Ellis 1971; Mecardo Sierra et al. 1997). No living strain was obtained for

molecular study, its placement in Chaetosphaeriaceae is based on morphological characters such as presence of capitate hyphae, phialidic conidiogenous cells and conidiogenesis.

Phaeodischloridium W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841541.

Colonies effuse, hairy, velvety, dark brown. Stroma absent. Teleomorph: Unknown. Anamorph: Conidiophores mononematous, solitary, erect, unbranched, straight, or slightly flexuous, septate, smooth or verruculose, dark brown, percurrently regenerating, paler towards the apex, with a swollen base. Conidiogenous cells integrated, terminal, cylindrical, lageniform, lacking a collarete, proliferating enteroblastically and producing successive conidia at the same level. Conidia holoblastic, solitary, accumulating in slimy brown masses at the apices or sometimes sliding down along the sides of conidiogenous cells after secession, cylindrical to cylindric-clavate, obtuse at both ends, medium to dark brown except the pale brown basal cells, 3-septate apical cell longer than others, thin-walled, smooth.

Type species: *Phaeodischloridium inaequiseptum* (Matsush.) W.P. Wu & Y.Z. Diao ($\equiv$ *Endophragmia inaequisepta* Matsush.).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Japan.

Phaeodischloridium inaequiseptatum (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov. Figs. 187, MycoBank MB841734.

$\equiv$ *Endophragmia inaequisepta* Matsush., Icon. Microfung. A Matsush. Lect.: 69, 1975.

$\equiv$ *Dischloridium inaequiseptum* (Matsush.) Hol.-Jech., Česká Mykol. 41: 111, 1987.

$\equiv$ *Chaetosphaeria aquatica* Z.L. Luo, K.D. Hyde & H.Y. Su, Fung. Div. 99: 582, 2019.

Colonies effuse, hairy, velvety, dark brown. Conidiophores mononematous, solitary, erect, unbranched, straight, or slightly flexuous, 4-7-septate, smooth or verruculose, dark brown, percurrently regenerating, paler towards the apex, 100-130 μ m long, 5-6 μ m wide, with a swollen base of up to 10 μ m wide. Teleomorph: Unknown. Anamorph: Conidiogenous cells integrated, terminal, cylindrical, lageniform, 6-10 x 4-5.5 μ m wide, 3-3.5 μ m wide at the conidiogenous loci, lacking a collarete, proliferating enteroblastically and producing successive conidia at the same level. Conidia holoblastic, solitary, accumulating in slimy brown masses at the apices or sometimes sliding down along the sides of conidiogenous cells after secession, cylindrical to cylindric-clavate, obtuse at both ends, medium to dark brown except the pale brown basal cells, 3-septate (rarely 1-septate), apical cell longer than others, thin-walled, smooth, 16-30 x 5-7 μ m.

Material examined: China: Hainan Province, Haikou, on rotten wood of unidentified plant, 20 Dec. 2000, W.P. Wu (Wu5523); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2221).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Japan.

Description and illustration: Matsushima (1975); Luo et al. (2019).

Notes: This unique fungus was originally described as *Endophragmia inaequiseptata* Matsush. (Matsushima 1975). Since *Endophragmia* Duvernoy & Maire (1920) is not used as the generic name after Hughes's relocation of its species and its inclusion in *Endophragmiella* B. Sutton was not accepted by Hughes (1979), Holubová-Jechová (1987) transferred it to *Dischloridium* B. Sutton, which was highly questioned due to its brown and 3-septate conidia. Morphologically it is identical to the recently described *Chaetosphaeria aquatica* Z.L. Luo, K.D. Hyde & H.Y. Su on conidiophores (181-271 x 5-7 μ m), conidiogenous cells and conidia (1-3-septate, 20-24 x 6-8 μ m). Phylogenetically this fungus belongs to Chaetosphaeriaceae, but is clearly separated from other known *Chaetosphaeria* species including the type species. Thus, a new genus is created to accomodate this fungus. On the phylogenetic tree, it is clustered together with *Catenularia* and *Cacumisporium*, both with dark colored conidia.

E. inaequiseptata is an earlier name for *C. aquatica*, the new combination *Phaeodischloridium inaequiseptatum* (Matsush.) W.P. Wu & Y.Z. Diao is made here and *C. aquatica* becomes a synonym.

This fungus shows some similarity with *Paradischloridium ychaffrei* Bhat & Sutton ($\equiv$ *Dischloridium triseptata* Hol.-Jech.) on terminal monophialidic conidiogenous cells, lacking conspicuous collarettes, and brown, 3-septate conidia, but they clearly differs from each other. In *P. ychaffrei*, the young and hyaline conidia are formed within the venter of the conidiogenous cells, and the conidia are pseudoseptate (Bhat and Sutton, 1985a; Reblová et al. 2011).

Sporoschisma Berk. & Broome, Gardener's Chronicle: 540, 1847.

$\equiv$ *Pithospermum* Mont., Sylloge generum specierumque plantarum cryptogamarum: 306, 1856.

$\equiv$ *Melanochaeta* E. Müll., Harr & Sulmont, Revue de Mycologie (Paris) 33:377, 1969.

Colonies effuse, black, hairy, composed of ascomata with mixed tufts of conidiophores. Teleomorph: Ascomata solitary, scattered, superficial, anchored to substrate by an indistinct basal stroma, broadly pyriform; wall smooth and shining, covered with stiff, erect, dark brown to black setae each with a slightly swollen, light brown to colorless cap. Paraphyses filiform, septate, longer than asci, hyaline. Asci unitunicate, cylindrical to narrow clavate, apex with a refractive, non-amyloid ring, eight-spored. Ascospores partially biserial, fusiform with transverse septa, curved, central four cells darker brown and larger than the lighter brown end cells. Anamorph: Colonies discrete, superficial, effuse, black, hairy to setose, composed of conidiophores and capitate hyphae arising from small stromata. Capitate hyphae present or absent, erect, simple, sterile, brown, septate, with an apical swelling surrounded by a blob of mucilage. Conidiophores subcylindrical to clavate, erect, single or in small cluster together with capitate hyphae, septate in the basal part, brown to dark brown, terminating in a conidiogenous cell. Conidiogenous cells integrated, terminate, phialidic, brown to dark brown, subcylindrical to urceolate with long collarettes. Conidia more or less cylindrical to subcylindrical, ends flattened or rounded, septate, pale brown to dark brown, formed in false chain.

Type species: *S. mirabile* Berk. & Broome.

Ecology/Substrate/Host: Saprobe on dead material of plants, especially rotten wood.

Geographical distribution: Commonly known, especially in subtropical and tropical area.

Description and illustration: Hughes (1949,1966); Nag Raj and Kendrick (1975); Ellis (1971); Holubová-Jechová (1978); Goh et al. (1997); Seifert et al. (2011); Zelski et al. (2014); Luo et al. (2016).

Notes: *Sporoschisma* Berk. & Broome was created to accommodate lignicolous hyphomycetous fungi that form chains of dematiaceous conidia endogenously from flask-shaped, dark brown, erect conidiophores, often with basal sterile capitate setae (Hughes 1949,1966; Nag Raj and Kendrick 1975; Ellis 1971; Holubová-Jechová 1978; Goh et al. 1997; Seifert et al. 2011; Zelski et al. 2014; Luo et al. 2016). Morphologically, the most closely related genera to *Sporoschisma* are *Chalara* (Corda) Rabenh. and *Sporoschismopsis* Hol.-Jech. & Hennebert, *Sporoschisma* differs from them by producing capitate setae (Seifert et al. 2011). In addition to this, the conidia in *Sporoschisma* are dark-colored, while they are hyaline in *Chalara*. In *Sporoschismopsis*, the percurrently proliferated conidiophores are cylindrical and without distinct swollen venter, and the conidia are clavate. The conidial anatomy and conidiogenesis in *Sporoschisma* was studied by Ho et al. (1998).

A revision for all species known in the genus was given Hughes (1949) and most of the described taxa were excluded from the genus (9 species and 1 variety) or regarded as synonym (1 variety). The four species accepted by Hughes were *S. insigne* Sacc., Rouss. & Bomm., *S. juvenile* Boud., *S. mirabile* Berk. & Broome and *S. saccardoi* E.W. Mason & S. Hughes. Including of *S. insigne* into the genus was questioned by Hughes due to its hyaline conidia and this was later excluded from the genus and replaced into *Chalara* (Hughes 1958; Nag Raj and Kendrick 1975). More additional species have been described since then (Rao and Rao 1964; Bhat and Kendrick 1993; Goh et al. 1997; Luo et al. 2016). Goh et al. (1997) provided the latest revision for the genus and 7 species (including 2 new species) were accepted in the genus. Yang et al. (2016) introduced two new species, *S. longicatenatum* J. Yang & K.D. Hyde and *S. palauense* J. Yang & K.D. Hyde from submerged wood from freshwater in Thailand. Réblová et al. (2016) made two new combinations *Sporoschisma daemonoropsis* (J. Fröhl. & K.D. Hyde) A.N. Mill and *S. taitense* (Mugambi & Huhndorf) A.N. Mill.

The teleomorph of the genus *Sporoschisma* were known in 4 species, *S. daemonoropsis* (J. Feöhl. & K.D. Hyde) Réblová (= *Melanochaeta daemonoropsis* J. Feöhl. & K.D. Hyde), *S. hemipsilum* (Berk. & Broome) Zelski, A.N. Mill. & Shearer (= *Melanochaeta hemipsila* (Berk. & Broome) E. Müll., Harr & Sulmont), *S. mirabile* Berk. & Broome (= *M. aotearoae* (S. Hughes) E. Müll., Harr & Sulmont) and *S. taitense* (Mugambi & Huhndorf) A.N. Mill (= *Melanochaeta taitensis* Mugambi & Huhndorf). All of them belong to *Melanochaeta* E. Müll., Harr & Sulmont in Chaetosphaeriaceae (Hughes 1966; Müller et al. 1969; Samuels and Müller 1978; Müller and Samuels, 1982; Goh et al. 1997).

Combined morphology and phylogenetic study, 13 species are accepted in the genus (Fig. 188), including *S. australiense* (Goh & K.D. Hyde) Réblová, *S. chiangraiense* N.G. Liu & K.D. Hyde, *S. daemonoropsis* (J. Feöhl. & K.D. Hyde) Réblová, *S. hemipsilum* (Berk. & Broome) Zelski, A.N. Mill. & Shearer, *S. juvenile* Boud., *S. longicatenatum* J. Yang, J.K. Liu & K.D. Hyde, *S. mirabile* Berk. & Broome, *S. nigroseptatum* D. Rao & R. Rao, *S. palauense* J. Yang, J.K. Liu & K.D. Hyde, *S. parvicuneatum* Goh & K.D. Hyde, *S. phaeocentron* W.H. Ho, K.D. Hyde & Goh, *S. taitense* (Mugambi & Huhndorf) A.N. Mill, and *S. uniseptatum* Bhat & W. Kendr. (Berkeley 1847; Boudier 1911; Rao and Rao 1964; Bhat and Kendrick 1993; Goh et al. 1997; Zhao and Zhao 2012; Réblová, 2014; Zelski et al. 2014; Luo et al. 2016; Yang et al. 2016; Réblová et al. 2016; Bao et al., 2021). Phylogenetically these species are monophyletic. Identification of species in the genus is mainly based on conidial morphology such as septation, shape and size, but other characters including morphology of conidiophores and capitate setae can also be used together.

The genus *Sporoschisma* was widely distributed genus and has worldwide distribution (Hughes 1949, 1966, 1953, 1979; Rao and Rao 1964; Holubová-Jechová 1973, 1982; Matsushima 1975, 1980; Bhat and Sutton 1985a; Bhat and Kendrick 1993; Goh et al. 1997). The genus was recently studied in submerged wood in China, with 5 species reported from Yunnan Province of mainland China (Luo et al. 2016), 5 species (*S. juvenile*, *S. mirabile*,

S. nigrseptatum, *S. hemipsilum* and *S. uniseptatum*) from Hong Kong (Goh et al. 1997; Lu et al. 2000) and 2 species (*S. mirabile* and *S. saccardoi*) from Taiwan (Matsushima 1980).

Key to species of *Sporoschisma* with anamorph*

1. Conidia 1-septate.....2
1. Conidia more than 1-septate.....4
2. Conidia 24-35 x 13-15 µm wide, capitate setae absent.....*S. parvicuneatum*
2. Conidia less than 12 µm wide, capitate setae present.....3
3. Conidia 27-32 x 11-12.5 µm wide*S. uniseptatum*
3. Conidia 15.3-30 x 8.5-12.5 µm*S. chiangraiense*
4. Conidia mostly 3-septate.....5
4. Conidia mostly 5-septate.....9
5. Conidia versicolored with end cells paler than middle cells6
5. Conidia uniformly pigmented.....7
6. Conidia 27-37.5 x 9.5-10.5 µm, ends cell very short, smooth-walled*S. australiense*
6. Conidia 24-52 x 11-14.5 µm, end cells same sized as other cells, verruculose*S. phaeocentron*
7. Conidia uniformly 3-septate, 32-38 x 11-12 µm, smooth-walled.....*S. mirabile*
7. Conidia 1-3 septate8
8. Conidia 34-44 x 10.5-14.5 µm, verruculose, ends rounded.....*S. juvenile*
8. Conidia 36-58 x 10-14 µm, smooth, ends truncated*S. palauense*
9. The two central cells of conidia distinctly longer than the penultimate ones.....*S. nigroseptatum*
9. The four inner cells of the conidia almost of equal length.....10
10. Conidia 35-45.5 x 9-11 µm, both ends rounded*S. longicatenatum*
10. Conidia more than 11 µm wide, both ends truncated11
11. Conidia 42-47 x 12.5-13.5 µm*S. hemipsilum*
11. Conidia 37-42 x 11.5-12.5 µm*S. taitense*

**S. daemonoropsis* (J. Feöhl. & K.D. Hyde) Réblová is the only one with only teleomorph known and not included here.

Sporoschisma hemipsilum (Berk. & Broome) Zelski, A.N. Mill. & Shearer, IMA Fungus 5: 433. 2014.

≡ *Sphaeria hemipsila* Berk. & Broome, Bot. J. Linn. Soc. 14: 126, 1873.

≡ *Lasiosphaeria hemipsila* (Berk. & Broome) Sacc., Syll. Fung. 2: 198, 1883.

≡ *Chaetosphaeria hemipsila* (Berk. & Broome) Petch., Ann. Roy. Bot. Gard. Peradenija 6: 336, 1917.

≡ *Melanochaeta hemipsila* (Berk. & Broome) E. Müll. et al., Revue Mycol. 33: 377, 1969.

= *Chaetosphaeria coelestina* Höhn., Sitzungsber. Akad. Wiss. Wein, Math.-Naturwiss. Kl, 1 Abt. 118: 324, 1909.

= *Sporoschisma saccardoi* E.W. Mason & S. Hughes, Mycol. Pap. 31: 20, 1949.

Colonies effuse, black, hairy. Mycelium partially immersed and partly superficial, composed of pale brown to brown, septate and branched hyphae. Capitate setae present, erect, straight, smooth, in tufts mixed with conidiophores, 3-5 septate, pale brown to medium brown, paler towards the apex, up to 300 µm long, 5-6.5 µm wide, with a swollen apex of 5-10 µm wide, proliferation absent or up to 5 times, often together with conidiophores arising from a stroma. Teleomorph: Not observed. Anamorph: Conidiophores solitary or rarely in small group of 2-3, associated with 1-3 capitate setae, erect, straight or slightly flexuous, cylindrical, 1-septate at the base but hardly seen due to nearly blackish wall, dark brown to blackish, paler towards the apex, smooth, thick-walled, consists of a stalk with 1 cell and a terminated conidiogenous cell, 200-280 µm long, stalk 10-15 µm wide. Conidiogenous cells monophialidic, terminated, integrated, dark brown to blackish, smooth, consist of a swollen venter and a tubular collarete, transition from venter to collarete gradually, venter subcylindrical, 17.5-20 µm wide; collarete cylindrical, 15-17.5 µm wide, frayed at the apex. Conidia borne in false chain, doliiform to cylindrical, both ends truncated or flattened and thick-walled, medium cells dark brown, end cells lighter but with darker colored and thick wall, smooth, uniformly 5-septate, septa dark brown and 3-5 µm thick, 46-53 x 13-14 µm.

Material examined: China: Beijing, Huairou, Hongluosi, on rotten wood, 29 July 2020, W.P. Wu (17331); China: Guangdong Province, on submerged rotten wood, 9 Oct. 1998, W.P. Wu (W2081b); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead wood of unidentified plant, 2 Jan. 1997, W.P. Wu (1273b); China, Jilin Province, Changbaishan, on wood of ?*Pinus* sp., 5 Sept. 1998, W.P. Wu (W1739). Living strain: 78101 and 78100 (from Wu17331).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, Brunei Darussalam, Canada, China, Ecuador, Indonesia, Italy, Kenya, Malaysia, Peru, South Africa, Thailand, and Europe.

Description and illustration: Hughes (1949, 1966); Nag Raj and Kendrick (1975); Goh et al (1997); Zelski et al. (2014); Yang et al. (2016); Luo et al. (2016).

Notes: *Sporoschisma hemipsilum* (Berk. & Broome) Zelski, A.N. Mill., & Shearer is a commonly found species in the genus and was fully described and illustrated by Hughes (1949, 1966), Nag & Kendrick (1975), Goh et al. (1997), Zelski et al. (2014), Luo et al. (2016) and Yang et al. (2016). It can be distinguished from the most closely related species *S. nigroseptatum* by its four inner cells of the conidia are equal in length, while in *S. nigroseptatum* the two central cells are longer than the penultimate cells (Nag Raj and Kendrick 1975; Goh et al. 1997). The Chinese collection of *S. hemipsilum* is agreeable with those described from other places as given by different authors. However, we have seen that the capitate setae proliferating up to 5 times in one of the Chinese collection (W1739) and this was not reported earlier. There is a big variation on conidial size among the several examined collections, the specimen Wu1739 has biggest conidia with size of 46-53 x 13-16 µm, while in specimen Wu2081b the conidia are only measured 32-43 x 11-11.5 µm. This has also been reported in the different publication, for example, 48-60 x 11-13.5 µm from Perú by Zelski et al. (2014); 36.5-53 x 10-13 µm from Thailand by Yang et al. (2016), 42-47 x 12.5-13.5 µm from China by Luo et al. (2016). It might be a species complex that needs to be solved with help of DNA sequence data.

The teleomorph of *Sporoschisma hemipsilum* was known as *Chaetosphaeria hemipsilum* (Berk. & Broome) Petch, but this was not found from the Chinese specimens examined here (Hughes 1966; Müller et al. 1969; Nag Raj and Kendrick 1975; Goh et al. 1997). The ITS sequences obtained from the Chinese collections are 99-100% identical to several sequences from other countries. Goh et al. (1997) reported it on submerged wood from Hong Kong. Matsushima (1981) reported it from Taiwan. Recently the species was also reported on the decaying wood submerged in water from mainland China (Luo et al. 2004; Luo et al. 2016, 2020).

Sporoschisma juvenile Boud., Icones Mycologicae 3: 589, 1904.

= *Sporoschisma aquaticum* Z.L. Luo, H.Y. Su & K.D. Hyde, Mycol. Progress 15: 1148, 2016.

Colonies effuse, black, hairy. Mycelium partially immersed and partly superficial, composed of pale brown to brown, septate and branched hyphae. Teleomorph: Not observed. Anamorph: Capitate setae present, erect, straight, smooth, in tufts mixed with conidiophores, 2-4 septate, pale brown to medium brown, paler towards the apex, 100-125 µm long, 5-7 µm wide, with a swollen apex of 7-10 µm wide. Conidiophores solitary or in small group of 2-3, associated with 1-3 capitate setae, erect, straight or slightly flexuous, cylindrical, septate but hardly seen due to nearly blackish wall, dark brown to blackish, paler towards the apex, smooth, thick-walled, 175-225 µm long, consists of a stalk with 2 cells and a terminated conidiogenous cell, stalk up to 8 µm wide with a swollen basal cell of 12-15 µm wide. Conidiogenous cells monophialidic, terminated, integrated, dark brown to blackish, smooth, 100-125 µm long, consist of a swollen venter and a tubular collarette, transition from venter to collarette abrupt, venter ellipsoidal to subcylindrical, 17-20 µm wide; collarette cylindrical, 12.5-13 µm wide, frayed at the apex. Conidia borne in false chain, cylindrical, both ends rounded or subtruncated or flattened, pale brown to brown, verruculose, concolorous, 1-3 septate but mostly 3-septate, 30-38 x 10-12 µm.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead wood of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1306b).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: Australia, China, Czechoslovakia, France, Hong Kong, Perú, Seychelles, and the UK.

Description and illustration: Hughes (1949); Nag Raj and Kendrick (1975); Goh et al. (1997); Zelski et al. (2014); Luo et al. (2016).

Notes: *Sporoschisma juvenile* Boud. is characterized by its abruptly transited venter to collarette in conidiogenous cells, and 3-septate conidia with verruculose wall. It can be distinguished from the most closely related species *S. mirabile* by its verruculose, narrower conidia with rounded or subtruncated or flattened ends and abrupt transition from venter to collarette (Hughes 1949; Goh et al. 1997; Zelski et al. 2014; Luo et al. 2016). In a recent study, Luo et al. (2016, 2019) reported the occurrence of *S. juvenile* on submerged wood with smaller conidia size (25-31 x 9-10 µm). *Sporoschisma aquaticum*, morphologically similar to *S. juvenile*, was treated as a synonym of *S. juvenile* (Luo et al. 2016, 2019). It is a common species and has been recorded on various plants including *Alnus*, *Angelica*, *Fagus*, *Fraxinus*, *Hedera*, *Quercus*, *Sorbus* and other plants. The species was reported in Hong Kong (Lu et al. 2002) and mainland China (Lupo et al. 2016; Luo et al. 2019).

Sporoschisma longicatenatum J. Yang, J.K. Liu & K.D. Hyde, Phytotaxa 289: 152, 2016. Fig. 189

Colonies effuse, black, hairy, with long chains of conidia. Mycelium immersed, composed of pale to dark brown hyphae. Teleomorph: Not observed. Anamorph: Capitate hyphae scattered or in groups mixed with conidiophores, capitate, usually surrounded by hyaline mucilage at the swollen apex, smooth, pale to medium brown, paler towards the subhyaline apex, straight or flexuous, 2-septate, 80-120 x 4-5 µm, 6-8 µm wide at the swollen apex. Conidiophores macronematous, mononematous, smooth, dark brown to black, straight or slightly flexuous, solitary or in groups of 2-3, arising from dark brown to black bulbous base, composed of a cylindrical

stipe and a swollen venter with a long cylindrical neck, erect, sometimes proliferating percurrently, 180-242 µm long; basal part 45-60 x 5-6.5 µm; phialides 152-174 µm long. Conidiogenous cells monophialidic, percurrent, integrated, terminal, determinate, brown, lageniform, frayed at the apex, 150-174 µm long; venter 34-27 x 14-18 µm; collarette 110-125 x 10-12 µm. Conidia cylindrical to doliiiform, (25-) 30-39 x 8.5-10 µm, (4-)5-euseptate, hyaline when young, olivaceous to brown at maturity, with hyaline to pale brown end cells, which are much shorter than the four inner cells, conspicuously darkened at the septa, rounded at both ends.

Material examined: China: Guangdong Province, Guangzhou, Baiyunshan, on rotten seed pod of unidentified *Leguminosae*, 5 Feb. 2012, W.P. Wu (Wu12046); China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead stem of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1306k). Living strain: 42822 (from Wu1306k), 54250 and 54415 (from Wu12046).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Thailand.

Description and illustration: Yang et al. (2016).

Notes: *Sporoschisma longicatenatum* J. Yang, J.K. Liu & K.D. Hyde is a recently described species on submerged wood in freshwater from Thailand (Yang et al. 2016). Morphologically *S. longicatenatum* and *S. hemipsilum* are very similar and can be distinguished by the conidia with rounded ends in *S. longicatenatum* and more or less truncated ends in *S. hemipsilum*. The ITS sequences obtained from the Chinese collections are 100% identical to those ones from the type specimen.

***Sporoschisma mirabile* Berk. & Broome, Gard. Chron.: 540, 1847.**

Colonies effuse, black, hairy. Mycelium partially immersed and partly superficial, composed of pale brown to brown, septate and branched hyphae. Teleomorph: Not observed. Anamorph: Capitate setae present, erect, straight, smooth, in tufts mixed with conidiophores, 3-4 septate, pale brown to medium brown, paler towards the apex, 100-125 µm long, 5-7 µm wide, with a swollen apex of 7-9 µm wide. Conidiophores solitary or in small group of 3-4, associated with 1-6 capitate setae, erect, straight or slightly flexuous, cylindrical, septate but hardly seen due to nearly blackish wall, dark brown to blackish, paler towards the apex, smooth, thick-walled, consists of a stalk with 2-3 cells and a terminated conidiogenous cell, 150-200 µm long, stalk up to 10 µm wide with a swollen basal cell of 15-18 µm wide. Conidiogenous cells monophialidic, terminated, integrated, dark brown to blackish, smooth, consist of a swollen venter and a tubular collarette, transition from venter to collarette gradually, venter ellipsoidal, 15-20 µm wide; collarette cylindrical, 11-14 µm wide, frayed at the apex. Conidia borne in false chain, cylindrical, both ends truncated or flattened and thick-walled, medium brown to dark brown, smooth, concolorous, uniformly 3-septate, septa dark brown and 3-5 µm thick, 32-38 x 11-12 µm.

Material examined: China: Yunnan Province, Xishuangbanna, on dead branches, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2930b); China: Hubei Province, Shennongjia, on dead branches, Sept 2004, W.P. Wu (Wu8098a, Wu8161a, Wu8174a, Wu8174b, Wu8273, Wu8276b, Wu8307d). Stain studied: 50702 (from Wu8273).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Belgium, Canada, France, Germany, New Zealand, UK, USA.

Description and illustration: Hughes (1949, 1966); Nag Raj and Kendrick (1975); Goh et al (1997); Luo et al. (2016).

Notes: *Sporoschisma mirabile* Berk. & Broome was fully described and illustrated by Hughes (1949), Nag Raj and Kendrick (1975), Goh et al. (1997) and Luo et al. (2016). It can be distinguished from the most closely related species *S. juvenile* by its smooth-walled, darker, and wider conidia with truncated or flattened ends and gradually transition from venter to collarette. The teleomorph of *S. mirabile* was described as *Melanochaeta aotearoae* (S. Hughes) E. Müller (= *Chaetosphaeria aotearoae* S. Hughes), and it was also found from one of the Chinese specimens (Wu8273) examined here (Hughes 1966; Müller et al. 1969).

S. mirabile is another most commonly found species in the genus and with broad distribution on many different plant species, including *Alnus*, *Bambusa*, *Beilschmiedia*, *Corynocarpus*, *Dysoxylum*, *Epilobium*, *Fagus*, *Fraxinus*, *Freyinetia*, *Knightia*, *Melicytus*, *Neopanax*, *Quercus*, *Rhipogonum*, *Rhapalostylis*, *Salix*, *Sorbus*, *Ulmus* and many other plants. Goh et al. (1997) reported it on dead culms of *Bambusa* sp. from Hong Kong and Matsushima (1980) reported its occurrence in Taiwan. More recently the species was also reported on submerged decaying wood in Yunnan, mainland China (Luo et al. 2016).

***Sporoschisma nigroseptatum* D. Rao & R. Rao, Mycopath. Mycol. Appl. 24: 82, 1964.**

Colonies effuse, black, hairy. Mycelium partially immersed and partly superficial, composed of pale brown to brown, septate and branched hyphae. Teleomorph: Not observed. Anamorph: Capitate setae present, erect, straight, smooth, in tufts mixed with conidiophores, 3-4 septate, pale brown to medium brown, paler towards the apex, up to 200 µm long, 4-5 µm wide, with a swollen apex of 7-9 µm wide, proliferation absent or up to 3 times, often together with conidiophores arising from a stroma. Conidiophores solitary or rarely in small group of 2-3, associated with 0-3 capitate setae, erect, straight or slightly flexuous, cylindrical, 2-septate at the base but hardly

seen due to nearly blackish wall, dark brown to blackish, paler towards the apex, smooth, thick-walled, consists of a stalk with 1-2 cell and a terminated conidiogenous cell, 250-300 µm long, stalk 10-14 µm wide. Conidiogenous cells monophialidic, terminated, integrated, dark brown to blackish, smooth, consist of a swollen venter and a tubular collarete, transition from venter to collarete gradually, venter subcylindrical, 17-22.5 µm wide; collarete cylindrical, 17-20 µm wide, truncated at the apex. Conidia borne in false chain, doliiform to cylindrical, both ends truncated or flattened and thick-walled, medium cells dark brown, end cells lighter but with darker colored and thick wall, smooth, uniformly 5-septate, septa dark brown and 2-3.5 µm thick, 30-38 x 13.5-14 µm; the two central cells (7-12 µm long) are distinctly longer than the penultimate cells (5-6 µm long).

Material examined: China: Guangdong Province, on submerged rotten wood, 9 Oct. 1998, W.P. Wu (Wu1976a, Wu2074a).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Australia, India, Japan, New Zealand.

Description and illustration: Rao and Rao (1964); Hughes (1966); Nag Raj and Kendrick (1975); Bhat and Sutton (1985a); Morgan-Jones et al. (1992); Goh et al (1997); Luo et al. (2016).

Notes: *Sporoschisma hemipsilum* (= *S. saccardoi* E. Mason & S. Hughes) also produce 5-septate, versicolored, smooth-walled conidia, but the four inner cells of the conidia are equal in length (Hughes 1966; Goh et al. 1997). *S. nigroseptatum* seems to be a tropical species, and less commonly found than *S. hemipsilum*. The species was fully described and illustrated by Hughes (1949, 1966), Nag & Raj and Kendrick (1975), Goh et al. (1997) and Luo et al. (2016). Goh et al. (1997) reported it on submerged wood from Hong Kong. Luo et al. (2016) reported its occurrence on decaying wood submerged in a stream in Yunnan, mainland China. Its occurrence in Taiwan was also reported (Chen 1994). No living strain and DNA sequence are available for comparison with *S. hemipsilum* and other related species.

***Sporoschisma parvicuneatum* Goh & K.D. Hyde, Mycol. Res. 101: 1298, 1997.**

Teleomorph: Not observed. Anamorph: Capitate setae absent. Conidiophores solitary or in small group of 2-5, erect, straight or slightly flexuous, subcylindrical, 2-septate but hardly seen due to nearly blackish wall, dark brown to blackish, paler towards the apex, smooth, thick-walled, consists of a stalk with 2 cells and a terminated conidiogenous cell, up to 200 µm long, stalk up to 5-10 µm wide, arising from dark brown to blackish bulbous basal stromata 10-18 µm wide. Conidiogenous cells monophialidic, terminated, integrated, dark brown to blackish, smooth, 100-125 µm long, consist of a swollen venter and a tubular collarete, transition from venter to collarete abrupt, venter ellipsoidal to subcylindrical, 13-15 µm wide; collarete cylindrical, 12-13 µm wide, frayed at the apex. Conidia borne in false chain, slightly cuneate, subcylindrical, slightly rounded or flattened at both ends, pale brown to medium brown, finely spinulose, concolorous, 1 septate, rarely 2-septate, 20-27 x 10-13.5 µm.

Material examined: China: Guangdong Province, on submerged rotten wood, 9 Oct. 1998, W.P. Wu (Wu2209).

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Philippines.

Description and illustration: Goh et al (1997).

Notes: *Sporoschisma parvicuneatum* Goh & K.D. Hyde was originally described on submerged wood from Philippines by Goh et al (1997). The species is characterized by its absence of capitate setae, abruptly transitioned venter to collarete in conidiogenous cells, 1-septate, cuneate conidia. No living strain and DNA sequence are available for comparison.

***Sporoschisma phaeocentron* W.H. Ho, K.D. Hyde & Goh, Mycol. Res. 101: 1299, 1997.**

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Malaysia.

Description and illustration: Goh et al. (1997); Luo et al. (2016).

Notes: *Sporoschisma phaeocentron* was originally described from Malaysia (Goh et al. 1997). Its occurrence in China was recently reported from the submerged decaying wood collected in a stream in Cangshan Mountain, Yunnan, China (Luo et al. 2016). No specimen was examined by us and the above description is based on the documentation provided by Luo et al. (2016). No living strain and DNA sequence are available for comparison.

***Sporoschisma taitense* (Mugambi & Huhndorf) A.N. Mill., IMA Fungus 7: 133, 2016.**

≡ *Melanochaeta taitensis* Mugambi & Huhndorf, Sydowia 60: 263, 2008

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Kenya.

Description and illustration: Mugambi and Huhndorf (2008); Luo et al. (2016); Réblová et al. (2016).

Notes: *Sporoschisma taitense* (Mugambi & Huhndorf) A.N. Mill was originally described from Kenya and recently also recorded from China (Mugambi and Huhndorf 2008; Luo et al. 2016). *S. taitense* is morphologically similar to *S. nigroseptatum* in having cylindrical to doliiform, 5-septate, smooth conidia with four inner cells dark brown and the two end cells hyaline to pale brown, but differs from it in the conidia without conspicuous, spherical

guttulate. Furthermore, the phylogenetic analysis based on combined ITS and LSU sequence data also showed the significant difference from other species. No specimen of this species was seen by us and the above description was based on Luo et al. (2016).

Sporoschisma uniseptatum Bhat & W.B. Kendr., Mycotaxon 49: 71, 1993.

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, India, Seychelles.

Illustration: Bhat and Kendrick (1993); Goh et al (1997).

Notes: No specimen of this species was seen by us and the above description was copied from Goh et al. (1997). *Sporoschisma uniseptatum* is characterized by its presence of capitate setae, gradually transited venter to collarete in conidiogenous cells, 1-septate, cylindrical conidia. The species was originally described on decaying twigs from India, and later reported by Goh et al. (1997) on submerged wood from Philippines. Lu et al. (2002) recorded its occurrence in Hong Kong.

Stephembruneria Castañeda, Fungi Cubenese III: 14, 1988

Colonies effuse, hairy, dark brown. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, erect, dark brown, proliferation percurrently or sympodially. Conidiogenous cells integrated, terminal, phialidic, cylindrical to clavate, with a narrower sporulating loci with poorly developing collarete, proliferating enteroblastically to produce a succession of conidia at the same level. Conidia holoblastic, acrogenous, solitary, ellipsoidal, obtuse at apex, base with a distinct scar, septate, dark brown, smooth. Conidia secession rhexolytic.

Type species: *Stephembruneria elegans* Castañeda

Ecology/Substrate/Host: Saprobe on dead material of plants.

Geographical distribution: China, Cuba.

Description and illustration: Castañeda-Ruiz (1988).

Notes: The genus *Stephembruneria* was described for a dematiaceous hyphomycetes found on dead culms of unidentified Gramineae species. It is characterized by setiform conidiophores, clavate conidiogenesis cells with very narrow collarete and brown multiseptate conidia (Castañeda-Ruiz 1988). *Kylindria*, *Xenokylindria* Di Cosmo, Berch & W. Kendr. and *Paradischloridium* Bhat & B. Sutton are the genera with similar conidiogenesis, however the conidia in *Kylindria* and *Xenokylindria* are hyaline; *Paradischloridium* has brown septate conidia but conidiogenous cells are cylindrical and the conidiogenous loci are as broad as conidiogenous cell body (Di Cosmo et al. 1983; Bhat and Sutton 1985a; Castañeda-Ruiz 1988).

Stephembruneria microsperma W.P. Wu & Y.Z. Diao, sp. nov., Figs. 190, MycoBank MB841616.

Etymology: refers to its small conidia.

Diagnosis: Similar to the type species of the genus, but differs in producing smaller conidia.

Typification: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1318a; ex-type strain NN 43126).

Colonies effuse, hairy, dark brown. Teleomorph: Not observed. Anamorph: Conidiophores mononematous, mononematous, solitary, erect, unbranched, straight or slightly flexuous, 3-5-septate, smooth but verruculose at the upper part, dark brown, blackish at the base, percurrently or sympodially proliferating, paler towards the apex, 250-270 µm long, 7-8 µm wide, with a swollen base of up to 30 µm wide. Conidiogenous cells integrated, terminal, cylindrical or slightly clavate, brown, becoming paler towards the apex, smooth or verruculose, 30-45 µm long, 8-10 µm wide at the widest distal end, 2-2.5 µm long and 2.5-3 µm wide at the conidiogenous loci, lacking a collarete, proliferating enteroblastically and producing successive conidia at the same level. Conidia holoblastic, solitary, accumulating in dry hyaline masses at the apices or sometimes sliding down along the sides of conidiogenous cells after secession, ellipsoidal, obtuse at apex, base with a distinct scar of 1.5 µm wide, (6-)7-septate, medium to dark brown, apical and basal cells subhyaline, apical cell longer than others, thin-walled, smooth, 27-31 x 11-12 µm.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branches of unidentified plant, 2 Jan. 1997, W.P. Wu (Holotype WFH Wu1318a; ex-type strain 43126); China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu2217); China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 29 Dec. 1997, W.P. Wu (Wu1515); China: Guangxi Province, Damingshan, on dead stem of grass, 19 Dec. 1997, W.P. Wu (Wu1444); China: Guangxi Province, Shiwandashan, on dead culms of bamboo, 31 Dec. 1997, W.P. Wu (Wu1605e). Living strain: ex-type strain 43126.

Ecology/Substrate/Host: Saprobe on dead culm of bamboo.

Geographical distribution: China.

Notes: *Stephembruneria microsperma* W.P. Wu & Y.Z. Diao is very similar to *S. elegans* Castañeda, but has smaller conidia (30-43 x 10-13 µm in *S. elegans*; Castañeda 1988; Li 2016). The small conidia were constantly

found from all examined collections from China. In addition, the conidiophores in the *S. elegans* are much longer. The very similar fungus was reported from China under *S. elegans* R.F. Castañeda by Ma et al. (2012), where the author also reported the smaller conidia (26.5–33.5 x 10–11.5 µm) from their material on dead branches of *Ficus benjamina*, collected in Hainan Province.

Phylogenetically, *Stephembruneria microspora* is closely related to members of *Chaetosphaeriales*. On a megablast search using the ITS sequences from the strain obtained from the specimen Wu1318a, the closest matches in NCBI's GenBank nucleotide database were members of *Phialocephala*, *Chaetosphaeria*, *Nawawia* and *Phialophora* in *Chaetosphaeriaceae*, including *Phialocephala* sp. (GenBank AB671500, identities 462/544 (85%), 29 gaps (5%)), *Chaetosphaeria dilabens* (GenBank MH861683, identities 464/552 (84%), 42 gaps (7%)).

Genera with synnematos conidioma

Five genera among the 91 accepted chaetosphaeriaceous fungal genera form synnematos conidiomata. These genera are *Arcuatospora*, *Menisporopsis*, *Phialoarthrobotryum*, *Phialosporostilbe*, *Polynema*, and some species of *Thozetella* (Nag Raj 1978; Seifert et al. 2011)

Phylogenetically all these genera are well-defined monophyletic genera, but polyphyletic in the phylogenetic trees generated by using the combined data set of ITS and LSU (Fig. 3). Morphologically most of these genera are also well-delimited by a combination of setae, conidiophores, conidiogenous cells and conidia. The living strains of many studied species were also studied on PDA, some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to synnematos genera of anamorphic chaetosphaeriaceous fungi:

1. Conidiomata sporodochial or synnematos; sterile setae absent; microawn present *Thozetella*
1. Conidiomata synnematos; sterile setae present; microawns absent 2
2. Synnemata diverge from setae towards apices and become unilateral; conidia septate *Arcuatospora*
2. Sterile setae in the middle of synnemata 3
3. Conidia brown, septate, without appendage *Phialoarthrobotryum*
3. Conidia hyaline, aseptate, with appendage 4
4. Conidia round-tetrahedral to pyramidal, with 3 protuberant corners each corner furnished with one setula, base slightly truncate to rounded with one setula *Phialosporostilbe*
4. Conidia falcate, fusiform, cylindrical 5
5. Conidia falcate, fusiform, with 1 setulae at end *Menisporopsis*
5. Conidia cylindrical, fusiform, straight, with more than 1 setulae at each end *Polynema*

Arcuatospora Réblová & Hern.-Restr., Journal of Fungi 7 (6. No 438): 8, 2021. MycoBank MB 839474.

Colonies on the natural substrate effuse, hairy, mycelium superficial, composed of setose synnemata. Teleomorph: Not observed. Anamorph: Anamorph: Setae erect, straight, arise singly from a discoid, pseudoparenchymatous subiculum, dark brown to black, opaque, thick-walled, paler and thinner-walled at the apex, apex sterile, broadly rounded, occasionally terminating into a phialide. Conidiophores macronematous, synnematos, closely bound, parallel, unbranched, brown, synnemata arise around the base of the seta, surrounds the seta, diverge from it towards their apices and become unilateral. Conidiogenous cells integrated, terminal, mono- or polyphialidic, extending percurrently and sympodially, paler than the conidiophores; collarettes subhyaline, cup-shaped or funnel-shaped. Conidia falcate, slightly truncate at the base with a basal scar, 1-septate, hyaline, with a straight or gently curved setula at each end, inserted terminally at the apex, subterminally at the base, conidia accumulate in slimy fascicles.

Type species: *Arcuatospora novae-zelandiae* (S. Hughes & W.B. Kendr.) Réblová & Hern.-Restr.

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: Widely distributed in subtropical and tropical areas, including Australia, Brazil, China, Costa Rica, Cuba, Ecuador, Japan, Mexico, Nepal, New Zealand, Kenya, and Venezuela. Probably widely distributed in tropical and subtropical area.

Description and illustration: Réblová et al. (2021b).

Note: The genus *Arcuatospora* Réblová & Hern.-Restr. was established for *Menisporopsis novae-zelandiae* and three other species which are morphologically similar to *Menisporopsis*, but phylogenetically unrelated to the lineage containing *M. theobromae* and other species of *Menisporopsis* (Réblová et al. 2021b). The transversely 1-septate conidia with simple setulae and synnemata surrounding the seta becoming unilateral towards their apices are the main diagnostic characteristics of the genus to distinguish it from *Menisporopsis*. Our phylogenetic analysis based on the Chinese materials supports the above separation (Fig. 191). In total 7 species of *Arcuatospora* were discovered from China.

Members of the genus are saprobes on decaying leaves, petioles and fruits of various host plants. They have been reported worldwide from freshwater and terrestrial biotopes in subtropical and tropical geographical areas

(Hughes 1952; Pirozynski and Hodges 1973; Varghese and Rao 1978; Rao and de Hoog 1986; Seifert et al. 2011). The living strains were also studied on PDA (Figs. 192-193), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Arcuatospora ellisii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 194-195, MB841617.

Etymology: named after the former IMI mycologist M.B. Ellis for his contribution to anamorphic fungi.

Diagnosis: Similar to *A. hughesii* in smaller conidia but differs in not curved collarettes; Similar to *A. sinensis* but differs in ITS sequences.

Typification: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of *Cinnamomum* sp., 15 Nov. 2019, W.P. Wu (Holotype WFH Wu17147; ex-type strain CGMCC 3.20745 = NN 77541).

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 20-25 µm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, up to 16 septa, smooth- and thick-walled, 160-295 µm long, 4.5-6 µm wide, apex 3-4 µm, sterile and terminated with a rounded apex, sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 75-87 µm high, 8-13 µm wide in the lower part, 15-20 µm wide in the upper fertile region; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 70-90 µm high, 1.2-1.5 µm wide, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 20-25 x 2.5-3 µm, periclinal thickening obvious, collarette funnel-shaped and conspicuous, 1.5-2.5 µm wide, up to 1.5 µm deep. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, lunate, fusiform, straight or slightly curved, 13-14.5 x 2-2.3 µm, base slightly truncated, apex rounded or obtuse, appendiculate with one setula of 5-6.5 µm long at each end.

Colonies on PDA effuse, colonies 1.2-1.6 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, soil brown, with pale colored margin, reverse pale brown to soil brown.

Material examined: On dead leaves of unidentified tree, China: Guangdong Province, Shaoguan, Danxiashan, 25 Dec 2012, W.P. Wu (12497); on dead leaves of unidentified tree, China: Guangdong Province, Shenzhen, Lianhuashan Park, 11 Nov. 2019, W.P. Wu (Wu17244); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of *Cinnamomum* sp., 15 Nov. 2019, W.P. Wu (Holotype WFH Wu17147). Living strain: 55346 (from Wu12497), 77699 (from Wu17244), ex-type strain NN 77541 and 77542.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Arcuatospora ellisii* W.P. Wu & Y.Z. Diao is phylogenetically closely related to other species in the genus. Morphologically it resembles other species on appearance of conidiomata, but differs from them by polyphialidic conidiogenous cells, lunate conidia in smaller size (Hughes and Kendrick 1968; Réblová et al. 2021b). Variations on conidial size were observed among different collections.

Arcuatospora hughesii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 196, MycoBank MB841619.

Etymology: named after the Canadian mycologist S.J. Hughes.

Etymology: Similar to other species but differs in curved collarettes, smaller conidia (14-15.5 x 2-2.5 µm) with shorter setulae (6-8 µm).

Typification: China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leaves of unidentified tree, 2 March 2012, W.P. Wu (Holotype WFH Wu12237; ex-type strain CGMCC 3.20646 (=NN 54242)).

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 30-35 µm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, septate, smooth- and thick-walled, 250-300 x 5-7 µm, apex rounded and 2.5-3 µm wide, sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 11-17 µm wide; conidiophores cylindrical, erect, straight or flexuous, unbranched, or branched, pale to medium brown, septate, smooth- and thick-walled, 130-150 x 2-3.5 µm, terminating in a conidiogenous cell. Conidiogenous cells monophialidic or polyblastic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 18-25 µm long, 2.5-3.5 µm wide, periclinal thickening obvious, collarette funnel-shaped and conspicuous, 1-2 µm wide, 1-1.5 µm long. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, falcate, fusiform, curved, 14-15.5 x 2.0-2.5 µm, base slightly truncated, apex acute, appendiculate with one setula of 6-8 µm long at each end.

Colonies on PDA effuse, colonies 0.7-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leaves of unidentified tree, 2 March 2012, W.P. Wu (Holotype WFH Wu12237). Living strain: ex-type strain CGMCC 3.20646 (=NN 54242).

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: China.

Notes: *Arcuatospora hughesii* W.P. Wu & Y.Z. Diao is similar to *A. novae-zelandiae* in having 1-septate conidia with a single setulae at each end. However, in *A. novae-zelandiae*, the conidiophores are closely packed together, the conidiogenous cells are monoblastic, and the conidia is much bigger (17-20 µm long) and with longer setulae (9-12 µm) (Hughes and Kendrick, 1968; Réblová et al. 2021b). In addition, the ITS sequences for those two species are significantly different.

***Arcuatospora lunata* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 197, MycoBank MB841620.**

Etymology: refers to its lunate conidia.

Diagnosis: Similar to *Arcuatospora suttonii* but differs in a combination of cylindrical conidiogenous cell with funnel-shaped collarette, lunate conidia with tapering ends and ITS sequence.

Typification: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17248; ex-type culture CGMCC 3.20750 = NN 77700).

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 25-30 µm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, 8-13-septate, smooth- and thick-walled, 150-300 µm long, 6-8 µm, apex rounded and 4-5 µm, sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 10-12 µm wide in the lower part, 17-22 µm wide in the upper fertile region; conidiophores cylindrical, erect, straight of flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 60-120 µm high, 1.2-1.5 µm wide, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, clavate, erect, straight, thin-walled, 13-18 x 3-3.5 µm long, periclinal thickening obvious, collarette funnel-shaped and conspicuous, 1.5-3 µm wide, up to 1.5 µm deep. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, lunate, fusiform, curved, 14-17 x 2-2.3 µm, base slightly truncated, apex acute, appendiculate with one setula of 5-7 µm long at each end.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, with pale colored margin, reverse pale brown to yellow brown.

Material examined: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17248; ex-type culture NN 77700); China: Guanxi Province, Nanning, Subtropical Botanical Garden, on dead leaves of unidentified tree, 15 Nov. 2013, W.P. Wu (Wu13145). Living strain: 57467 (from Wu13145), ex-type culture NN 77700.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Arcuatospora lunata* is similar with *A. suttonii*, *A. novae-zelandiae* and *A. hughesii* in having 1-septate conidia with a single setula at each end. In *A. hughesii*, the conidiophores in the fertile region of the synnemata are not closely packed, the conidiogenous cells are usually polyphialidic, and the conidia are smaller (14-15.5 x 2.0-2.5 µm). In *A. novae-zelandiae*, the conidia are slightly larger (17-20 µm long) and with longer setulae (9-12 µm) (Hughes and Kendrick 1968; Réblová et al. 2021b). The conidia in *A. suttonii* are slightly longer and wider than those in *A. lunata*. In addition, the ITS sequences for those four species are significantly different.

***Arcuatospora novae-zelandiae* (S. Hughes & W.B. Kendr.) Réblová & Hern.-Restr., J. Fungi 7: 8, 2021.**

≡ *Menisporopsis novae-zelandiae* S. Hughes & W.B. Kendr. New Zealand J. Bot. 6:369, 1968.

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight, or flexuous. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler towards the apex, septate but hardly seen due to heavy pigmentation, smooth- and thick-walled, apex acute, 180-300 x 8-9 µm, normally not sitting in the middle of conidiophores. Conidiophores closely compacted into synnemata, cylindrical, erect, straight of flexuous, unbranched, pale to medium brown, septate, smooth- and thick-walled, 80-150 x 1.5-2 µm, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, single, erect, straight or curved, thin-walled, periclinal thickening obvious, collarette inconspicuous, 3-3.5 µm wide, collarette up to 1.5 µm wide. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, uniseptate, smooth- and

thin-walled, falcate, fusiform, curved, 17-20 x 1.8-2.5 μm , base truncated, apex acute, appendiculate with one setula of 9-12 μm long at each end.

Material examined: China: Hubei Province, Shennongjia, On dead leave of unidentified tree, 19 Sept. 2004, W.P. Wu (Wu7050); China: Yunnan Province, Simao, On dead leaves, 13 Oct. 1999, W.P. Wu & Yan Huang (WU2814b); China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, On dead fruit of *Quercus* sp., 15 Oct. 2013, W.P. Wu (Wu7249).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, Brazil, China, Costa Rica, Cuba, Ecuador, Japan, Mexico, Nepal, New Zealand, Kenya, and Venezuela. Probably widely distributed in tropical and subtropical area.

Description and illustration: Hughes & Kendrick (1968); Cruz et al (2014); Réblová et al. (2021b).

Notes: As already known in literatures, *Arcuatospora novae-zelandiae* exhibits distinctive characteristics, such as conidiophores forming lateral to the seta near the apex, and 1-septate conidia with one setula at each end (Hughes & Kendrick 1968; Réblová et al. 2021b); but also showed some minor variation on setae, conidiophore and conidial morphology among specimens collected from different sites, for example, Arias et al. (2010) collected specimens with polyphialidic conidiogenous cells and larger conidia. Matsushima (1975) also reported the presence of larger conidia. The dimensions of the morphological structures of *Menisporopsis novae-zelandiae* from Chinese material agree with the original description, variations on size of setae and conidiophores, conidial shape and size are also seen among different specimens from China. The fungus was also described from dead leaves of *Sycopsis sinensis* from China (Li et al. 2013). Its occurrence in Taiwan was also reported (Matsushima 1980). The species has been recorded from many countries, but their identity to the type specimen needs to be confirmed by comparative study on morphology and phylogeny (Hughes and Kendrick 1968; Matsushima 1975, 1980, 1989, 1993; Mercado-Sierra et al. 1997; Castañeda-Ruiz et al. 2001; Delgado-Rodriguez et al. 2002; Arias et al. 2010; Almeida et al. 2011; Cruz et al. 2014).

Arcuatospora septata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 198, MycoBank841622.

Etymology: refers to the septate conidia of this species.

Diagnosis: Similar to other species in the genus, but differs in producing short conidiogenous cells with inconspicuous collarette, and relatively large conidia (16.5-19 (-21) x 2.4-2.6 μm) with longer setulae at both ends (7-10 μm long).

Typification: China: Hunan Province, Chen Zhou, Yizhang County, Mangshan, on dead leaves of unidentified tree, 10 April 2002, W.P. Wu (Holotype WFH Wu6039c; ex-type strain CGMCC 3.20644 (=NN 47512)).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 40-50 μm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, multiseptate, smooth- and thick-walled, 260-360 x 6-8 μm , apex rounded and 4-5 μm wide, sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 100-175 μm high, 10-15 μm wide, 25-30 μm wide in the sporulating region; conidiophores cylindrical, erect, straight or flexuous, unbranched, or branched in the top part, pale to medium brown, septate, smooth- and thick-walled, 100-160 x 1.5-2 μm , terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, cylindrical, erect, straight, thin-walled, pale brown to brown, 10-18 μm long, 2.5-4 μm wide, periclinal thickening not obvious, collarette inconspicuous, 1-1.5 μm wide, up to 1 μm long. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, falcate, fusiform, curved, 16.5-19 (-21) x 2.4-2.6 μm , base slightly truncated, apex acute, appendiculate with one setula of 7-10 μm long at each end.

Colonies on PDA effuse, colonies 1.2-1.7 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey to grey brown, with brown colored margin, reverse pale brown to dark brown.

Material examined: China: Hunan Province, Chen Zhou, Yizhang County, Mangshan, on dead leaves of unidentified tree, 10 April 2002, W.P. Wu (Holotype WFH Wu6039c; ex-type strain NN 47512); China: Hubei Province, Shennongjia, on dead leave of unidentified tree, 19 Sept. 2004, W.P. Wu (Wu8279c); China: Sichuan Province, Ya An, Yucheng, Bifengxia, on dead leaves of *Cinnamomum* sp., 15 Dec. 2013, W.P. Wu (Wu13192). Living strain: ex-type strain CGMCC 3.20644 (from Wu6039c), 50638 (from Wu8279c), 57705 (from Wu13192).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Réblová et al. (2021b).

Notes: *Arcuatospora septata* W.P. Wu & Y.Z. Diao is phylogenetically closely related to other species in the genus. Morphologically it differs from other species by shorter conidiogenous cells with inconspicuous collarettes and larger conidia. Réblová et al. (2021b) described a similar fungus from a pure culture CBS694.74 as a distinct species, but without giving it a name due to lacking morphological characters on natural substrate.

Arcuatospora sinensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 199-201, MycoBank MB841623

Etymology: refers to the country China where this fungus was first discovered.

Typification: China: Zhejiang Province, Hangzhou, Longjing, on dead leaves of *Cinnamomum* sp., 30 Sept 2013, W.P. Wu (Holotype WFH Wu13025; ex-type strain CGMCC 3.20653 (=NN 57331)).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 25-37 μm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, up to 7-12-septate, smooth- and thick-walled, 170-270 μm long, 5-7 μm wide, apex 2.5-3 μm , sterile and terminated with a rounded apex, or fertile and terminated with a conidiogenous cells, sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 120-150 μm high, 11-15 μm wide in the lower part, 20-25 μm wide in the upper fertile region; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 120-159 μm high, 1.2-1.5 μm wide, terminating in a conidiogenous cell. Conidiogenous cells monophialidic or polyblastic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 15-25 μm long, 2.5-3 μm wide, periclinal thickening obvious, collarete funnel-shaped and conspicuous, 1-1.5 μm wide, up to 1 μm deep. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, lunate, fusiform, curved, 10-13 (-15) μm , base slightly truncated, apex rounded or obtuse, appendiculate with one setula of 5-7.5 μm long at each end.

Colonies on PDA effuse, colonies 0.6-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, brown, with pale colored margin, reverse pale brown to brown.

Material examined: on dead leaves of *Cinnamomum* sp., China: Zhejiang Province, Hangzhou, Longjing, 30 Sept 2013, W.P. Wu (Holotype WFH Wu13025; ex-type strain NN 57331); China: Guangdong Province, Shaoguan, Danxiashan, On dead leaves of unidentified tree, 25 Dec 2012, W.P. Wu (Wu12497, Wu12528); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaf of *Cinnamomum* sp., 11 Nov. 2019, W.P. Wu (Wu17244). Living strain: 55333 (from Wu12528), 55346 (from Wu12497), ex-type strain CGMCC 3.20653 (=NN 57331), 57332 (from Wu13025a); 77699 (from Wu17244).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Arcuatospora sinensis* W.P. Wu & Y.Z. Diao is phylogenetically closely related to other species in the genus. Morphologically it resembles other species on appearance of conidiomata, but differs from them by polyphialidic conidiogenous cells, lunate conidia in smaller size (Hughes and Kendrick 1968; Réblová et al. 2021b). Slightly longer conidia (up to 16 μm) was observed in the specimen Wu12528.

Arcuatospora suttonii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 202-203, MB841624.

Etymology: named after the former IMI mycologist Brian C. Sutton.

Typification: China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 29 Dec 2020, W.P. Wu (Holotype WFH Wu17630; ex-type strain CGMCC 3.20764 = NN 78458).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 25-35 μm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, up to 15-septate, smooth- and thick-walled, 150-330 μm long, 3.5-5 μm , apex rounded and 2.5-3 μm , sitting not in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 11-16 μm wide in the lower part, 17-23 μm wide in the upper fertile region; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, (50-)90-140 μm high, 1.2-1.5 μm wide, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 13-32 μm long, 2.8-3.5 μm wide, periclinal thickening obvious, collarete funnel-shaped and conspicuous, 1.5-3.5 μm wide, up to 1 μm deep. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, 1-septate, smooth- and thin-walled, falcate, fusiform, curved, 13-17.5 x 2.5-3 μm , base slightly truncated, apex acute, appendiculate with one setula of 5-8 μm long at each end.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, light brown to dark brown, reverse of the same color, or darker.

Material examined: China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 29 Dec 2020, W.P. Wu (Holotype WFH Wu17630). Living strains: ex-type strain 78458 and 78459 (from Wu17630).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Arcuatospora suttonii* is similar with *A. novae-zelandiae* and *A. hughesii* in having 1-septate conidia with a single setula at each end. In *A. hughesii*, the conidiophores in the fertile region of the synnemata are not

closely packed, the conidiogenous cells are usually polyphialidic, and the conidia are smaller (14-15.5 x 2.0-2.5 µm). In *A. novae-zealandiae*, the conidia are slightly larger (17-20 µm long) and with longer setulae (9-12 µm). In addition, the ITS sequences for those three species are significantly different. Some variation on the ITS sequences was observed from different strains of this species, same as found in *A. novae-zealandiae* (Hughes & Kendrick 1968).

Arcuatospora yunnanensis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 204, MycoBank MB841626.

Etymology: refers to the Yunnan province in China where this fungus was first discovered.

Typification: China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on dead fruit of *Quercus* sp., 15 Oct. 2013, W.P. Wu (Holotype WFH Wu7244b; ex-type strain CGMCC 3.20642 (=NN 47742)).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 30-40 µm diam. Setae cylindrical, erect, straight, unbranched, dark brown, becoming paler toward the apex, 8-12-septate, smooth- and thick-walled, 250-280 x 6-9 µm, 3.5-4 µm wide at the rounded apex, sitting in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, 90-120 µm high, 15-17 µm wide in the lower part, 18-25 µm wide in the upper fertile region; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 90-100 µm high, 1.5-2 µm wide, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, lageniform, cylindrical, erect, straight, thin-walled, 15-20 µm long, 2-2.5 µm wide, periclinal thickening obvious, collarette inconspicuous and not curved, 1-1.2 µm wide, up to 1 µm deep. Conidia holoblastic, aggregated in slime heads around the conidiogenous cells, hyaline, 1-setpate, smooth- and thin-walled, falcate, fusiform, curved, 13-17 x 2-2.5 µm, base slightly truncated, apex acute, appendiculate with one setula of 6-7 µm long at each end.

Colonies on PDA effuse, colonies 1.5-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to grey brown, reverse pale brown.

Material examined: China: Hunan Province, Chen Zhou, Yizhang County, Mangshan, on dead leaves of unidentified tree, 12 April 2002, W.P. Wu (Wu6026); On dead fruit of *Quercus* sp., China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, 15 Oct. 2013, W.P. Wu (Holotype WFH Wu7244b); China: Yunnan Province, Baoshan, Lujiang, Bawan, Gaoligongshan, on dead leaves of *Quercus* sp., 15 Oct. 2001, W.P. Wu (Wu7255a). Living strain: 47471 (from Wu6026), ex-type strain CGMCC 3.20642 (NN 47742) (from Wu7244b), and 47757 (from Wu7255a).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Nepal.

Description and illustration: Réblová et al. (2021b).

Notes: *Arcuatospora yunnanensis* W.P. Wu & Y.Z. Diao is phylogenetically closely related to other species in the genus. Morphologically it resembles *A. novae-zealandiae* on conidial shape, but differs from it by the setae somewhat centrally in synnemata, and smaller conidia. Réblová et al. (2021b) described a similar fungus from a pure culture MUCL43189 as a distinct species, but without giving it a name due to lacking morphological characters on natural substrate. The ITS from this fungus is almost identical to those obtained from living strains of *A. yunnanensis*. Variations on conidial size were observed among different collections, for example: 13-14.5 x 1.5-2 µm from the type specimen, 14-17 x 2-2.5 µm from Wu7255a.

Menisporopsis S. Hughes, Mycol. Pap. 48: 59, 1952

= *Menisporopascus* Matsush., Matsush. Mycol. Mem. 10: 141, 2003.

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiomata synnemata, solitary, erect, straight, or flexuous, composed of a number of parallel, thin- or thick-walled, septate, brown, smooth conidiophores and dark brown, septate setae. Conidiophores closely compacted into synnemata, cylindrical, unbranched, medium brown to dark brown, septate, smooth- and thick-walled. Conidiogenous cells monophialidic or polyphialidic, integrated, terminal, cylindrical or clavate, single, erect, straight, thick-walled but becoming thin-walled towards the apex, periclinal thickening obvious, collarette conspicuous or inconspicuous. Conidia holoblastic, aggregated in slime heads, hyaline, aseptate or septate, thin-walled, smooth, falcate, fusiform, subcylindrical, curved, appendiculate.

Type species: *Menisporopsis theobromae* S. Hughes.

Ecology/Substrate/Host: Saprobe on decaying plant material, especially decaying leaves and fruit.

Geographical distribution: Broadly distributed, and commonly found in subtropical and tropical area.

Description and illustration: Hughes (1952); Pirozynski and Hodges (1973); Varghese and Rao (1978); Rao and de Hoog (1986); Seifert et al. (2011).

Notes: The genus *Menisporopsis* S. Hughes was first introduced for *Menisporopsis theobromae* S. Hughes, a microfungus from decaying leaves of *Theobroma cacao* in Ghana (Hughes 1952). This genus is characterized by synnematus conidiomata that surround a central, simple, dark brown seta, phialidic conidiogenous cells and lunate to falcate 0- to 1-septate conidia with terminal setulae (Hughes 1952; Pirozynski and Hodges 1973; Varghese and Rao 1978; Rao and de Hoog 1986). On conidial morphology, the genus *Menisporopsis* is similar to *Dictyochoaeta* and *Menispora*, but can be distinguished from them by its synnematus conidiomata with setae (Hughes 1952; Ellis 1971,1976).

Eleven species are known in the genus *Menisporopsis* and they are distinguished primarily by conidial morphology and dimensions. These species are *M. anisospora* R.F. Castañeda & Iturr., *M. breviseta* C.G. Lin & K.D. Hyde, *M. dushanensis* C.G. Lin & K.D. Hyde, *M. heterosetulosa* Cano, R.F. Castañeda & Guarro; *M. kobensis* Matsush., *M. ludoviciana* (Crane & Schokn.) P.M. Krik & B. Sutton, *M. multisetulata* K.M. Tsui, Goh, K.D. Hyde & Hodgkiss, *M. novae-zealandiae* S. Hughes & W. Kendr., *M. pandanicola* Tibpromma & K.D. Hyde, *M. pirozynskii* V. Rao, *M. pleiosetosa* Rao & de Hoog, *M. profusa* Piroz. & Hodges, *M. theobromae* S. Hughes and *M. trisetulosa* Siboe, P.M. Kirk & P.F. Cannon (Hughes and Kendrick 1968; Ellis 1971; Matsushima 1971,1975; Pirozynski and Hodges 1973; Rao 1978; Kirk and Sutton 1985; Rao and de Hoog 1986; Castañeda-Ruiz et al. 1997; Siboe et al. 1999; Tsui et al. 1999; Castañeda-Ruiz et al. 2001; Matsushima 2003; Seifert et al. 2011; Tibpromma et al. 2018; Lin et al. 2019). However, *Menisporopsis ludoviciana* (= *Chaetopsina ludoviciana* Crane & Schokn.) was excluded from the genus and transferred into *Vermiculariopsiella* as *V. ludoviciana* (Crane & Schokn.) R.F. Castañeda, Cano & Guarro (Castañeda-Ruiz et al., 2001). Key to the eight accepted species was provided by Siboe et al. (1999), Castañeda-Ruiz et al. (2001) and Cruz et al. (2014).

Matsushima (2003) first described the teleomorph of the genus *Menisporopsis* with the new genus, *Menisporopascus* Matsush., typified by *Menisporopascus kobensis* and was later placed in Sordariomycetidae *incertae sedis* by Lumbsch & Huhndorf (2007a, b, 2010). Based on preliminary studies, *Menisporopsis* was included in a clade within Chaetosphaeriaceae (Réblová et al. 2006; Reblová and Seifert 2008).

Our phylogenetic analysis shows that the synnematus genus *Menisporopsis* S. Hughes is polyphyletic, and the species are resolved with two very distinct phylogenetic groups (Figs. 3 and 205). The first group includes *M. theobromae* (the type species of the genus), *M. anisospora* R.F. Castañeda & Iturr., *M. breviseta* C.G. Lin & K.D. Hyde, *M. dushanensis* C.G. Lin & K.D. Hyde, *M. pandanicola* Tibpromma & K.D. Hyde, *M. pirozynskii* Varghese & V.G. Rao and several new species; morphologically these species produces synnematus conidiomata with 1 (rarely 2) centralized setae, monophialidic or polyphialidic conidiogenous cells, and setouse, hyaline and aseptate conidia formed in droplet; phylogenetically they are closely related to *Phialosporostilbe* Mercado & J. Mena with similar structure on conidiomata, but differs by tetrahedral conidia with three protuberant corners and a slightly truncate base bearing a single setulae in the latter genus (Mercado Sierra and Mena Portales 1985; Hyde et al. 1996; Shirouzu and Harada 2004; Seifert et al. 2011). The second group is with two known species, *M. novae-zealandiae* S. Hughes and *Arcuatospora seorsa*, and several new species, differs from the members in the first group by producing synnemata with 1 setae not sitting in the center of the synnemata and 1-septate conidia; and phylogenetically they are closely related to *Menispora* species. In a very recent publication by Réblová et al. (2021b), the new genus, *Arcuatospora* Réblová & Hern.-Restr., was created to accommodate the second group. These separation is supported from our phylogenetic analysis with additional species.

In nature the *Menisporopsis* species occur as saprobes on decaying leaves and submerged decomposing wood in pantropical areas (Tsui et al. 1999; Seifert et al. 2011). Several species are discovered from China and reported here. The living strains of many studied species were also studied on PDA (Figs. 206), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to all known species of *Menisporopsis*

1. Conidiogenous cells unilocal2
1. Conidiogenous cells multilocal.....*M. profusa*
2. Conidia truncated at the base3
2. Conidia not truncated at the base4
3. Conidia ellipsoid, 12-18 x 4-5 µm, 2-4 basal and 1 apical setula up to 6 µm long.*M. pleiosetosa*
3. Conidia heterosporous, 17-30 x 2-6 µm, 1 setulae at each end and 1-2 lateral setula arising more or less at the center on the concave side.....*M. anisospora*
4. Conidia with one setulae at both ends5
4. Conidia with more than one setula at both ends 8
5. Conidia 22-24 x 3-3.5 µm, setulae 4.5-6.5 µm long; microconidia cylindrical 7-8 x 1 µm *M. biformis*
5. No microconidia produced 6
6. Conidia 22-30 x 4.5 µm; setulae 6-10 µm *M. kobensis*
6. Conidia 15-22 µm long 7
7. Conidia 14-20 x 2.0-3.5 µm, aseptate, setula 6-10 µm long*M. theobromae*

7. Conidia 19-22 x 3.5-4.2 µm, setula 5-8 µm long	<i>M. dinemasporioides</i>
8. Conidia, allantoid, with 3 setulae, 10 µm long, 1 setulae at both ends and 1 setula near the base at the convex side, 12-20 x 2 µm	<i>M. trisetulosa</i>
8. Conidia with more than 3 setulae	9
9. Conidia 11-14.5 x 2.0-3.0 µm, with 4 setulae	<i>M. elegans</i>
9. Conidia more than 15 µm	10
10. Conidia with 1-2 setulae at each end	11
10. Conidia with 2-3 setulae at each end	14
11. Setae 97-189 x 2.7-5.4 µm; synnemata 6.5-12 µm wide; conidia cylindrical or fusiform, 14.2-24.3 x 2.4-3.6 µm; setulae 1-2 at each end, 4-9 µm long	<i>M. breviseta</i>
11. Setae longer than 200 µm; synnemata wider	12
12. Setae 207-405 µm long; synnemata 8-22.5 µm wide; conidia cylindrical or fusiform, 14-20 x 2.7-4.2 µm; setulae 1-2 at each end, 3-11 µm long	<i>M. dushanensis</i>
12. Setae 344-375 x 7-10 µm; synnemata 14-23 µm wide; conidia lunate, 17-22 x 2-3 µm; setulae (1-)2 at each end, 4-12 µm long	<i>M. pandanicola</i>
14. Conidia 15-20 x 2-3 µm, cylindrical to allantoid, with 4-5 setulae, 1-3 basal setulae of the different length and one subapical setulae at the convex side	<i>M. pirozynskii</i>
14. Conidia 12-19 x 2.5-4 µm, allantoid, with 5-6 setulae, 3-4 basal, 1 subapical and 1 apical	<i>M. multisetulata</i>

Menisporopsis biformis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 207, MycoBank MB841627.

Etymology: refers to its two types of conidia produced from the same synnemata.

Diagnosis: Similar to *Menisporopsis theobromae* in conidial morphology but differs in producing two types of conidia (macroconidia and microconidia) and larger macroconidia.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaf petiole of palm, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17473; ex-type strains CGMCC 3.20805 (= NN 78233).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight, or flexuous, consisting of 1-centralized setae and closely packed conidiophores, 11-14 µm wide in the lower part, up to 40 µm wide in the upper fertile region. Setae cylindrical, erect, straight, unbranched, medium brown to dark brown, up to 12-septate, smooth- and thick-walled, 190-227 x 3-4.5 µm, apex rounded, slightly swollen and with a mucilaginous cap. Conidiophores closely compacted into synnemata, cylindrical, erect, straight or flexuous, unbranched, pale to medium brown, septate, smooth- and thick-walled, 110-150 µm high, 1.5-2.5 µm wide, terminating in a conidiogenous cell. Conidiogenous cells mono- or poly-phialidic, integrated, terminal, cylindrical or clavate, erect, straight or curved, thin-walled, smooth, dark brown, 25-28 x 2.5-3 µm, with up to 4 inconspicuous collarettes. Conidia holoblastic, aggregated slime heads around the conidiogenous cells, both microconidia and macroconidia are produced; microconidia hyaline, aseptate, cylindrical to fusiform, thin- and smooth-walled, with rounded ends, aseptate, 7-8 x 1 µm; macroconidia hyaline, aseptate, smooth- and thin-walled, cylindrical, falcate, curved, 22-24 x 3-3.5 µm, appendiculate with a setula at each end and 4.5-6.5 µm long.

Colonies on PDA effuse, colonies 8-14 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead leaf petiole of palm, 17 Oct 2020, W.P. Wu (Holotype WFH Wu17473, Wu17474, Wu17475). Living strain: ex-type strain 78233 (from Wu17473); 78234 (from Wu17474), 78235 and 78236 (from Wu17475).

Ecology/Substrate/Host: Saprobe on dead leaf of palm.

Geographical distribution: China.

Notes: *Menisporopsis biformis* W.P. Wu & Y.Z. Diao is characterized by centrally located setae among conidiophores, forming of both microconidia and macroconidia, and larger macroconidia with one setula at each end. It can be easily distinguished from other known species by the two types of conidia. Morphologically it is most similar to *Menisporopsis theobromae* in morphology of synnemata and conidial morphology, but differs in producing two types of conidia (macroconidia and microconidia) and larger macroconidia (Tsui et al. 1999; Cruz et al. 2014; Lin et al. 2019).

Menisporopsis breviseta C.G. Lin & K.D. Hyde, Mycosphere 10: 678, 2019

Ecology/Substrate/Host: Saprobe on decaying leaves of plant.

Geographical distribution: China.

Description and illustration: Lin et al. (2019).

Notes: *Menisporopsis breviseta* is a recently described species from China. It is similar to *M. pandanicola* by having lunate, hyaline conidia with 1-2 setula at each end. However, *M. breviseta* differs from *M. pandanicola* by its shorter setae and conidia with 1-2 setula at each end (Lin et al. 2019).

Menisporopsis dinemasporioides W.P. Wu & Y.Z. Diao, sp. nov., Fig. 208, MycoBank MB841628

Etymology: refers to its similarity to the genus *Dinemasporium* on cupulate conidiomata.

Diagnosis: Similar to *Menisporopsis theobromae* but differs in producing cup-shaped conidiomata and slightly smaller conidia.

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12102; ex-type strain CGMCC 3.20711 = NN 54208).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 40-50 µm diam. Setae 1-2 in each conidiomata, cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, septate, smooth- and thick-walled, 220-285 x 4-5.5 µm, apex rounded and 2-2.5. Conidiophores closely compacted into synnemata; synnemata dark brown to black, 150-180 µm long, 40-60 µm wide, lower part blackish, 40-50 µm high, upper part loosely packaged with excipulum-like structure, 80-110 µm high; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thin-walled, 60-100 x 2-3 µm, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 15-20 µm long, 2-3.5 µm wide, periclinal thickening obvious, collarette inconspicuous. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, aseptate, smooth- and thin-walled, falcate, fusiform, curved, 19-22 x 3.5-4.2 µm, both ends rounded, appendiculate with one setula of 5-8 µm long at each end.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, then grey to yellow brown, with pale colored margin, reverse yellow brown and with dark brown in the center.

Material examined: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (Holotype WFH Wu12102; ex-type strain NN 54208); China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17232a,b,c,d,r). Living strain: ex-type strain 54208; 77694, 77695, 77696, 77618 and 77745 (all from Wu17232).

Ecology/Substrate/Host: Saprobe on dead leaf of palm.

Geographical distribution: China.

Notes: *Menisporopsis dinemasporioides* W.P. Wu & Y.Z. Diao can be easily distinguished from all other species by its conidiomata with excipulum-like structure with 1-2 setae arising centrally from the basal stroma of the conidiomata, falcate to fusiform conidia with one setulae at each end (Tsui et al. 1999; Castañeda-Ruiz et al. 1997; Castañeda-Ruiz et al. 2001; Cruz et al. 2014; Heredia et al. 2000; Heredia et al. 2018). Similar conidiomata with excipulum-like structure was illustrated in *M. multisetulata* by Heredia et al. (2018).

Phylogenetically, on a megablast search using the ITS sequence from the type specimen Wu12102, the closest matches in NCBI's GenBank nucleotide database were members of *Menisporopsis*, *Pyrigemmula*, *Codinaea*, *Codinaeopsis* and *Dictyochoeta* in *Chaetosphaeriaceae*, including *Menisporopsis anisospora* (GeneBank MH862827, identities 466/479 (97%), 6 gaps (1%)), *Menisporopsis theobromae* (GeneBank KX609957, identities 434/468 (93%), 17 gaps (3%)), *Menisporopsis dushanensis* (GenBank NR166299, identities 430/465 (92%), 12 gaps (2%)).

Menisporopsis dushanensis C.G. Lin & K.D. Hyde, Mycosphere 10: 681, 2019.

Ecology/Substrate/Host: Saprobe on dead leaf of plant.

Geographical distribution: China.

Description and illustration: Lin et al. (2019).

Notes: The most similar species to *M. dushanensis* are *M. breviseta* (setae 97-189 µm long; conidiophores up to 182 µm long; conidia cylindrical or fusiform, aseptate, 14-24 x 2.4-3.6 µm; 1-2 setulae at each end, 4-9 µm long) and *M. pandanicola* (setae 344-375 µm long; conidia lunate, aseptate, 17-22 x 2-3 µm; (1-2) setulae at each end, 4-12 µm long) in producing lunate conidia with 1-2 setula at each end (Tibpromma et al. 2018; Lin et al. 2019). *M. dushanensis* differs from *M. breviseta* by longer setae and synnemata, and wider conidia; differs from *M. pandanicola* by longer setae and wider conidia.

Menisporopsis elegans W.P. Wu & Y.Z. Diao, sp. nov., Fig. 209, MycoBank MB841629.

Etymology: *elegans* (L), beautiful, refers to its beautiful synnemata and conidia.

Typification: China: Guangdong Province, Zhaoqing, Dinghuashan, on dead leaves of *Fagus* sp., 3 March 2012, W.P. Wu (Holotype WFH Wu12183; ex-type strain CGMCC 3.20795 (= NN 54228)).

Colonies hypophyllous, effuse, thick, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight or flexuous, basal stroma 30–40 µm diam. Setae cylindrical, erect, straight, unbranched, dark brown to blackish, becoming paler toward the apex, up to 15 septa, smooth- and thick-walled, 370–450 x 5–9 µm, apex rounded and 3.5–4, sitting in the middle of conidiophores. Conidiophores closely compacted into synnemata; synnemata brown, lower part closely packed and 20–25 µm wide, upper part 50–60 µm wide; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 130–160 x 2–3 µm, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 20–25 µm long, 2.5–3.2 µm wide, periclinal thickening obvious, collarete inconspicuous. Conidia holoblastic, aggregated in slime heads at the apex of synnemata, hyaline, aseptate, smooth- and thin-walled, falcate, fusiform, curved, 11.5–14.5 x 2.0–3.0 µm, both ends rounded, appendiculate with one terminal setula of 7–9 µm long at each end and one subterminal setula of 3–6.5 µm at each end.

Colonies on PDA effuse, colonies 3–3.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, to slightly grey with pale colored margin, reverse pale-yellow brown, with a dark center.

Material examined: Typification: China: Guangdong Province, Zhaoqing, Dinghuashan, on dead leaves of *Fagus* sp., 3 March 2012, W.P. Wu (Holotype WFH Wu12183). Living strain: ex-type strain 54228.

Ecology/Substrate/Host: Saprobe on dead leaves of *Fagus* sp.

Geographical distribution: China.

Notes: Morphologically *Menisporopsis elegans* is similar with a few species producing aseptate conidia with both terminal and subterminal setulae, including *M. breviseta* (setae 97–189 µm long; conidiophores up to 182 µm long; conidia cylindrical or fusiform, aseptate, 14–24 x 2.4–3.6 µm; 1–2 setulae at each end, 4–9 µm long), *M. dushanensis* (setae 207–455 µm long; conidiophores up to 147 µm long; conidia cylindrical or fusiform, aseptate, 14–20.5 x 2.7–4.2 µm; 1–2 setulae at each end, 3–11 µm long), *M. pandanicola* (setae 344–375 µm long; conidia lunate, aseptate, 17–22 x 2–3 µm; (1–)2 setulae at each end, 4–12 µm long) and *M. pirozynskii* (setae 300–500 µm long; conidiophores up to 75–80 µm long; conidia cylindrical or fusiform, aseptate, 16–20.5 x 2–3.5 µm; 2 setulae at each end, terminal setulae 7–10 µm long, subterminal setulae 2.5–8 µm long) in producing fusiform to subcylindrical conidia with both terminal and lateral appendages (Varghese and Rao 1978; Castañeda-Ruiz et al. 1997; Lin et al. 2019). *M. elegans* differs from these species by producing shorter conidia.

***Menisporopsis macrospora* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 210, MycoBank MB841630.**

Etymology: refers its large conidia.

Typification: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17184; ex-type strain CGMCC 3.20673 (=NN 77554)).

Mycelium superficial, consisting of yellow-brown, septate, 1.5–2 µm thick hyphae. Teleomorph: Not observed. Anamorph: Seta central, solitary, erect, straight, subulate, thick-walled, smooth, brown, 10–12-septate, up to 300 µm long, 5–8 µm wide at the base, and 3–4 µm wide at the apex. Synnemata brown, 150–180 µm high, 22–25 µm wide, spreading at the head. Conidiophores unbranched, pale brown, 1.5–2 µm wide with swollen phialides (2.5–3.5 µm). Conidiogenous cells monophialidic, terminal, pale brown, straight, brown, smooth, thin-walled, 20–25 x 2.5–3.5 µm, collarete inconspicuous. Conidia allantoid, smooth, aseptate, hyaline, aggregated into slimy masses at the apex of the synnemata, 17.5–21 x 3–3.5 µm, with 2 setulae at each end, usually 1 at the terminal 5–7 µm long and 1 on the subterminal convex side 3–5 µm long.

Colonies on PDA effuse, colonies 0.8–1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, purple brown, reverse pale brown to soil brown.

Material examined: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17184). Living strain: ex-type strain CGMCC 3.20673 (=77554) and 77555 (from holotype specimen).

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: China.

Notes: *M. macrospora* W.P. Wu & Y.Z. Diao is similar to *M. dushanensis* C.G. Lin & K.D. Hyde, *M. pirozynskii* Varghese & V.G. Rao and *P. pandanicola* Tibpromma & K.D. Hyde in producing aseptate conidia bearing 1–2 setulae at each end, and usually 1 at the terminal and 1 on the subterminal convex side (Varghese and Rao 1978; Castañeda-Ruiz et al. 2001; Tibpromma et al. 2018; Lin et al. 2019). Apart from the slightly larger conidia in *M. macrospora*, these species are hardly distinguished from each other by morphology, and the ITS barcoding is useful for species delimitation.

***Menisporopsis multisetulata* K. M. Tsui, T. K. Goh, K.D. Hyde & I. J. Hodgkiss, Mycol. Res. 103:150, 1999.**

Typification: China: Hong Kong, New Territories, Tai Po, Lam Tsuen River, on submerged wood, 27 Nov. 1996, K. M. Tsui, KM117 (HKU(M) 4662).

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: China, Mexico.

Description and illustration: Tsui et al. (1999); Heredia et al. (2018).

Notes: *M. multisetulata* is unique in having conidia which have in total 5(6)-setulae (Tsi et al. 1999). It is similar to *M. pirozynskii* in its conidial size and shape. However, the conidia in *M. multisetulata* is slightly wider than those found in *M. pirozynskii*.

Menisporopsis pandanicola Tibpromma & K.D. Hyde, Fung. Div. 93:128, 2018.

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight, or flexuous. Setae cylindrical, erect, straight, unbranched, medium brown to dark brown, up to 10 septa, smooth- and thick-walled, 250-450 x 7-8 µm. Conidiophores closely compacted into synnemata; synnemata brown, lower part closely packed, 25-35 wide at the base, 15-20 µm wide in the middle part, 100-130 µm high; conidiophores cylindrical, erect, straight or flexuous, unbranched or branched, pale to medium brown, septate, smooth- and thick-walled, 100-130 x 1.5-2.5 µm, terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical, lageniform, erect, straight, thin-walled, 12-18 µm long, 2-2.5 µm wide, periclinal thickening obvious, collarete inconspicuous, curved, and 1-1.5 µm wide/high. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, aseptate, smooth- and thin-walled, lunate, curved, 15.5-18 x 2-3 µm, both ends rounded, appendiculate with 4 setulae, always with a single and 6-8 µm long apical setula, 1-2 basal setulae of the different length, usually 1 at the terminal 6-8 µm long and 1 on the subterminal convex side 4.5-6 µm long.

Typification: China: Hong Kong, Lantau Island, Pui O Beach, on *Pandanus* sp., 20 Sept. 2016, S. Tibpromma HK011 (HKAS 100862, holotype); ex-type living culture, KUMCC 17-0271 = MFLUCC 17 0638)

Material examined: China: Guangdong Province, on dead stem of unidentified plant, 9 Oct. 1998, W.P. Wu (2046b); China: Guangdong Province, Guangzhou, on dead leaves of unidentified tree, 10 Dec. 2013, W.P. Wu (WU12658a,b,c,d); China: Guangdong Province, Guangzhou, on dead leaves of unidentified tree, 10 Dec. 2013, W.P. Wu (Wu12679); China: Guangxi Province, Nanning, Qing Xiu Shan, on dead leaves of unidentified tree, 12 Nov. 2013, W.P. Wu (Wu13119a,b,c); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 6 Oct. 1999, W.P. Wu & Yan Huang (2737a). Living strain: NN57673 (from Wu12658b); 57674 (from Wu12658c); 57670 (from Wu12658d); 57454 (from Wu13119b); 57466 (from Wu13119a); 57449 (from Wu13119c); 57712 (from Wu12679).

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: China.

Description and illustration: Tibpromma et al. (2018).

Notes: *Menisporopsis pandanicola* Tibpromma & K.D. Hyde has slightly larger conidia (17-22 x 2-3 µm) with 1-2 longer setulae at each end (4-12 µm) than the closely related species *M. theobromae* (conidia 12-14 x 1.8-2 µm) with 1 setula at each end (6-8 µm long) (Liu et al. 2016; Tibpromma et al. 2018).

Menisporopsis pirozynskii Varghese & Rao, Bot. Notiser 131: 215, 1978.

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: Argentina, Brazil, Brunei Caledonia, China, Congo, Cuba, India, Malaysia, Mexico, Nigeria, and Thailand. Probably widely distributed in tropical and subtropical area.

Description and illustration: Varghese and Rao (1978); Mouchacca (1990); Cabello et al. (1993); Matsushima and Matsushima (1996); Castañeda-Ruiz et al. (1997); Begerow et al. (2000); Heredia et al. (2000); Somrithipol et al. (2000); Gusmão et al. (2001); Caldach et al. (2002a); Whitton et al. (2012); Cruz et al. (2014).

Notes: *Menisporopsis pirozynskii* Varghese & Rao differs from other known species of the genus by its monophialidic conidiogenous cells and aseptate conidia with 4 setulae, including a single apical, 1-2 basal of the different length, and 1 subapical (Varghese and Rao 1978; Castañeda-Ruiz et al. 1997). Variation on number and position of setulae was reported in this species (Mouchacca 1990; Cabello et al. 1993; Castañeda-Ruiz et al. 1997; Cruz et al. 2014). The dimensions and morphology of the reproductive structures of these specimens collected in China agree with the original description (Varghese and Rao 1978).

Menisporopsis theobromae S. Hughes, Mycol. Pap. 48: 59, 1952.

Colonies hypophyllous, effuse, think, inconspicuous. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata synnemata, solitary, erect, straight, or flexuous, consisting of a central setae and closely packed conidiophores, 10-15 µm wide at the lower part, 20-25 µm wide in the upper sporulating region. Setae cylindrical, erect, straight, unbranched, medium brown to dark brown, up to 15-septate, smooth- and thick-walled, 180-500 x 5-8 µm, with a rounded or truncated apex, sometimes with a mucilaginous cap. Conidiophores closely compacted into synnemata, cylindrical, erect, straight or flexuous, unbranched, pale to medium brown, septate, smooth- and thick-

walled, 80-130 x 1-1.5 μm , terminating in a conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, cylindrical or clavate, single, erect, straight or curved, thin-walled, periclinal thickening obvious, 11-16 x 3-3.5 μm , collarette inconspicuous or funnel-shaped. Conidia holoblastic, aggregated in white slime heads around the conidiogenous cells, hyaline, aseptate, smooth- and thin-walled, falcate, fusiform, curved, 12-16 x 2-2.5 μm , with a setula at each end and 5-8 μm long.

Colonies on PDA effuse, colonies 8-16 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, grey brown, soil brown to dark brown, reverse brown to dark brown.

Material examined: China: Guangdong, Guangzhou, South China Agriculture University, on dead leaves of unidentified tree, 30 Dec 2018, W.P. Wu (Wu16362); China: Guangxi Province, Nanning, Qingxiushan, on dead leave of unidentified tree, 12 Nov. 2013, W.P. Wu (Wu13127); China: Hainan Province, Sanya, on dead leaves of unidentified tree, 27 Dec. 2020, W.P. Wu (Wu17617); China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17182); China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2738b); China: Yunnan Province, Xishuangbanna, on dead leaves, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2841); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaf of fern, 15 Oct 2018, W.P. Wu (Wu16135); China: Zhejiang Province, Deqing, Moganshan, on dead leaves of *Osmanthus fragrans*, 16 Oct 2019, W.P. Wu (Wu17002). Living strain: 57433 and 53437 (from Wu13127), 76330 and 76331 (from Wu16135), 77333 and 77371 (from Wu17002), 76660 and 76661 (from Wu16362), 77596 and 77597 (from Wu17182), 78417 and 78418 (from Wu17617).

Ecology/Substrate/Host: Saprobe on dead leaves of plant.

Geographical distribution: Australia, Brazil, China, Congo, Cuba, French Guiana, French Polynesia, Japan (CBS Filamentous fungi strain database 2013), Ghana, Ivory Coast, Malaysia, Mexico, Papua New Guinea, Peru, Philippines, Puerto Rico (IMI database 2013), Sri Lanka (IMI database 2013) and Venezuela. Probably widely distributed in tropical and subtropical area.

Description and illustration: Hughes (1952); Ellis (19991); Matsushima (1971); Cruz et al. (2014); Liu et al. (2016); Luo et al. (2018).

Notes: *Menisporopsis theobromae* S. Hughes differs from other known species of the genus by central setae in the synnemata, its monophialidic conidiogenous cells and aseptate conidia with one setula at each end (Hughes 1952; Tsui et al. 1999; Liu et al. 2016). This species is probably the most widespread member of the genus, in consequence there is a remarkable morphological variability as reported and also our own observation, for example the unusual presence of 0-1-septate conidia described by Heredia-Abarca (1994) and smaller conidial size reported by Cruz et al. (2014) (Hughes 1952; Meyer 1959; Batista et al. 1965; Matsushima 1971, 1980, 1989, 1993; Kiffer et al. 1981; Heredia-Abarca 1994; Mercado-Sierra et al. 1997; Castañeda-Ruiz et al. 2001; Whitton et al. 2012; Cruz et al. 2014). Among the material we studied, variation on shape and size of synnemata, setae, conidia and setulae were observed. In the specimen Wu17617, the setae are with a truncated apex covered by a mucilaginous cap. The conidia from the Chinese specimens are somewhat smaller than those from original description given by Hughes (1952). Its occurrence in Taiwan was reported (Matsushima 1980).

Phialoarthrobotryum Matsush., Icones Microfungorum A Matsushima Lectorum: 111, 1975

Teleomorph: Unknown. Anamorph: Conidiomata synnemata, cylindrical, rigid, brown, capitulate at the apex; synnematos hyphae closely packed in parallel, septate, branched at the top part, terminated with phialides. Conidia brown, septate, formed in wet spore mass.

Type species: *Phialoarthrobotryum triseptatum* Matsush.

Ecology/Substrate/Host: Saprobe on dead material of *Bambusa multiplicis*.

Geographical distribution: Japan.

Description and illustration: Matsushima (1975).

Phialoarthrobotryum triseptatum Matsush., Icones Microfungorum A Matsushima Lectorum: 112, 1975.

Colonies effuse, black. Teleomorph: Not observed. Anamorph: Synnemata solitary or 2-3 in cluster, erect, straight, 1200-1700 μm high, 20-45 μm wide at the middle part, basal part inflated, dark brown, capitulate at the apex; synnematos hyphae arranged in parallel to form the synnemata, septate, brown, 1.5-2.5 μm wide, apex with 2-3 branches and terminated with 2-3 phialides. Phialides cylindrical, hyaline, 1.2-1.8 μm wide, 2-2.5 μm wide below the apex, collarette funnel-shaped. Conidia elongate obovoid, slightly curved, 14-25 x 4-6 μm , (1-)3(-6) septate, medium brown, formed in brown to black spore mass.

Typification: On branches of *Bambusa multiplicis*, Japan: Yaku Island, Kagoshima, July 1971, T. Matsushima (2183, typus).

Ecology/Substrate/Host: Saprobe on dead material of *Bambusa multiplicis*.

Geographical distribution: Japan.

Description and illustration: Matsushima (1975).

Notes: *Phialoarthrobotryum* Matsush. was established for *P. triseptatum* Matsush., a microfungus on bamboo. It is similar with *Arthrobotryum* in forming synnemata, and brown and septate conidia, but with phialidic conidiogenesis (Matsushima 1975). Recently the LSU and ITS sequences were produced from the isotype material preserved in CBS (CBS120.84 = MFC2183 from Japan, identified by Matsushima, 1971). The phylogenetic analysis together with other Chaetosphaeriaceae fungi clearly shows its affinity to Chaetosphaeriaceae. The second species, *P. brasiliense* H.P. Upadhyay described from Brazil, differs from *P. triseptata* by hyaline, 0-7(-9) septate and fusiform conidia (Upadhyay 1981). Its phylogenetic relationship with the type species of the genus remains to be studied for the strain (ATCC46169) from the type specimen.

Phialosporostilbe Mercado & J. Meno, Rev. Jardin Bot. Nac. Habana 6: 58, 1985.

Colonies effuse, hairy, greyish brown. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiomata synnematal, solitary, erect, unbranched, straight, or flexuous, composed of parallel, thick-walled, septate, brown, smooth conidiophores, which are usually form individual conidiophores, except for one in the center which sometimes remains sterile. Conidiophores unbranched, medium brown to dark brown, smooth, septate, thick-walled. Conidiogenous cells monophialidic, integrated, terminal, single, cylindrical to clavate, straight, thick-walled but becoming thin-walled towards the apex, periclinal thickening obvious, collarete inconspicuous. Conidia hyaline, aseptate, thin-walled, smooth, round-tetrahedral to pyramidal, with 3 protuberant corners each corner furnished with one setula, base slightly truncate to rounded with one setula. Microconidia occasionally seen, hyaline, aseptate, ellipsoidal, smooth, formed in drop from conidiogenous cells in the lower part of the synnemata.

Type species: *Phialosporostilbe trubinata* Mercado & J. Meno.

Ecology/Substrate/Host: Saprobe on dead plant material.

Geographical distribution: Widely distributed, including Brazil, China, Cuba, Japan, Thailand.

Description and illustration: Mercado Sierra and Meno (1985); Mercado Sierra et al. (1997).

Notes: The genus *Phialosporostilbe* was introduced for a synnematus hyphomycetes with phialidic conidiogenous cells and round-tetrahedral to pyramidal conidia with a few appendages (Mercado Sierra and Mena-Portales, 1985). Subsequently six additional species, *Phialosporostilbe catenata* Sureshkumar, Sharath, Kunwar & Manohar., *P. dendroidea* (K.D. Hyde, Goh & T. Steinke) J. Yang & K.D. Hyde, *P. gregariclava* Shirouzu & Y. Harada, *P. setosa* Bhat & W. Kendr., *P. scutiformis* N.G. Liu, J. Yang & K.D. Hyde, *P. yadongensis* Y.M. Wu & T.Y. Zhang, have been added into the genus (Bhat and Kendrick 1993; Hyde et al. 1996; Shirouzu and Harada 2004; Sureshkumar et al. 2005; Wu and Zhang 2009; Yang et al. 2018a). Phylogenetically, *Phialosporostilbe* is closely related to other members of Chaetosphaeriaceae (Yang et al. 2018a).

Its distinction with *Nawawia* is somewhat confused, as discussed by Bhat and Kendrick (1993) and Hyde et al. (1996). The conidiogenesis and conidial morphology are almost identical among the members of described species in these two genera, the only difference is that *Phialosporostilbe* produces synnematus conidiomata with setae, while most species in *Nawawia* produce single conidiophore and do not bear setae. However, the recent molecular study showed these two genera are phylogenetically distinct, which also leads to transfer the synnematus species *Nawawia dendroidea* K.D. Hyde, Goh & T. Steinke into *Phialosporostilbe* (Yang et al. 2018a).

A total of four species have been reported from China, including *P. setosa*, *T. scutiformis*, *P. turbinata* and *P. yadongensis* (Chang 1989; Wu and Zhang 2009; Yang et al. 2018a). Here we added another species *P. gregariclava* as new record for China.

Key to known species of *Phialosporostilbe*

1. Conidia with 4-10 apical appendages	<i>P. yadongensis</i>
1. Conidia with 2-4 apical and 0-1 basal appendages	2
2. Conidia of two types, 5-7.5 µm long	<i>P. setosa</i>
2. Conidia 8-15 µm long	3
3. Conidia without basal appendage	4
3. Conidia with both apical and basal appendages	6
4. Conidia 12-15 x 7.4-10 µm	<i>P. catenata</i>
4. Conidia <12 µm long	5
5. Conidia 10-12 µm long, 8-10 µm wide, appendage 4-8 µm long	<i>P. dendroidea</i>
5. Conidia 7.5-11.6 µm long, 6-8.2 µm wide, appendage 3.5-7.5 µm long	<i>P. scutiformis</i>
6. Conidia 8.5-11.5 x 7-8 µm	<i>P. trubinata</i>
6. Conidia 8-13 x 8-12.5 µm	<i>P. gregariclava</i>

Phialosporostilbe gregariclava Shirouzu & Y. Harada, Mycoscience 45: 390, 2004. Fig. 211

Colonies effuse, hairy, greyish brown. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae 2-4 µm wide. Teleomorph: Not observed. Anamorph: Conidiomata synnematal, formed from basal stroma, solitary, erect, unbranched, straight, or flexuous, up to 300 µm tall, 15-20 µm wide, composed of single setae and 4-7 parallel and closely compacted conidiophores. Setae cylindrical, dark brown, multiseptate, thick- and smooth-walled, up to 200-300 µm tall, 8-10 µm wide, terminating in a clavate to subcylindrical conidiogenous cell. Conidiophores macronematous, mononematous, cylindrical, pale brown to medium brown, 3-5-septate, smooth- and thick-walled, 60-130 x 6-8 µm, terminating in a clavate to subcylindrical conidiogenous cell. Conidiogenous cells monophialidic, integrated, terminal, single, clavate to subcylindrical, straight, thick-walled but becoming thin-walled towards the apex, 25-30 µm long, 8-12 µm wide at its widest part, apical collarette 3-4 µm wide, periclinal thickening obvious, collarette inconspicuous. Conidia hyaline, aseptate, thin-walled, smooth, round-tetrahedral to pyramidal, 13-15 µm across the widest points, 10-15 µm long, with 3 protuberant corners, each corner furnished with one setula, 5-6 µm long, base truncate or rounded and with one setula of 4-6 µm long.

Material examined: China: Yunnan Province, Xishuangbanna, On rotten wood, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2259).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Shirouzu & Harada (2004).

Notes: *Phialosporostilbe gregariclava* Shirouzu & Y. Harada differs from the other known species in the genus by its setiform synnematosus conidiomata with relatively a fewer (4-7) conidiophores, and obclavate to subcylindrical, broader conidiogenous cells, and slightly larger conidia with appendages at both ends (Mercado Sierra and Mena Portales 1985; Bhat and Kendrick 1993; Hyde et al. 1996; Shirouzu and Harada 2004).

Phialosporostilbe scutiformis N.G. Liu, J. Yang & K.D. Hyde, Mycosphere 9: 1144, 2018.

Teleomorph: Not observed. Anamorph: Setae 380-500 x 4.2-5.2 µm. Synnemata 14-22 µm wide. Conidiophores 245-415 x 3.3-4.8 µm. Conidiogenous cells monophialidic, cylindrical to cylindric-clavate, 35-45 µm long, 3.5-4.7 µm wide at the base, 1.9-3.0 µm wide at the tip, with an inconspicuous apical collarette. Conidia round-tetrahedral, pyramidal, smooth, aseptate, thin-walled, guttulate, viewed from above triangular, 6-8.2 µm long of each above edge, 7.5-11.6 µm long of the side, with an appendage 3.5-7.5 µm long at each corner.

Typification: China: Guizhou Province, Anshun city, Gaodang village, on decaying wood submerged in Suoluo river, 19 Oct. 2016, J Yang, GD 12-6 (MFLU 18-1502 holotype, HKAS 102156 isotype); ex-type living cultures MFLUCC 17-0227, GZCC 17-0043.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Thailand.

Description and illustration: Yang et al. (2018a).

Notes: No specimen was examined by us and the above description is based on the original description (Yang et al. 2018a). *Phialosporostilbe scutiformis* is morphologically similar to *P. turbinata* and *P. dendroidea* in having tree-like structures of conidiophores and turbinate or cordiform conidia (Hyde et al. 1996; Mercado Sierra et al. 1997; Shirouzu and Harada 2004; Wu and Zhang 2009). However, *P. scutiformis* is distinguished from the other species by its conspicuous seta which is erect in the center of the lower conidiophores, and size of conidia and conidial setulae.

Phialosporostilbe setosa Bhat & W.B. Kendr., Mycotaxon 49: 57, 1993.

Colonies effuse, hairy, greyish brown. Mycelium partly immersed and partly superficial, composed of pale brown, septate hyphae 2-3.5 µm wide. Teleomorph: Not observed. Anamorph: Conidiomata synnematal, solitary, erect, unbranched, straight or flexuous, up to 380 µm tall, 10-15 µm wide, composed of 5-20 parallel, thick-walled, septate, brown, smooth hyphae 3-4.5 µm wide, usually diverging ¾ distance from base to apex to form individual conidiophores, except for one in the center which remains sterile. Conidiophores unbranched, medium brown to dark brown, smooth, 1-2 septate, thick-walled, up to 380 µm long, 3-4.5 µm wide. Conidiogenous cells phialidic, integrated, terminal, single, cylindrical, straight, thick-walled but becoming thin-walled towards the apex, up to 50 µm long, 4-5 µm wide, slightly narrowing at the apex to 2-3 µm wide, periclinal thickening obvious, collarette inconspicuous. Conidia hyaline, aseptate, thin-walled, smooth, round-tetrahedral to pyramidal, 8-10 µm across the widest points, 10-12.5 µm long, with 3 protuberant corners and a slightly truncate to rounded base, each corner furnished with one setula, 4-6 µm long. Microconidia hyaline, aseptate, ellipsoidal, smooth, 2-3 µm diam, formed in drop from conidiogenous cells in the lower part of the synnemata.

Material examined: China: Guangdong Province, Dinghushan, on dead leaves of unidentified bamboo, 9 Oct. 1998, W.P. Wu (Wu1993); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of *Miscanthus* sp., 25 Dec. 2012, W.P. Wu (Wu12420). Living strain: 55255 and 55256 (from Wu12420), 44663 (from Wu1903).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Cuba, India.

Description and illustration: Mercado Sierra and Meno (1985); Bhat and Kendrick (1993); Hyde et al. (1996).

Notes: The Chinese collections agree well with *P. setosa*, as described by Bhat & Kendrick, especially with the development of basal conidial setulae and a microconidia state (Mercado Sierra and Mena Portales 1985; Bhat and Kendrick 1993; Hyde et al. 1996; Shirouzu and Harada 2004).

Phialosporostilbe turbinata Mercado & Mena, Revista Del Jardin Bot. Nacional. 6:56, 1985.

Colonies effuse, dark brown to black, hairy. Teleomorph: Not observed. Anamorph: Synnemata erect or flexuous, cylindrical, brown to dark brown, 300-620 high, 13-19 thick near the base, loosed up and separated into individual conidiophores, septate. Conidiogenous cells monophialidic, integrate, determinate, subulate, cylindrical, brown to pale brown at the apex. Conidia solitary, single, cuboid, hyaline, thin-walled, smooth, with semispherical base part to sit on the phialidic conidiogenous cells, 11-14 length, 10-11.5 wide, with 3 fine appendages, one at the apex, two at the side ridge and one at the basal part.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Cuba.

Description and illustration: Chang (1989); Mercado Sierra and Mena Portales (1985).

Notes: No specimen was examined, and the above description is based on report on *Miscanthus* sp. and decaying twig from Taiwan by Chang (1989). Compared with the type specimen, the synnemata from the Taiwan collection is much longer and the conidia are more as cubic instead of turbinate conidia (Chang 1989).

Phialosporostilbe yadongensis Y.M. Wu & T.Y. Zhang, Mycotaxon 110:1, 2009.

Teleomorph: Not observed. Anamorph: Conidiomata synnematal, straight, 200-720 µm tall, 10-25 µm wide at base, 8-18 µm wide at the apex, composed of one dark brown, central seta and 10-20 parallel, thick-walled, septate, brown conidiophores diverging at their fertile apices, synnemata indeterminate incorporating 1 sterile seta, dark brown, smooth, thick-walled, blunt, 220-720 µm long, 6-9 µm wide. Conidiogenous cells terminal, integrated, monophialidic, pale brown to medium brown, cylindrical, 20-50 µm long, 3-5 µm wide at the apex, with an inconspicuous apical collarette. Conidia phialidic, asexual, catenate, up to 10 in a chain, cuneiform, with 4-10 radiating subapical appendages and a slightly truncate to rounded narrow base, aseptate, thick-walled, smooth, base truncate, pale brown, 6-8.5 µm long, 6-8 µm wide at the widest region, appendages 4-7 µm long.

Material examined: China: Tibet, Yadong altitude 3400m, isolated from a grassland soil, 11 Sept. 2007, Y.M. Wu (HMAS196250, isotype).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Wu and Zhang (2009); Zhang and Wu (2019).

Notes: *Phialosporostilbe yadongensis* W.M. Wu & T.Y. Zhang was described from a soil fungus isolated from Tibet, China and differs from other species by producing conidia with 4-10 radiating subapical appendage (Mercado Sierra and Mena Portales 1985; Wu and Zhang, 2009; Bhat and Kendrick 1993; Hyde et al. 1996; Shirouzu and Harada 2004). The isotype HMAS196250 was examined by us and it showed clearly difference from other known species.

Genera with sporodochial conidiomata

Among the 91 accepted chaetosphaeriaceous genera, 9 genera form sporodochial conidiomata. These genera are *Adautomilanezia*, *Eucalyptostroma*, *Eucalyptostromiella*, *Minimidochium*, *Neonawawia*, *Pseudothozetella*, *Thozetella* and *Verhulstia*. Phylogenetically all these genera are well-defined monophyletic genera, but polyphyletic in the phylogenetic trees generated by using the combined data set of ITS and LSU (Fig. 3). Morphologically most of these genera are also well-delimited by a combination of setae, conidiophores, conidiogenous cells and conidia. The living strains of many studied species were also studied on PDA, some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to all sporodochial genera in anamorphic chaetosphaeriaceous fungi:

1. Sporodochia without sterile setae or microawn 2
1. Sporodochia or synnemata with sterile setae or microawn 4
2. Conidia ellipsoidal, fusiform *Eucalyptostroma*
2. Conidia lunate or falcate 3
3. Conidiogenous cells cylindrical, lageniform; conidia falcate *Pseudothozetella*
3. Conidiogenous cells with bulbous base and cylindrical upper part; conidia lunate *Eucalyptostromiella*
4. Conidiomata sporodochia or synnemata; setae absent; microawns present *Thozetella*

4. Conidiomata sporodochia; setae present; microawns absent	5
5. Conidia dark brown, 3-septate, ellipsoid	<i>Adautomilanezia</i>
5. Conidia hyaline, 0-1 septate	6
6. Conidia without appendages	<i>Verhulstia</i>
6. Conidia bearing appendages	7
7. Conidia star-shaped, 5-lobed, bearing 4-6 filiform appendages	<i>Neonawawia</i>
7. Conidia fusiform, falcate, with 1 filiform appendage at each end	8
8. Conidia 1-septate	<i>Rattania</i>
8. Conidia aseptate	<i>Minimidochium</i>

Eucalyptostroma Crous & M.J. Wingf., Persoonia 37: 311, 2016

Teleomorph: Unknown. **Anamorph:** Conidiomata scattered to gregarious, superficial, sporodochial, cupulate, orange-yellow; basal stroma of textura intricata. Setae absent. Conidiophores arising from a stroma, septate, branched, pale orange-brown; forming a penicillate conidiogenous apparatus. Conidiogenous cells integrated, terminal, lageniform to cylindrical, in whorls, orange-brown, finely roughened to warty, thin-walled, with apical percurrent proliferations. Conidia aseptate, hyaline, smooth, thin-walled, ellipsoid, apex sub- obtuse, base truncate, widest in upper third, lacking appendages.

Type species: *Eucalyptostroma eucalypti* Crous & M.J. Wingf.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Colombia, Malaysia.

Description and illustration: Crous et al. (2016, 2018).

Notes: The genus *Eucalyptostroma* Crous & M.J. Wingf. was created for a hyphomycete occurring on *Eucalyptus pellita* leaves in Malaysia (Crous et al. 2016). The type species *Eucalyptostroma eucalypti* Crous & M.J. Wingf. is characterized by stromatic conidiomata with orange-yellow spore mass, closely packed and pigmented conidiophores in a penicillate arrangement, phialidic conidiogenous cells, and hyaline, aseptate and ellipsoid conidia. In nature, *Eucalyptostroma* is recognized on leaves by forming slimy, yellow-orange conidial massed on either synnemata or sporodochia (Crous et al. 2016, 2018). Apart from the type species, the second species, *Eucalyptostroma eucalyptorum* Crous & Wingf. also occurring on *Eucalyptus* leaves in Colombia was added into the genus and is distinguished by forming more synnematal conidiomata, and having slightly larger conidia than *E. eucalypti* (3-4.5 x 2 µm vs. 4-6 x 1.5-2.5 µm) (Crous et al. 2016, 2018). Phylogenetically both species are allied to Chaetosphaeriaceae (Hashimoto et al. 2015a, b; Crous et al. 2016, 2018).

In our phylogenetic analysis, two known species of *Eucalyptostroma* Crous & M.J. Wingf. (Fig. 3 and Fig. 212), *E. eucalypti* Crous & M.J. Wingf. (the type species) and *E. eucalyptorum* Crous & M.J. Wingf., and two undescribed species from China, are clustered together and formed a distinct group with strong support. In addition, several isolates from decaying fruit of *Quercus* sp., collected around Beijing area, produce very similar conidiomata, conidiogenous cells and conidia as *Eucalyptostroma*, but they are phylogenetically very distinct and the new genus *Paraecalyptostroma* W.P. Wu & Y.Z. Diao is created to accomendate this fungus. On the phylogenetic tree, the genus *Paliphora* Sivan. & B. Sutton, with setiform conidiophores, intercalary or terminal conidiogenous cells, polytretic sporulating loci on the conidiogenous cells, and hyaline, aseptate or septate, cylindrical to subfusiform or subacrose conidia in slimy masses, is clustered together with the genus *Eucalyptostroma* with strong support (Sivanesan and Sutton 1985; Malosso et al. 2018).

The living strains of several studied species were also studied on PDA (Fig. 206), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Eucalyptostroma*

1. Conidiomata synnematosus; conidia fusoid-ellipsoid in upper third, apex subobtusate, base truncate, 4–6 × 1.5–2.5 µm	<i>E. eucalyptorum</i>
1. Conidiomata sporodochial	2
2. Conidia cylindrical, fusiform, 4-6 x 1-1.5 µm	<i>E. hongluosiense</i>
2. Conidia fusoid-ellipsoid, widest in the upper third	3
3. Conidia 3–4.5 × 2 µm, ellipsoid	<i>E. eucalypti</i>
3. Conidia 3-4 x 1-1.2 µm, ellipsoid	<i>E. oxenbolliae</i>

Eucalyptostroma hongluosiense W.P. Wu & Y.Z. Diao, sp. nov., Fig. 213, MycoBank MB841631.

Etymology: refers to the locality where this fungus was originally collected.

Diagnosis: Similar to *Eucalyptostroma eucalypti* but differs in producing cylindrical conidia.

Typification: China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. Wu (Holotype WFH Wu16890; ex-type strain CGMCC 3.20669 (=NN 77220)).

Teleomorph: Not observed. **Anamorph:** Conidiomata scattered to gregarious, superficial, sporodochial, cupulate, orange-yellow, up to 400 µm diam; basal stroma of textura intricata, composed of brown, thick-walled and irregularly shaped cells, 15–40 µm thick. Setae absent. Conidiophores arising from upper layer of the basal stroma, septate, branched, pale orange-brown, 20–28 x 2–2.5 µm. Conidiogenous cells integrated, terminal, lageniform to cylindrical, single or in whorls, orange-brown, thin walled, 12–16 x 2–2.5 µm, apex up to 1.5 µm wide, with a funnel-shaped collarette. Conidia 4–6 x 1–1.5 µm, aseptate, hyaline, smooth, thin-walled, cylindrical, fusiform, apex subobtusate, base truncate or subobtusate, 1 µm diam.

Colonies on PDA effuse, colonies 1–1.3 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, white to soil brown, with pale colored margin, reverse pale brown to brown, with yellow brown pigment diffused into agar.

Material examined: China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. Wu (Holotype WFH Wu16890); China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 12 June 2020, W.P. Wu (WuBJ11, WuBJ12); China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Wu17297, Wu17318, Wu17372, Wu17350, Wu17369, Wu17381); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Quercus* sp., 2 Dec 2018, W.P. Wu (Wu16283). China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., China 25 Aug. 2019, W.P. Wu (Wu16870). Living strain: 76613 (from Wu16283), ; ex-type strain CGMCC 3.20669 (=NN 77220) and 77221 (from the holotype Wu16890), 77206 (from Wu16870), 77448 (from WuWuBJ11), 77449 (from WuBJ12), 77936 and 77937 (from Wu17369a,b), 77946 and 77947 (from Wu17318a,b), 77952 and 77953 (from Wu17350a,b), 77959 (from Wu17297), 77997 (from Wu17377).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Eucalyptostroma hongluosiense* W.P. Wu & Y.Z. Diao differs from the two known species in the genus, *E. eucalypti* Crous & M.J. Wingf. (conidia ellipsoid, (3–) 4 (–4.5) x 2 µm) and *E. eucalyptorum* Crous & M.J. Wingf. (conidia ellipsoid, (4–)5(–6) x (1.5)2(–2.5) µm), by producing cylindrical to fusiform and longer conidia (fusiform to cylindrical, 4–6 x 1–1.5 µm) (Crous et al. 2016, 2018). The species is found on leaves and fruit of *Fagaceae* in different part of China. The ITS sequences obtained from many strains in Chinese collections have little variation and are almost identical to the ITS sequence from the type specimen of *E. eucalypti*, a potential indication that different bar code is needed for species identification in this genus. It is interesting to mention that this fungus was commonly found in inside layer of the fruit nut holder of *Quercus* sp. in Beijing.

Eucalyptostroma oxenbolliae W.P. Wu & Y.Z. Diao, sp. nov., Fig. 214, MycoBank MB841632.

Etymology: named after the former employee, Karen Oxenboll, in Novozymes, who strongly supported this work in last many years.

Diagnosis: Similar to *Eucalyptostroma eucalypti* and *E. eucalyptorum* but differs in smaller conidia and ITS sequences.

Typification: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16273; ex-type strain CGMCC 3.20664 (=NN 76600)).

Teleomorph: Not observed. **Anamorph:** Conidiomata scattered to gregarious, superficial, sporodochial, cupulate, orange-yellow, 70–300 µm diam; basal stroma of textura intricata, composed of orange-yellow, thick-walled, and irregularly shaped cells, 50–73 µm thick. Setae absent. Conidiophores arising from a stroma, septate, branched, pale orange-brown, 25–30 µm long, 1.5–2 µm wide. Conidiogenous cells integrated, terminal, lageniform to cylindrical, single or in whorls, orange-brown, thin-walled, with apical percurrent proliferations, 10–15 x 1.5–2.5 µm, apex 1–1.5 µm wide. Conidia 3–4 x 1–1.2 µm, aseptate, hyaline, smooth, thin-walled, ellipsoid, apex subobtusate, base truncate, widest in upper third.

Colonies on PDA effuse, colonies 1.5–2.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white to pale brown, with pale colored margin, reverse pale brown and with light brown pigment diffused into agar.

Material examined: China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16315, 16277b1); China: Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16273). Living strain: ex-type strain CGMCC 3.20664 (=NN 76600) and 76601 (from Wu16273), 76705 (from Wu16315), 76693 (from Wu16277b1).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Eucalyptostroma oxenbolliae* W.P. Wu & Y.Z. Diao is morphologically similar to the two known species, *E. eucalypti* Crous & M.J. Wingf. (conidia ellipsoid, (3–) 4 (–4.5) x 2 µm) and *E. eucalyptorum* Crous & M.J. Wingf. (conidia ellipsoid, (4–)5(–6) x (1.5)2(–2.5) µm), but differs by having smaller conidia (3–4 x 1–1.5 µm) (Crous et al. 2016, 2018). In addition, its ITS sequences are significantly different from those from the two known

species. Based on a megablast search of the NCBI's nucleotide database using the ITS sequence of the ex-type culture, the best similarities were around 97% with the two species of *E. eucalypti* and *E. eucalyptorum*.

Eucalyptostromiella W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841543.

Etymology: refers its similarity to the genus *Eucalyptostroma*.

Diagnosis: Similar to *Eucalyptostroma* but differs in producing lunate or falcate conidia and also in phylogeny.

Type species: *Eucalyptostromiella beijingensis* W.P. Wu & Y.Z. Diao.

Teleomorph: Unknown. Anamorph: Conidiomata scattered to gregarious, superficial, sporodochial, cupulate, orange-yellow; basal stroma of textura intricata. Setae absent. Conidiophores arising from a stroma, septate, branched, pale orange-brown, forming a penicillate conidiogenous apparatus. Conidiogenous cells integrated, terminal, lageniform to cylindrical, in whorls, orange-brown, finely roughened to warty, thin-walled, with apical percurrent proliferations. Conidia aseptate, hyaline, smooth, thin-walled, ellipsoid, apex subobtuse, base truncate, widest in upper third, lacking appendages.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: The new genus *Eucalyptostromiella* W.P. Wu & Y.Z. Diao is created from both the phylogenetic analysis and morphological comparison with other relevant Chaetosphaeriaceae fungi, especially *Eucalyptostroma* Crous & M.J. Wingf. Morphologically the genus *Eucalyptostromiella* resembles *Eucalyptostroma* on producing sporodochial conidiomata with wet spore mass, branched and pale brown conidiophores with terminal monophialidic conidiogenous cells, and hyaline, aseptate conidia (Crous et al. 2016, 2019). It differs from *Eucalyptostroma* in producing flask-shaped conidiogenous cells and falcate conidia.

Eucalyptostromiella beijingensis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 215, MycoBank MB841633.

Etymology: refers the locality where this fungus was originally collected.

Diagnosis: Conidiomata sporodochial, yellow brown, fresh colored. Conidiophores cylindrical, yellow to yellow brown, 20-34 x 1.5-2 µm. Conidiogenous cells flask-shaped, with percurrent proliferation, 12-15 µm long, 2-2.5 µm at the base, 1-1.2 µm in the upper part. Conidia lunate or falcate, 9.5-12 x 1.2-1.8 µm.

Typification: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Holotype WFH Wu17319; ex-type strain CGMCC3.20753 = NN 78012).

Teleomorph: Not observed. Anamorph: Conidiomata scattered to gregarious, superficial, sporodochial, cupulate, orange-yellow, up to 500 µm diam; basal stroma of textura intricate, composed of pale brown to dark brown, thick-walled, irregular shaped cells, up to 3 µm diam. Setae absent. Conidiophores arising from an upper layers of basal stroma, septate, branched, pale orange-brown, 20-34 x 1.5-2 µm, densely packed in a sporulating layer. Conidiogenous cells integrated, terminal, monophialidic, lageniform with a swollen lower part and a narrow cylindrical upper part, single or a few in whorls, orange-brown, thin-walled, 12-15 µm long, venter 6-7 µm long and 2-2.5 µm wide, cylindrical upper part 5-7 x 1-1.2 µm, with an open end. Conidia falcate, lunate, acute at both ends, 9.5-12 x 1.2-1.8 µm, aseptate, hyaline, smooth, thin-walled, lacking appendages.

Colonies on PDA effuse, colonies 1.0-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to brown in the central part, reverse brown to dark brown.

Material examined: China: Beijing, Huairou, Hongluosi, on dead fruit of *Quercus* sp., 29 July 2020, W.P. Wu (Holotype WFH Wu17319). Living strains: ex-type strain NN 78017, 78016 and 78012 (all from Wu17319).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Eucalyptostromiella beijingensis* W.P. Wu & Y.Z. Diao is characterized by sporodochial conidiomata with yellow brown basal stroma and covering by yellow to brown conidial mass, branched conidiophores bearing terminal monophialidic conidiogenous cells with a swollen lower part and a cylindrical upper part, and hyaline, aseptate, falcate conidia in wet spore mass. Morphologically it resembles the two known species in *Eucalyptostroma* but differs by falcate or lunate conidia (Crous et al. 2016, 2018).

Phylogenetically, *Eucalyptostromiella* is closely related to some members in Chaetosphaeriaceae. On a megablast search using the LSU sequences from the exotype strain (Wu17319), the closest matches in NCBI's GenBank nucleotide database were members of *Dictyochaeta* and *Chaetosphaeria* in Chaetosphaeriaceae, including *Dictyochaeta* sp. (GeneBank MT454498, identities 863/929 (93%), 11 gaps (1%)), *Dictyochaeta fuegiana* (GeneBank EF063574, identities 862/929 (93%), 11 gaps (1%)), *Dictyochaeta callimorpha* (GeneBank AF466062, identities 848/912 (93%), 10 gaps (1%)), *Dictyochaeta biapiculata* (GeneBank AF466065, identities 842/911 (92%), 8 gaps (1%)), *Exserticlava vsaiformis* (GeneBank AB753846, identities 853/928 (92%), 9 gaps (1%)); On a megablast search using the ITS sequences from the exotype isolate (17319), the closest matches in NCBI's GenBank nucleotide database were members of *Arthrobotryum*, *Dictyochaeta* and *Chaetosphaeria* in Chaetosphaeriaceae, including *Arthrobotryum hyalosporum* (GeneBank MH861926, identities 379/440 (86%), 19 gaps (4%)), *Dictyochaeta fuegiana* (GeneBank MT454487, identities 322/377 (85%), 19 gaps (5%)).

Minimidochium B. Sutton, Can. J. Bot. 47: 2095, 1970.

Colonies effuse, brown, sparse. Mycelium immersed composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Unknown. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose. Setae sterile, arising from the lower cells of the stroma, subulate, acutely pointed, mid to dark brown, smooth, simple, erect, straight. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, hyaline to pale brown, smooth, septate. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, clavate, lageniform, with a very small apical collarette. Conidia holoblastic, solitary, hyaline, aseptate or septate, curved, cylindrical, subcylindrical, fusiform, falcate, furnished with setulae appendages at each end.

Type species: *Minimidochium setosum* B. Sutton.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Sutton (1969); Seifert et al. (2011).

Notes: The genus *Minimidochium* was introduced by Sutton (1969) for a sporodochial hyphomycetes with falcate and appendaged conidia, *M. setosum* B. Sutton. Subsequently six species have been added into the genus so far, they are *Minimidochium crepuscolara* C. Ciccari., *Minimidochium eucalypti* Vittal & Dorai (= *Minimidochium indicum* Vittal & Dorai, *Minimidochium indicum* Varghese & V.G. Rao, *Minimidochium microsporum* Matsush., *Minimidochium nipponicum* Matsush, *Minimidochium parvum* Cabello, Aramb. & Cazau, (Sutton 1969; Varghese and Rao 1980; Vittal and Dorai 1993; Matsushima 1995, 1997; Cabello et al. 1998; Pasqualetti et al. 2005; Zhao 2012). No DNA sequence has been available for molecular phylogenetic study, especially from the type species. Here we generated the ITS and LSU sequences from a new species, and assign the genus to Chaetosphaeriaceae. However, its taxonomic position might change according to the molecular phylogeny study with involvement of type species in future.

The genus was known from China with only 1 species, *M. monoseptatum* G.C. Zhao. Here we added another species from China. (Figs. 4 and 448)

Key to known species of *Minimidochium*

1. Conidia 1-3 septate	2
1. Conidia aseptate	3
2. Conidia 1-septate, 11-14 x 2-2.5 µm	<i>M. monoseptatum</i>
2. Conidia 3-septate, 35-42 x 5-6 µm	<i>M. triseptata</i>
3. Conidia with setulae at both ends, apical setulae branched	<i>M. eucalypti</i>
3. Conidia with setulae at both ends, unbranched	4
4. Conidia less than 10 µm long	5
4. Conidia more than 10 µm long	6
5. Conidia 3.5-5 x 1.5-2.7 µm, setulae 0.5-2.5 µm long	<i>M. microsporum</i>
5. Conidia 7.5-9.5 x 2-2.5 µm, setulae 5-8 µm long	<i>M. setosum</i>
6. Conidia less than 2 µm wide	7
6. Conidia more than 2 µm wide	8
7. Conidia 8-12 x 1 µm	<i>M. parvum</i>
7. Conidia 12-15 x 1.8-2 µm; setulae 3-4 µm long	<i>M. dictyochoetum</i>
8. Conidia more than 20 µm long	9
8. Conidia up to 17 µm long	10
9. Conidia 25-37 x 4-5 µm, setulae 3-7 µm long	<i>M. falcata</i>
9. Conidia 20-23 x 2-2.5 µm, setulae 6-7 µm long	<i>M. elegans</i>
10. Conidia 10-13 X 2.5-3.5 µm, setulae 4-8 µm	<i>M. nipponicum</i>
10. Conidia 11.5-16.5 x 2-2.5 µm, setulae up to 10 µm	<i>M. indicum</i>

Minimidochium dictyochoetum W.P. Wu, sp. nov., Fig. 216, MycoBank MB841634.

Etymology: Refers to its similarity to the genus Dictyochoeta in conidial morphology.

Typification: China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Yu Zhang (Holotype WFH Wu15158; ex-type strain CGMCC 3.20660 (=NN 75992)).

Mycelium immersed, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose, 30-50 µm wide, 40-60 µm high, covered by white spore mass. Teleomorph: Not observed. Anamorph: Setae sterile, arising from the lower cells of the stroma, subulate, acutely pointed, mid to dark brown, becoming paler towards the apex, smooth, simple, erect, straight or slightly curved, 5-8-septate, 200-420 x 6-10 µm, acute or obtuse at apex. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, pale

brown to brown, becoming subhyaline towards the apex, smooth, 1-3-septate, 30-40 x 2-3 µm. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, lageniform, 9-11 x 2.5-3 µm, with a very small apical collarette. Conidia holoblastic, solitary, hyaline, aseptate, curved, fusiform, apex acute, base slightly truncate, 13-15 x 1.8-2 µm, furnished with a setula at each end, 3-4 µm long.

Colonies on PDA effuse, colonies 2.5-3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to pale brown, reverse pale brown to brown.

Material examined: China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Yu Zhang (Wu15158, holotype). Living strain: ex-type strain CGMCC 3.20660 (=75992) and 75993.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Minimidochium dictyochaetum* W.P. Wu is characterized by sporodochial conidiomata, presence of setae among conidiophores, and hyaline, aseptate and large conidia (20-23 x 2-2.5 µm) with short appendages at both ends. Among the known species with aseptate conidia bearing unbranched setulae in the genus are *M. indicum*, *M. microsporum*, *M. nipponicum*, *M. parvum* and *M. setosum*, none of them has conidia longer than 20 µm, thus they can be easily distinguished (Sutton 1970; Ciccarone 1988; Vittal and Dorai 1991; Matsushima 1995, 1996; Cabello et al. 1998). *Rattania falcata* W.P. Wu described in this work also produces relatively larger conidia (25-37 x 4-5 µm, with one setulae at each end and 4-7 µm long), but its conidia are much larger than those found in *M. elegans*.

Phylogenetically, *Minimidochium dictyochaetum* is closely related to some members in *Chaetosphaeriaceae*. On a megablast search using the ITS sequences from the strain obtained from the type specimen, the closest matches in NCBI's GenBank nucleotide database were members of *Codinaea*, *Dictyochaeta* and *Menispora* in *Chaetosphaeriaceae*, including *Codinaea acaciae* (GeneBank KY965397, identities 528/391 (89%), 20 gaps (3%)), *Dictyochaeta aquatica* (GeneBank MH476572, identities 495/549 (90%), 13 gaps (2%)), *Dictyochaeta curvispora* (GeneBank MH862954, identities 490/544 (90%), 13 gaps (2%)).

Minimidochium triseptata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 217, MycoBank MB841635.

Etymology: refers its 3-septate conidia.

Typification: China: Guangdong Province, on dead leaves of ?*Smilax* sp., Oct. 9 1998, W.P. Wu (Holotype WFH Wu2083p).

Mycelium immersed, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose, up to 600 µm in diam. Setae sterile, arising from the lower cells of the stroma, subulate, acutely pointed, mid to dark brown, becoming paler towards the apex, smooth, simple, erect, straight or slightly curved, 8-12-septate, 250-375 x 5-7 µm, tapering toward a narrower upper part and acute apex. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, pale brown to brown, becoming subhyaline towards the apex, smooth, 1-3-septate, 20-40 x 4-5 µm. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, lageniform, 12-20 x 4-5.5 µm, with an apical collarette. Conidia holoblastic, solitary, hyaline, 3-septate, curved, fusiform, apex acute, base slightly truncate, 35-42 x 5-6 µm, furnished with a setula at each end, 7-10 µm long.

Material examined: China: Guangdong Province, on dead leaves of ?*Smilax* sp., Oct. 9 1998, W.P. Wu (Holotype WFH Wu2083p).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Minimidochium triseptata* described here fits well into the genus *Minimidochium* in stromatic conidiomata with setae, phialidic conidiogenous cells and hyaline conidia with appendages. It differs from all known species in the genus by having larger conidia with 3-septa (Sutton 1970; Ciccarone 1988; Vittal and Dorai 1991; Matsushima 1995, 1996; Cabello et al. 1998; Zhao 2012). No strain was obtained from the specimen.

Pseudothozetella W.P. Wu & Y.Z. Diao gen. nov., MycoBank MB841544

Etymology: refers its similarity to the genus *Thozetella*.

Diagnosis: Similar to *Thozetella* in producing sporodochial conidiomata with slime spore mass, but differs in no microawns and conidia without setulae.

Type species: *Pseudothozetella lunata* W.P. Wu & Y.Z. Diao

Teleomorph: Unknown. Anamorph: Conidiomata sporodochia, scattered, punctiform, white, cream to light brown, topped by a moist spore mass. Conidiophores macronematous, hyaline to pale brown, septate, smooth-walled, simple, or branched, cylindrical. Conidiogenous cells integrated and terminal, determinate, monophialidic, cylindrical, hyaline to pale brown, with or without a minute apical collarette. Conidia holoblastic, falcate, hyaline, aseptate, thin- and smooth-walled, with truncated base and pointed apex.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Pseudothozetella lunata W.P. Wu & Y.Z. Diao, sp. nov., Figs. 218, MycoBank MB841636.

Etymology: refers its lunate conidia.

Diagnosis: Similar to *Thozetella* in producing sporodochial conidiomata with wet spore mass and falcate conidia, but differs in lacking microawns and conidia bearing no setulae.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leave of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15207; ex-type strain CGMCC 3.20661 (= NN 76055)).

Colonies on natural substrate cream-colored. Mycelium partly immersed and partly superficial, composed of dark brown, septate, and branched hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2–3.5 µm wide, up to 80 µm high. Conidiophores macronematous, brown, irregularly cylindrical, branched, 2–6 septate, compact at base, more or less free toward of upper part of sporodochia, 70–120 x 2.5–4 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, 14–19 x 2.5–3 µm, without funnel-shaped collarettes, periclinal wall thickened, collarette 1–1.2 µm wide and 0.5–0.8 µm deep. Conidia falcate, fusiform, curved, aseptate, hyaline, smooth, 22–27 x 1.2–1.6 µm, with a truncate base, tapering towards a pointed apex, formed in slimy spore mass.

Colonies on PDA effuse, colonies 1–1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to dark brown, reverse brown to dark brown.

Material examined: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leave of unidentified tree, 6 Dec. 2018, Zhang Yu (Holotype WFH Wu15207). Living strains: ex-type strain CGMCC 3.20661 (=76055), 76056, 76057, 76058, 76083, 76084 and 76103 (all from Wu15207).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: The new genus *Pseudothozetella* is characterized by sporodochial conidiomata, closely packed conidiophores terminating with phialidic conidiogenous cells, and hyaline, aseptate, falcate conidia produced in a wet spore mass. Morphologically it is closely related to *Thozetella* but lacking microawn and conidial setulae, to *Menisporopsis* but without setae associated with conidiophores and non-setose conidia (Seifert et al. 2011).

The LSU and ITS sequences were also obtained from the single spore isolate of this species and its phylogenetic affinity to *Arthrobotryum*, *Thozetella* and *Chaetosphaeria* in Chaetosphaeriaceae was confirmed. On a megablast search using the large subunit ribosomal RNA gene sequence from the collection Wu15207, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeria*, *Zanclospora*, *Nawawia* and *Chloridium* in Chaetosphaeriaceae, including *Chaetosphaeria fuegiana* (GeneBank EF063574, identities 852/912 (93%), 6 gaps (0%)), *Chaetosphaeria callimorpha* (GeneBank AF466062, identities 838/896 (94%), 5 gaps (0%)). On a megablast search using the ITS sequence from the type collection Wu15207, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeriaceae*, including *Arthrobotryum hyalosporum* (GeneBank MH861926, identities 490/554 (88%), 22 gaps (3%)), *Chaetosphaeria dilabens* (GeneBank MH861683, identities 474/565 (84%), 24 gaps (4%)), *Phialocephala fusca* (GeneBank AB671500, identities 481/578 (83%), 24 gaps (4%)).

Rattania Prabhugaonkar & Bhat, Mycotaxon 108: 218, 2009.

Teleomorph: Unknown. Anamorph: Conidiomata sporodochia, superficial, gregarious, dark brown, setose, with a small stroma at the base. Setae erect, straight to flexuous, unbranched, rhizoidal at base, tapering to a pointed apex, septate, smooth, thick-walled, dark brown. Conidiophores distinct, branched, smooth, hyaline, arising in a palisade layer from a pseudoparenchymatous stroma. Conidiogenous cells terminal, integrated or discrete, usually monoblastic, sometimes extending sympodially once or twice to produce successive solitary holoblastic conidia, after secession leaving an inconspicuous, flat secession scar with no evident wall thickening. Conidia slimy, solitary, fusiform, curved, hyaline, smooth, 0–multiseptate, thin-walled, truncate at the base, acuminate at the tip, setulate at both ends.

Type species: *Rattania setulifera* Prabhugaonkar & Bhat.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, India.

Description and illustration: Prabhugaonkar and Bhat (2009); Seifert et al. (2011); Calabon et al., 2021).

Notes: *Rattania* was introduced by Prabhugaonkar and Bhat (2009) to accommodate *Rattania setulifera*, a species isolated from fresh leaves of rattan in India. *Rattania* is characterized by sporodochial, setose conidiomata, monoblastic conidiogenous cells and slimy, fusiform, 0–5-septate, setulate conidia (Ellis 1971, 1976; Prabhugaonkar and Bhat, 2009; Bhat 2010; Seifert et al. 2011). The second species, *R. aquatica* M.S. Calabon &

K.D. Hyde from submerged decaying wood in freshwater river in Thailand, was recently added into the genus (Calabon et al. 2021).

Shenoy et al. (2010) placed the genus in Chaetosphaeriaceae. It resembles *Brunneodinemasporium* Crous & R.F. Castañeda, *Dinemasporium* Lév., *Minimidochium* B. Sutton, *Neopseudolachnella* A. Hashim. & Karz. Tanaka, *Pseudodinemasporium* A. Hashim. & Karz. Tanaka, *Pseudolachnea* Ranoj. and *Pseudolachnella* Teng, which morphologically also produce setose conidiomata, phialidic conidiogenous cells, and hyaline and falcate conidia with appendages, and phylogenetically belong to the same family, Chaetosphaeriaceae (Ellis 1971, 1976; Sutton 1980; Seifert et al. 2011; Lin et al. 2019; Fig. 3 and Fig. 219). Among these genera, all genera except for *Minimidochium* belong to coelomycetes producing cupulate to discoid conidiomata with lateral prosenchymatic wall (Sutton 1980; Seifert (2011); Hashimoto et al. 2015a, b), thus they can be easily distinguished from the genus *Rattania*. *Minimidochium*, also a hyphomycetes with superficial sporodochial conidiomata, can be distinguished from *Rattania* by its conidiogenous cells and conidia, furthermore phylogenetically they are clearly different from each other. The living strains of studied species were also studied on PDA (Fig. 220), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to known species of *Rattania*

1. Conidia 1-septate, 25-50 x 1.5-3.5 µm; setulae 1-5 µm long	<i>R. setulifera</i>
1. Conidia aseptate	2
2. Conidia 12-17 x 2.5-3 µm; setulae 5-6.5 µm long	<i>R. falcata</i>
2. Conidia more than 20 µm long	3
3. Conidia 22-27 x 3-5 µm; setulae 3.6-8.3 µm	<i>R. aquatica</i>
2. Conidia 25-37 x 4-5 µm; setulae 3-7 µm long	<i>R. intermedia</i>

Rattania falcata W.P. Wu & Y.Z. Diao, sp. nov., Figs. 221-222, MycoBank MB841637.

Etymology: refers to its falcate conidia.

Diagnosis: Similar to the type species of the genus, *Rattania setulifera*, but differs in producing phialidic conidiogenous cells and smaller conidia.

Typification: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16324; ex-type strain CGMCC 3.20731 = NN 76627).

Mycelium immersed, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose, 70-110 µm wide, 70-90 µm high, dark brown, basal stroma composed of dark brown, irregular cell. Setae sterile, arising from the lower part of the stroma, subulate, acutely pointed, mid to dark brown, becoming paler towards the apex, smooth, simple, straight or slightly curved, up to 3-13-septate, 150-520 µm long, the longer setae are 15-17 µm wide, and the short setae are 8-10 µm wide, with a long basal cells in 12-23 µm wide; hyphae in the outside layer of the basal stroma terminated with a obclavate setae with a wider base and tapering toward a pointed apex, 12-17 x 3-3.5 µm. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, pale brown, becoming hyaline towards the apex, smooth, 1-3-septate, branched, 15-23 x 2-3.5 µm. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, lageniform, 9-11 x 2.5-3.5 µm, pale brown to brown, with a very small apical collarette. Conidia holoblastic, solitary, hyaline, aseptate, falcate, fusiform, curved, multiguttulate, 12-17 x 2.5-3 µm, apex attenuating into an acute apex, base truncate or rounded, furnished with a setula at each end, 5-6.5 µm long.

Colonies on PDA effuse, colonies 1.2-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey to slightly yellow, reverse dark brown in the center and becoming pale brown towards the margins.

Material examined: Typification: China; Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16324); China; Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16314, 16364, 16364a); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of unidentified broad leaf tree, 17 Oct. 2020, W.P. Wu (Wu1774); China: Guangdong Province, on dead leaves of ?*Smilax* sp., 9 Oct. 1998, W.P. Wu (WU2083a). Living strain: ex-type strain NN 76627 (from Wu16324), 76663 (from Wu16364), 76664 (from Wu16364a), 78376 and 78377 (from Wu17574).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Rattania falcata* W.P. Wu & Y.Z. Diao differs from the known species in the genus *R. setulifera* Prabhugaonkar & Bhat by aseptate conidia in smaller size (0-septate and 12-17 x 2.5-3 µm in *R. falcata*; 0-5 septate and 25-50 x 1.5-3.5 µm in *R. setulifera*); from *R. aquatica* M.S. Calabon & K.D. Hyde by small-sized conidia (22-27 x 3-5 µm in *R. aquatica*) (Prabhugaonkar and Bhat 2009; Calabon et al. 2021). In addition to these, their ITS sequences are also significantly different from each other.

Phylogenetically, *Rattania falcata* is closely related to some members in Chaetosphaeriaceae. On a megablast search using the ITS sequences from the strain obtained from the type specimen Wu1998d, the closest matches in NCBI's GenBank nucleotide database were members of Chaetosphaeriaceae, including *Rattania aquatica* (GeneBank MW260331, identities 495/500 (99%), 0 gap (0%)); unidentified Sordariomycetes (GeneBank AB847015, identities 478/503 (95%), 8 gaps (1%)), unidentified Chaetosphaeriaceae (GeneBank KY413761, identities 470/491 (96%), 14 gaps (2%)). These two isolates were isolated as plant endophytes (Obase and Matsuda 2014; Spear 2017).

Rattania intermedia W.P. Wu & Y.Z. Diao, sp. nov., Fig. 223, MycoBank MB841638.

Etymology: refers its conidial size between other species.

Diagnosis: Similar to *Rattania falcata* in phialidic conidiogenous cells and falcate conidia, but differs in larger conidia.

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead branches of unidentified plant, 11 Oct. 1998, W.P. Wu (Holotype WFH Wu1998d; ex-type strain CGMCC3.20638 (=NN 44906)).

Mycelium immersed, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose, dark brown, basal stroma composed of dark brown, irregular cell. Setae sterile, arising from the lower part of the stroma, subulate, acutely pointed, mid to dark brown, becoming paler towards the apex, smooth, simple, straight or slightly curved, up to 10-septate, 160-320 x 3-5 µm, with a slightly swollen base up to 15 µm wide. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, pale brown, becoming hyaline towards the apex, smooth, 2-4-septate, branched, 25-35 x 2.5-4 µm. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, lageniform, 10-15 x 3-4.5 µm, pale brown, with a very small apical collarette. Conidia holoblastic, solitary, hyaline, aseptate, falcate, fusiform, curved, multiguttulate, 25-37 x 4-5 µm, apex attenuating into an acute apex, base truncate or rounded, furnished with a setula at each end, 3-7 µm long.

Colonies on PDA effuse, colonies 2.8-3.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey, reverse dark brown in the center and becoming pale brown towards the margins.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 11 Oct. 1998, W.P. Wu (Holotype WFH Wu1998d; ex-type strain NN 44906); China: Guangdong Province, Dinghushan, on dead branches of *Quercus* sp., 9 Oct. 1998, W.P. Wu (1852e). Living strain: 44665 (from Wu1852e), ex-type strain CGMCC3.20638 (=NN 44906) and 45779 (from Wu1998d).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Rattania intermedia* W.P. Wu & Y.Z. Diao differs the two known species by conidial septation and size. The conidia in *R. setulifera* Prabhugaonkar & Bhat is 1-septate and much larger (0-5 septate and 25-50 x 1.5-3.5 µm); the conidia in *R. falcata* is also aseptate but much smaller (12-17 x 2.5-3 µm) (Prabhugaonkar and Bhat 2009). In addition, their ITS sequences are also significantly different from each other.

Phylogenetically, *Rattania falcata* is closely related to some members in Chaetosphaeriaceae. On a megablast search using the ITS sequences from the strain obtained from the type specimen Wu1998d, the closest matches in NCBI's GenBank nucleotide database were members of unidentified Chaetosphaeriaceae, including *Rattania aquatica* (GeneBank MW260331, identities 497/500 (99%), 0 gap (0%)); unidentified Sordariomycetes (GeneBank AB847015, identities 478/503 (95%), 8 gaps (1%)), unidentified Chaetosphaeriaceae (GeneBank KY413761, identities 470/491 (96%), 14 gaps (2%)).

Thozetella Kuntze, Revisio Generum Plantarum, A. Felix, Leipzig 2: 873, 1891

Saprobic on decaying leaf, branches, and decaying wood. Teleomorph: Ascomata non-stromatic, semi-immersed, scattered to gregarious, often with confluent walls, subglobose to broadly conical, brown, glabrous, papillate, opening by a rounded pore. Ostiole central, periphysate. Peridium leathery to fragile, carbonaceous, two layered; outer wall composed of brown, brick-like cells of textura prismatica, cells opaque in the upper part, pale brown at the base, towards the interior grading into several rows of thin-walled, hyaline, flattened cells. Hamathecium composed of abundant, persistent, septate, hyaline paraphyses. Asci 8-spored, unitunicate, cylindrical-clavate, rounded, slightly tapering at the apex, short-pedicellate, with a distinct, non-amyloid apical annulus. Ascospores ellipsoid to narrowly fusiform, slightly curved, 1-septate, septum indistinct, not constricted at the septum, hyaline to yellowish grey, smooth-walled, arranged obliquely uniseriate, often two-seriate only in the upper sporiferous part, with a hardly defined mucilaginous sheath swelling and diffusing in water. Anamorph: Conidiomata sporodochia or synnemata-like, scattered, punctiform, white, cream to light brown, topped by a moist spore mass. Microawns absent or present, produced from conidiophores, hyaline, thin or thick-walled, L-shaped, or hamate, sigmoid, or lunate or sickle-shaped, smooth, or rough-walled, aseptate or septate. Conidiophores macronematous, hyaline to pale brown, septate, smooth-walled, simple, or branched, cylindrical. Conidiogenous

cells integrated and terminal, determinate, monophialidic, cylindrical, hyaline to pale brown, with or without a minute apical collarette. Conidia holoblastic, lunate, aseptate, thin- and smooth-walled, with one filiform setula at each end.

Type species: *T. nivea* (Berk. & Muell.) Kuntze.

Ecology/Substrate/Host: Saprobe on dead plant material, including leaves, seed, branches and rotten wood.

Geographical distribution: Broadly distributed, especially in subtropical and tropical area.

Description and illustration: Kuntze (1891); Pirozynski and Hodges (1973); Sutton and Cole (1983); Mercade Sierra et al. (1997); Silva and Grandi (2013).

Notes: The genus *Thozetella* Kunze is characterized by conidiophores that are grouped into stroma or short synnemata and terminated by phialidic conidiogenous cells, and hyaline, aseptate, falcate, curved conidia with one setulae at each end. Members of *Thozetella* also produce a second type of “conidium”, referred to as microawns, which are hyaline, aseptate or septate, often curved, L-shaped or sigmoid, smooth or verruculose especially towards the apex, and are produced by the same phialides which produce the conidia (Pirozynski and Hodges 1973; Nag Raj 1975; Sutton and Cole 1983; Castañeda-Ruiz 1985a, b, c; Silva and Grandi 2013). These microawns are unique within the anamorphic fungi, but their role is unknown (Sutton and Cole 1983). *Thozetellopsis* Agnihothr. is similar to *Thozetella* but differs due to the lack of microawns (Agnihothrudu 1958; Sherwood 1974). Future phylogenetic analysis might show they represent the same genus.

At present there are 22 described species in the genus *Thozetella* (Pirozynski and Hodges 1973; Shearwood 1974; Nag Raj 1976; Sutton and Cole 1983; Castañeda-Ruiz 1984; Castañeda-Ruiz & Arnold 1985; Mercado Sierra et al. 1997; Natalia et al. 2004; Paulus et al. 2004; Jeewon et al. 2009; Silva and Grandi 2011; Barbosa et al. 2011; Silva and Grandi 2013; Monteiro et al. 2016; Perera et al. 2016; Hyde et al. 2020). Species concept in this genus is mainly based on limited characters of microawns and conidia (shape and size). This was questioned by Pirozynski and Hodges (1973), who recognized that *T. cristata*, *T. tocklaiensis*, and *T. radicata* were a series of species differentiated on conidial, microawn, and synnemata dimensions and development, and could represent a single species with geographical variations. This was further supported by experimental data by Sutton and Cole (1983), Waipara et al. (1996), Silva and Grandi (2013) who showed a great variation of *T. effusa* and many other species on different substrates. Knowledge of variation with growth conditions and age was limited for most species. Keys to described species were provided by Paulus et al. (2004), Whitton et al. (2012) and Barabosa et al. (2011). Barabosa et al. (2011) and Monteiro et al. (2016) also illustrated the microawns of all species.

Paulus et al. (2004) successfully used the ITS sequences to distinguish the 5 new species of *Thozetella*, since then the ITS sequences have been used for species identification (Jeewon et al. 2009; Perera et al. 2016). Including of *T. ciliata* (Castañeda-Ruiz, Arnold & Guerra) Hol.-Jech. & Mercado is doubtful due to lacking microawns and producing setae. In our phylogenetic analysis (Fig. 3 and Fig. 224), the sporodochial or synnematus genus *Thozetella* Kunze, typified by *T. nivea* (Berk.) Kuntze., was resolved as a monophyletic clade with strong support value in all analysis. The relationship between *Chaetosphaeria* Tul. & C. Tul. and *Thozetella* Kuntze was suggested by Paulus et al. (2004) and later confirmed with *Chaetosphaeria rivularis* Réblová & J. Fourn. (Ariyawansa et al. 2015). *Chaetosphaeria rivularis*, originally described with both teleomorph and *Thozetella*-like anamorph on wood submerged in freshwater in southern France, is the only known *Chaetosphaeria* species with the *Thozetella* anamorph. Phylogenetically *C. rivularis* is closely related to other members of the genus *Thozetella*, while very distinct from all other *Chaetosphaeria* species. Here we proposed to transfer *Chaetosphaeria rivularis* into *Thozetella* and emend the concept of the genus *Thozetella* with its teleomorph characters.

Only one species, *T. havanensis* R.F. Castañeda, was reported from China (Wang and Zhang, 2010). Here we report 27 species, including 17 new species. In addition, *Chaetosphaeria rivularis* Réblová & J. Fourn. is transferred to this genus as new combination. The living strains of many studied species were also studied on PDA (Figs. 225), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to all known species of *Thozetella*

1. Microawns absent 2
1. Microawns present 3
2. Conidiomata stromatic without setae *T. suttonii*
2. Conidiomata synnemata and bearing setae *T. ciliata*
3. Conidia without setulae or only with rudimentary setulae 4
3. Conidia with long setulae 5
4. Microawns 12-17 x 2-2.5 µm, conidia 3.5-5.5 x 1.5-1.7 µm *T. asetula*
4. Microawns 13-21 x 2-2.5 µm, conidia 8-10 x 1.8-2.5 µm *T. lunata*
5. Microawns T-shaped and/or L-shaped 6
5. Microawns other than T- or L-shaped 16
6. Microawns predominantly T-shaped, 18-65 µm long *T. aculeata*

6. Microawns predominately awn-like and/or L-shaped	7
7. Microawns apex undulating or geniculate	8
7. Microawns apex straight	10
8. Microawns 0–2 septate, 60–80 x 3.5–4.5 µm	<i>T. acerosa</i>
8. Microawns aseptate	9
9. Microawns 48–75 x 3–5 µm; conidia 10–15 x 2–3 µm	<i>T. boonjiensis</i>
9. Microawns aseptate, 50–70 x 3–4 µm	<i>T. nivea</i>
10. Microawns with acute apex	<i>T. cubensis</i>
10. Microawns with rounded apex	11
11. Conidiomata with sterile setae; microawns 70–100 x 3.5–5 µm, aseptate; conidia 13.7–15.5 x 2.1–2.7 µm; setulae 4.8–5.7 µm long	<i>T. bambusicola</i>
11. Conidiomata without setae	12
12. Microawns 70–280 x 2.5–8 µm	<i>T. gigantea</i>
12. Microawns up to 80 µm long	13
13. Microawns 0–1-septate, 19–75 x 1.5–3.5 µm; conidia lunate, 13.5–18 x 1.5–2 µm; setulae 4.5–7 µm long	<i>T. pindobaceuensis</i>
13. Microawns aseptate	14
14. Microawns irregularly L-shaped, sigmoid, basal part strongly curved, (20–)50–96 µm long; conidia lunate, 10–12 x 2–2.5 µm; setulae 3.5–7.5 µm long	<i>T. moganshanensis</i>
14. Microawn more or less L-shaped, base part straight or slightly curved	15
15. Microawns 20–80 x 1.5–1.8 µm; conidia 12.5–13.5 x 2.5 µm; setulae 5–7 µm	<i>T. paragiganitea</i>
15. Microawns up to 100 µm long; conidia 11–15 x 2 µm; setulae 3–5 µm long	<i>T. hunanensis</i>
16. Microawns Y-shaped, capitate, coronate	17
16. Conidia other shape	19
17. Microawns Y-shaped	<i>T. ypsiloidea</i>
17. Microawns other than Y-shaped	18
18. Microawns clavate, apical part swollen with 5–6 coronate projections	<i>T. coronata</i>
18. Microawns capitate, apical part verruculose	<i>T. capitata</i>
19. Microawns cylindrical, fusiform, elliptic-fusiform, filiform, straight or slightly curved	20
19. Microawns other shape, usually strongly curved	22
20. Microawns filiform, smooth, septate, 30–60 x 3–4.5 µm; conidia 11–13 x 2–2.5 µm	<i>T. radicata</i>
20. Microawns not filiform, aseptate	21
21. Microawns elliptic-fusiform, slightly curved, smooth, 16–25 x 3–4 µm	<i>T. submersa</i>
21. Microawns fusiform, clavate, ellipsoid, straight or curved, aseptate, 17–22 (–28) µm long; basal part thin- and smooth-walled, with an obtuse base, 2–2.5 µm wide; upper part verruculose, 3–3.5 µm wide; conidia fusiform, lunate, 11–13 x 1.8–2.5 µm; setulae 5–7 µm long	<i>T. japonica</i>
22. Microawns sickle-shaped, strongly curved, upper tapering to an acute or obtuse apex	23
22. Microawns not typically sickle-shaped	24
23. Microawns 40–60 x 2.5–3 µm, conidia 11.5–14.5 x 2.3–2.7 µm	<i>T. cristata</i>
23. Microawns 40–95 x 2.5–5 µm, conidia 13–16 x 1.5–3 µm	<i>T. falcata</i>
24. Microawns sickle-like, tapering to an acute apex, smooth-walled or slightly verruculose	25
24. Microawns vermiform, hamate, smooth or verruculose	30
25. Microawns straight to sigmoid or irregularly curved, 0–3 septate, 65–130 x 4–6.5 µm; conidia lunate to allantoid, 11–13 x 1.8–2.5 µm; setulae 2.8–5.5 µm long	<i>T. rivularis</i>
25. Microawns strongly curved, up to 50 µm long	26
26. Microawns smooth-walled, apex acute	27
26. Upper part of microawns finely verrucose	29
27. Microawns awn-like, smooth, 32–56 x 1.7–2.8 µm; conidia 11.5–14.5 x 2.2–3.4 µm; setulae 2–3.5 µm long	<i>T. fabacearum</i>
27. Conidia with longer setulae	28
28. Microawns straight or curved, L-shaped or sigmoid, 22–55 x 2.5–5 µm; conidia 12.5–19 x 5–6.5 µm; setulae 7–11 µm long	<i>T. pinicola</i>
28. Microawns variously shaped, bulbous base, acerose apex, straight, undulate, uncinata or bent 18–38 (–44) x 1.5–4 µm; conidia 9–13 (–18) x 1.5–3 µm	<i>T. tocklaiensis</i>
29. Microawns 24–59 x 3–4.2 µm, outer curved surface finely verrucose; conidia fusoid, 11.5–17 x 2–3 µm; setulae 6–8 µm long	<i>T. serrata</i>
29. Microawns variously shaped, awn-like, L-shaped, curved or almost straight, recurved, aseptate, 20–52 x 3–3.5 µm, smooth or slightly verruculose; conidia fusiform, 12–14 x 2–2.5 µm; setulae 6–8 µm long	<i>T. lithocarp</i>
30. Microawns hamate, strongly curved, tapering towards the acute or obtuse apex	31

30. Microawns vermiform, hamate, apex obtuse	32
31. Microawns predominantly hamate, curved, 25-31 x 3.5-4.5 µm; conidia lunate, fusiform, slightly curved, 12-13 x 2 µm; setulae 6-8 µm long	<i>T. minima</i>
31. Microawns awn-like, claw-like, irregularly sigmoid, curved, recurved, aseptate, 14-36 x 3-4 µm; basal part lageniform with lumen, thin-walled and frequently collapsed, smooth, 6-12 x 2.5-3.5 µm; conidia fusiform, lunate, 10-13.5 x 1.8-2.5 µm; setulae 4.5-7 µm long	<i>T. aunstrupii</i>
32. Conidiomata effuse; microawns 20-30 x 3 µm; conidia 16-19 x 4-4.5 µm; setulae 6-11.5 µm long	<i>T. effusa</i>
32. Conidiomata sporodochial or synnematosus	33
33. Microawns smooth-walled	34
33. Microawns verrucose	35
34. Microawns hamate, aseptate, 21-34 x 2-4 µm; conidia 9-12 x 1.5-2.5 µm.....	<i>T. queenslandica</i>
34. Microawns vermiform, curved or straight, 0-1-septate, 25-38 x 3.5-5 µm; conidia fusiform, 10-13 x 2-2.5 µm; setulae 3.5-5.5 µm long	<i>T. fanglanii</i>
35. Microawns sigmoid, verruculose, 17-45 x 2-3.5 µm; conidia 10.5-17.5 x 2-3 µm	<i>T. buxifolia</i>
35. Conidia mostly hamate, sometime fusiform or subcylindrical	36
36. Conidia 13-16 µm long	37
36. Conidia less than 13 µm long in average	39
37. Microawns hamate, strongly curved, 1-septate, 20-30 x 2.8-3.2 µm; conidia fusiform, narrow clavate, 13-16 x 1.5-2 µm; setulae 6-7 µm long	<i>T. longispora</i>
37. Microawns various, fusiform, subcylindrical, hamate, apex obtuse	38
38. Microawns 40-55 x 3-4 µm; conidia fusoid, straight or slightly curved, (12-)13-14(-15) x (2.5-)3 µm; Setulae 5-8 µm long	<i>T. neonivea</i>
38. Microawns 32-37 x 2.5-3 µm; conidia 13-16 x 2-2.5 µm	<i>T. canadensis</i>
39. Microawns with 6 uniform width, sigmoid, allantoid, uncinata, verruculose, 22.4-35 x 1.5-3.2 µm, conidia 11-14 x 2.3 µm	<i>T. havanensis</i>
39. Microawns without uniform width	40
40. Microawns produced from conidiogenous cells, vermiform-shaped, curved, recurved, 0-1-septate, 15-20 x 3.3-3.8 µm; basal cells very short, 3-5 µm long; apical cells verruculose; conidia fusiform, 11-14.5 x 2-2.5 µm, setulae 5.5-7 µm long	<i>T. wenyngiae</i>
40. Conidial setulae up to 5 µm long	41
41. Microawns 1-septate, 20-47 µm long; basal cell 8-17.5 x 3-3.5 µm; apical cell recurved, apex obtuse, verruculose; conidia fusiform, 10-13 x 2 µm; setulae 4-5 µm long	<i>T. pseudotocklaiensis</i>
41. Microawns 10-28 µm long	42
42. Microawns predominantly hamate, curved, 1-septate, 10-27 µm long; basal part, thin- and smooth-walled, 5-7 µm long, 2-2.5 µm wide; upper part verruculose, 2-3 µm wide; conidia fusiform, 9-11 x 1.8-2 µm; setulae 4-5 µm long	<i>T. guozhongii</i>
42. Microawns with long basal cells	43
43. Microawns vermiform-shaped, curved, recurved, 1-septate, 16-23 x 3-3.2 µm; basal cells 7.5-14 x 2.5-2.8 µm; apical cells verruculose, apex obtuse; conidia fusiform, 11-13 x 2-2.5 µm, setulae 4-5 (-8) µm long; microconidia cylindrical, fusiform, 5-8 x 1.5 µm	<i>T. vermiformis</i>
43. No microconidia produced	44
44. Microawns 1-septate, 20-28 µm long; basal part 5-10 x 2.5-3.0 µm,; upper part verruculose, 3-3.5 µm wide, apex obtuse; conidia lunate, fusiform, 8-12 x 2-3 µm; setulae 3-4.5 µm long	<i>T. palmicola</i>
44. Microawns 1-septate, 18-27.5 x 3-3.8 µm; basal cell 5-12 (-18) x 2.5-3.6 µm; upper part recurved, tapering towards the obtuse apex, verruculose, 2.5-3.8 µm wide; conidia fusiform, curved, or almost straight, 10-12 x 1.8-2.2 µm; setulae 3-6.5 µm long.....	<i>T. septata</i>

Thozetella acerosa Paulus, P. Gadek & K.D. Hyde, Mycologia 96(5):1076, 2004.

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, sessile, cream, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical to ellipsoid or ovoid shaped white mass of conidia and microawns, stroma up to 60-85 µm high, and up to 60 µm wide. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, thin- and smooth-walled, arising from a basal plate, 30-50 x 2.5-3.5 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, pale brown, irregularly cylindrical to ellipsoid, with no or minute collarette, periclinal wall thickened, 11-14 x 2-2.5 µm, tapering towards the apex, apex 1 µm wide. Microawns produced from conidiophores, predominantly L-shaped to almost straight, hyaline, smooth, 60-68 µm long; basal part thin-walled, aseptate, sometime collapsed, cylindrical to lageniform, 13-24 x 4-4.5 µm; apical part acrose, smooth and thick-walled, apical part with a serrated edge, 25-45 x 0.5-1.2 µm. Conidia falcate to lunate, aseptate, finely guttulate, hyaline and smooth, 13-15.5 x 2.5 µm, with one filiform setula at each end, 5-8 µm long.

Material examined: China: Sichuan Province, Ya An, Wan Guan, Bi Feng Xia, on dead leaves of identified trees, 15 Dec. 2013, W.P. Wu (Wu13252); China: Sichuan Province, Ya An, Wan Guan, Bi Feng Xia, on dead leaves of identified trees, 15 Dec 2013, W.P. Wu (Wu13240); China: Sichuan Province, Ya An, Wan Guan, Bi Feng Xia, on dead leaves of identified trees, 15 Dec 2013, W.P. Wu (Wu13236). Living strain: 57532 (from Wu13236), 57589 (from Wu13240), 57593 (from Wu13252a), 57559 (from Wu13252b).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, China.

Description and illustration: Paulus et al. (2004).

Note: *Thozetella acerosa* Paulus, P. Gadek & K.D. Hyde resembles *T. aculeata* P. Silva & Grandi, *T. boonjiensis* B.C. Paulus, Gadek & K.D. Hyde, *T. cubensis* R.F. Castañeda & G.R.W. Arnold, *T. gigantea* B.C. Paulus, Gadek & K.D. Hyde and *T. nivea* (Berk.) Kuntze in L-shaped microawn (Castañeda-Ruiz & Arnold, 1985; Paulus et al. 2004; Silva and Grandi, 2013; Monteiro et al. 2016). *T. acerosa* differs from *T. aculeata* in its inverted T-shaped microawns with a basal part resembling a foot-cell or T-shape in *T. aculeata*; differs from *T. nivea* by its shorter and narrower conidia and longer microawns than reported for *T. nivea* (conidia 17.5–24 x 3–3.8 µm; microawn 50–70 x 1.3–4 µm); differs from *T. cubensis* and *T. gigantea* by having much longer microawns in the two later species (71–280 x 2.5–8 µm in *T. gigantea*; 49–110 µm long in *T. cubensis*); differs from *T. boonjiensis* by its smooth microawn without a serrated edge, while the microawns in *T. acerosa* have distinguished serrated edge. Furthermore, their ITS sequence from these species are also very different. The conidia in the Chinese specimens are somewhat smaller (13–15.5 x 2.5 µm) than those in the original description (14–20 x 2–3 µm), however they all have identical ITS sequences with *T. acerosa*.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu13252, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* in *Chaetosphaeriales*, including *Thozetella acerosa* (GeneBank AY330996, identities 454/454 (99%), 0 gap (0%)), *T. boonjiensis* (GeneBank AY330995, identities 432/440 (98%), 1 gap (0%)), *T. boonjiensis* (GeneBank AY330994, identities 421/427 (99%), 0 gap (0%)), *T. pindobacuensis* (GeneBank MH595849, identities 440/455 (97%), 1 gap (0%)), *T. gigantea* (GeneBank AY331001, identities 425/440 (97%), 1 gap (0%)).

Thozetella asetula W.P. Wu & Y.Z. Diao, sp. nov., Fig. 226, MycoBank MB841639.

Etymology: refers to its conidia without setulae.

Diagnosis: Differs from any other known species by producing smaller conidia without setulae.

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaf sheath of bamboo, 3 March 2012, W.P. Wu (Holotype WFH Wu12089; ex-type strain CGMCC 3.20645 (=NN 54235)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid, or otherwise shaped white mass of conidia and microawns, stroma up to 120 µm wide and 60 µm high. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, compact at base, more or less free toward of upper part of sporodochia, smooth- and thin-walled, 25–45 x 2.5–3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 10–15 x 1.5–2 µm. Microawns produced from conidiophores, predominantly hamate, strongly curved, hyaline, 1-septate, 12–17 x 2–2.5 µm; basal cell thin-walled, cylindrical, tapering towards a truncate or flatten base; apical cell thick-walled, rough-walled, with rounded apex. Conidia lunate, ellipsoid to irregularly shaped, aseptate, hyaline, thin- and smooth-walled, eguttulate, one end rounded and the other end acute, 3.5–5.5 x 1.5–1.7 µm, no setula.

Colonies on PDA effuse, colonies 1.3–1.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, pale grey, reverse yellow brown.

Material examined: : China: Guangdong Province, Zhaoqing, Dinghushan, on dead leaf sheath of bamboo, 3 March 2012, W.P. Wu (Holotype WFH Wu12089); China: Guangdong Province, Dinghushan, on rotten wood of unidentified plant, 9 Oct. 1998, W.P. Wu (Wu1862a); China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 12 Oct. 1998, W.P. Wu (Wu1966). Living strain: ex-type strain CGMCC 3.20645 (=54235), 44653 (from Wu1862a) and 44829 (from Wu1966).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella asetula* W.P. Wu & Y.Z. Diao differs from all known species in the genus by its 1-septate, short microawns and very small conidia without setulae. Among the known species in the genus *Thozetella*, none of them produces conidia without setulae (Paulus et al. 2004; Silva 2012; Silva and Grandi 2013; Monteiro et al. 2016). There seems to be some variation on microawns production among the examined specimens, abundant microawns were found from the specimen Wu12089, while no microawn was observed from the specimens Wu1862a and Wu1966. However, the conidial morphology from them is identical and furthermore, the strains obtained from those three specimens have identical ITS sequences, which are significantly different from any

known species (Paulus et al. 2004; Yeung et al. 2009; Silva and Grandi 2012; Barbosa et al. 2011; Monteiro et al. 2016).

Thozetella aunstrupii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 227, MycoBank MB841640.

Etymology: named after the for President of Novozymes China, Knud Aunstrup, who has given strong support to our work.

Typification: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17144; ex-type strain CGMCC3.20744 = NN 77539).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid or otherwise shaped white mass of conidia and microawns, up to 60 µm high, basal part cylindrical, 35–45 µm wide, upper part up to 80 µm wide. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2–4 µm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1–2 septate, smooth, thin-walled, compact at base, more or less free toward of upper part of sporodochia, 30–50 x 2–2.5 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, lageniform, collarettes inconspicuous, periclinal wall thickened, 8–15 x 2–3.5 µm. Microawns produced from conidiophores, awn-like, claw-like, irregularly sigmoid, curved, recurved, aseptate, refractive, hyaline, 14–36 µm long; basal part lageniform with lumen, thin-walled and frequently collapsed, smooth, 6–12 x 2.5–3.5 µm; upper part tapering toward the obtuse apex, verruculose, 3–4 µm wide. Conidia fusiform, lunate, curved, aseptate, hyaline, smooth, 10–13.5 x 1.8–2.5 µm, tapering toward an obtuse ends, bearing one setula at each end, 4.5–7 µm long.

Colonies on PDA effuse, colonies 1.3–1.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white in the center, becoming brown towards the margins, reverse yellow to dark brown in the center and becoming dark brown towards the margin.

Material examined: China: Guangdong Province, Nanshan, on dead seed pod of unidentified *Leguminosae*, 18 Aug. 2019, W.P. Wu (Wu16721, Wu16722); China: Guangdong Province, Guangzhou, South China Agricultural University, on dead leaves of unidentified tree, 3 Dec. 2018, W.P. Wu (16335); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead leaves of unidentified tree, 25 Aug. 2019, W.P. Wu (Wu16886); On dead leaves of unidentified tree, China: Guangdong Province, Shenzhen, Lianhuashan Park, 11 Nov. 2019, W.P. Wu (Holotype WFH Wu17144). Living strain: 76630 (from Wu16335), 77028 (from Wu16721a), 77029 (from Wu16721b), 77030 (from Wu16722a), 77031 (from Wu16722b), 77163 (from Wu16886a), 77164 (from Wu16886b), ex-type strain 77539 and 77540 (from Wu17144).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella aunstrupii* W.P. Wu & Y.Z. Diao is closely related to *T. havanensis* R.F. Castañeda on producing awn-like, sigmoid microawns with verruculose upper part. However, in *T. havanensis*, the conidiomata are synnematus, the microawns (22–35 µm long) are sigmoid, allantoid and unciform, and the conidia (11.5–16.3 x 1.9–2.8 µm) are much longer (Castañeda-Ruiz, 1984; Silva and Grandi, 2013). Silva and Grandi (2013), in comparing the type specimen and the Brazilian specimens of *T. havanensis*, reported much larger conidia than those in the type.

Among the Chinese specimens examined, the microawns from the type specimen Wu17144 are more or less uniformed in both shape (awn-like or sigmoid shape) and size (14–36 x 3–3.6 µm); while in the specimen Wu16886, the microawns have broad variation in size and shape. Phylogenetically, on a megablast search using the ITS sequence from the type collection Wu16721, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including unnamed fungus (GeneBank KT224952, identities 447/461 (97%), 2 gaps (0%)), *Thozetella neonivea* (GeneBank NR165579, identities 446/460 (97%), 1 gap (0%)), *Thozetella pandanicola* (GeneBank MH388366, identities 447/462 (97%), 7 gaps (1%)).

Thozetella bambusicola H.B. Jiang, Phookamsak & K.D. Hyde, Fung. Div. 103: 241, 2020

Typification: China: Sichuan Province, Yibin City, Changning County, Shunan Bamboo Forest, on dead bamboo branches, 23 July 2019, H.B. Jiang and R. Phookamsak, SC025 (KUN-HKAS 101776, holotype). GenBank numbers: LSU: MT102918, SSU: MT102919, ITS: MT102917.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Hyde et al. (2020).

Notes: *Thozetella bambusicola* is a recently described species that is distinguished from other *Thozetella* species in having sporodochia surrounded by black setae and L-shaped microawns (Hyde et al. 2020). In their phylogenetic analysis, *Thozetella bambusicola* forms an independent lineage distinct from other *Thozetella* taxa based on phylogenetic analyses of a combined ITS, LSU and TUB2 sequence dataset.

Thozetella fabacearum R.H. Perera & K.D. Hyde, Mycosphere 7: 1313, 2016.

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns, 40-50 μm high, basal part cylindrical, 20-35 μm wide, upper part up to 50 μm wide. Basal stroma dark brown, composed of dark brown, irregularly shaped cells. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, 2-3 septate, smooth, compact at base, more or less free toward of upper part of sporodochia, 25-50 x 2-3 μm . Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, lageniform, smooth- and thin-walled, 8-12 x 2-2.5 μm , without collarettes or inconspicuous, periclinal wall thickened, apex up to 1 μm wide. Microawns produced from conidiogenous cells, predominantly hamate, curved, aseptate, 15-53 μm long; basal part, straight, lageniform, thick- and smooth-walled, with an obtuse or truncate base, (2.5-)3-4.5 μm wide; upper part tapering towards the apex, smooth or slightly verruculose, 2-2.5 μm wide, with an obtuse or slightly acute apex. Conidia fusiform, curved, aseptate, hyaline, guttulate, smooth, 13.5-16 x 2-2.5 μm , tapering towards both ends, provided with a single filiform setula at each end, 4.5-5.5 μm long.

Colonies on PDA effuse, colonies 10-13 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, brown to dark brown, reverse of the same color.

Material examined: China: Guangdong Province, Guangzhou, Nanshan, on decaying fruit of *Phoenix sylvestris*, 18 Aug. 2019, W.P. Wu (Wu16745); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Fagaceae*, 2 Dec. 2018, W.P. Wu (Wu16281); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16309); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on decaying fruit of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17485); China: Guangdong Province, Guangzhou, South China Agricultural University, on dead laves of *Acacia* sp., 3 Dec. 2018, W.P. Wu (Wu16377); China: Guangdong Province, Shenzhen, Lianhuashan, on dead fruit of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17260); China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 29 Dec. 2020, W.P. Wu (Wu17674); China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 28 Dec. 2020, W.P. Wu (Wu17686); China: Hainan Province, Sanya, Yalongwan Park, on dead leaves of unidentified tree, 29 Dec. 2020, W.P. Wu (Wu17678, Wu17688). Living strain: 77030, 77039 and 77082 (rom Wu16745); 76701 and 76703 (from Wu16309), 76611 (from Wu16281), 77702 and 77672 (from Wu17260), 78244 and 78245 (from Wu17485), 76671 and 76672 (from Wu16377), 78439, 78497 and 78535 (from Wu17674), 78441 and 78442 (from Wu17678), 78501 and 78502 (from Wu17686), 78504 (from Wu17688).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Thailand.

Description and illustration: Perera et al. (2016).

Notes: *Thozetella fabacearum* is also a recently described species on seed pod of *Fabaceae* from Thailand. It is characterized by sporodochial conidiomata and aseptate L-shaped microawns with smooth or only slightly verruculose wall. Apart from the slightly shorter conidial setulae, the fungus from the several Chinese specimens is identical to those in the original description of *T. fabacearum*. The ITS sequences obtained from them are almost identical among each other and also to the one from the type species.

Thozetella falcata B.C. Paulus, Gadek & K.D. Hyde, Mycologia 96: 1078, 2004.

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial or synnemata, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid, or otherwise shaped white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2-3.5 μm wide, up to 60 μm high, basal part cylindrical, 35-45 μm wide, upper part up to 80 μm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1-2 septate, compact at base, more or less free toward of upper part of sporodochia, 18-22 x 2-2.5 μm . Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 6-10 x 2-3.5 μm . Microawns produced from conidiophores, predominantly falcate, L-shaped, strongly curved, with a smooth or verrucose apex, up to 45 μm long, lower part 20-30 x 2.5-4 μm , upper part 15-20 x 1-2 μm , with acute apex. Conidia fusiform, curved, continuous, hyaline, guttulate, smooth, 13-15 x 2 μm , provided with a single filiform setula at each end, 3-5 μm long.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Macadamia ternifolia*, 4 March 2012, W.P. Wu (WU12318); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead seed sheath of *Sindora tonkinensis*, 10 Dec. 2013, W.P. Wu (12666a,b); China: Guangdong Province, Zhaoqing, Dinghuashan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (WU12167a); China: Guangdong Province, Zhaoqing, Dinghuashan, on dead leaves of unidentified tree, 3 March 2012, W.P. Wu (WU12098); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead branches of palm tree, 10 Dec. 2013, W.P. Wu (Wu12642a,b); China, Guangdong, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16232); China, Guangdong, Guangzhou, on dead branches of palm, 10 Dec. 2013, W.P. Wu (Wu12642); China, Guangdong, Shenzhen,

Lianhuashan Park, on dead leaves of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17115b); China: Guangdong Province, Guangzhou, Nanshan, on dead fruit of *Phoenix sylvestris*, 18 Aug. 2019, W.P. Wu (Wu16745); China: Guangdong Province, Guangzhou, South China Agricultural University, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16309); China: Guangdong Province, Guangzhou, South China Agricultural University, on dead leaves of *Quercus* sp., 3 Dec. 2018, W.P. Wu (Wu16281); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of *Acacia* sp., 17 Oct 2020, W.P. Wu (Wu17485); China: Guangdong, Guangzhou, South China Agriculture University, 3 Dec. 2018, W.P. Wu (Wu16375); China: Guangxi Province, Nanning, Subtropical Botanical Garden, On dead leaves of *Acacia* sp., 15 Nov. 2013, W.P. Wu (Wu13094-57396); China: Guangxi Province, Nanning, Subtropical Botanical Garden, on dead leaves of *Acacia* sp., 15 Nov. 2013, W.P. Wu (Wu13153-57458); China: Guangxi Province, Nanning, Subtropical Botanical Garden, on dead leaves of *Acacia* sp., 15 Nov. 2013, W.P. Wu (Wu13153a-57459); China: Guangxi Province, Nanning, Subtropical Botanical Garden, on dead seed sheath of *Bauhinia blakeana*, 15 Nov. 2013, W.P. Wu (Wu13069-57389). Living strain: 54237 (from Wu12167a), 54238 (from Wu12098), 57389 (from Wu13069), 57396 (from Wu13094), 57458 (from Wu13153), 57459 (from 13153a), 54327 (from Wu12318), 57638 (from Wu12666a), 57680 (from 12666b), 57709 (from Wu12642a), 57707 (from Wu12642b), 76669 (from Wu16375), 76567 (from Wu16232), 77523 (from Wu17115b), 76611 (from Wu16281), 76701 and 76703 (from Wu16309), 77039, 77040 and 77082 (from Wu16745), 78244 and 78245 (from Wu17485).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, China.

Description and illustration: Paulus et al. (2004).

Notes: *Thozetella falcata* B.C. Paulus, Gadek & K.D. Hyde is a recently described species from Australia and characterized by synnematus conidiomata and predominantly sickle-shaped microawns (Paulus et al. 2004). Morphologically, *Thozetella falcata*, *T. cristata* Piroz. & Hodges, *T. radicata* (E.F. Morris) Piroz. & Hodges and *T. tocklaiensis* (Agnihothr.) Piroz. & Hodges produce synnemata, but can be distinguished by morphology of microawns. *T. falcata*, *T. cristata* and *T. radicata* are similar in microawn shape and in conidial dimensions, however, the microawns in *T. falcata* are considerably longer than those in other two species. The length and morphology of synnemata in *T. tocklaiensis* are similar to those of *T. falcata*, however, these two fungal taxa differ in microawn morphology and size (Paulus et al. 2004). *T. fabacearum* R.H. Perera & K.D. Hyde and *T. falcata*, with identical ITS sequences from the type specimens, are very similar on morphology of microawns, and can only be distinguished by the conidiomata morphology (sporodochia vs. synnemata) and size of microawns (Perera et al. 2016). The ITS sequences obtained from the pure cultures of all studied specimens by us are almost identical to the known sequence from the type strain of *T. falcata*.

***Thozetella fanglanii* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 228-229, MycoBank MB841641.**

Etymology: named after the former Chinese mycologist Fanglan Tai.

Typification: China: Beijing, Mentougou, Baihuashan, on rotten wood, 10 Aug 2018, W.P. Wu (Holotype WFH Wu15230; ex-type strain CGMCC 3.20662 (=NN 76092)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns, 40-60 µm high, basal part cylindrical, 25-35 µm wide, upper part up to 50 µm wide. Basal stroma dark brown, composed of dark brown, irregularly shaped cells. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, 2-3 septate, smooth, compact at base, more or less free toward of upper part of sporodochia, 25-40 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, lageniform, smooth- and thin-walled, 12-15 x 2-2.5 µm, without collarettes or inconspicuous, periclinal wall thickened, apex 1-1.5 µm wide. Microawns produced from conidiogenous cells, predominantly hamate, vermiform, curved, narrowed towards the obtuse apex, 0-1-septate at the base, 25-38 µm long; basal part, curved, with an obtuse base, 3.5-5 µm wide; upper part tapering towards the apex, 2.5-3.5 µm wide, with an obtuse or slightly acute apex. Conidia fusiform, curved, aseptate, hyaline, guttulate, smooth, 10-13 x 2-2.5 µm, tapering towards both ends, provided with a single filiform setula at each end, 3.5-5.5 µm long.

Colonies on PDA effuse, colonies 3-3.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey, reverse yellow brown in the center and becoming pale colored towards the margin.

Material examined: China: Beijing, Mentougou, Baihuashan, on rotten wood, 10 Aug 2018, W.P. Wu (Holotype WFH Wu15230); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead seed of unidentified broad leaf tree, 17 Oct. 2020, W.P. Wu (Wu17587). Living strain: ex-type strain CGMCC 3.20662 (=76092), 78389 and 78390 (from Wu17587).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella fanglanii* W.P. Wu & Y.Z. Diao morphologically differs from other known species in the genus by hamate to vermiform, 0-1-septae, thin- and smooth-walled microawns and smaller conidia (10-13 x 2-2.5 µm) with shorter setulae (3.5-5.5 µm long) (Castañeda-Ruiz & Arnold, 1985; Paulus et al. 2004; Silva and

Grandi, 2013; Monteiro et al. 2016; Perera et al. 2016). Morphologically, *T. fanglanii* resembles *T. queenslandica* Paulus, P. Gadek & K.D. Hyde in the shape and size of microawns, conidia and conidial setulae, but they can be distinguished by the not strongly curved microawns in *T. fanglanii* (Paulus 2004). In addition, the two species have very distinct ITS sequences. The microawns in the specimen Wu17587 are with 1-septatum at the base, while they are aseptate in the specimen Wu15230.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu15230, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including uncultured fungus clone (GeneBank FJ613103, identities 532/552 (96%), 4 gaps (0%)), many unnamed *Thozetella* species (including GeneBank KU059907, identities 526/551 (95%), 5 gaps (0%)), *Thozetella tocklaiensis* (GeneBank MH857817, identities 451/471 (96%), 4 gaps (0%)), *Thozetella havanensis* (GeneBank EF029184, identities 418/518 (93%), 14 gaps (2%)), *Thozetella falcata* (GeneBank AY331004, identities 440/459 (96%), 4 gaps (0%)).

Thozetella guozhongii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 230-231, MycoBank MB841642.

Etymology: named after the Chinese mycologist, Lu Guozhong.

Typification: China: Guangdong Province, Guangzhou, Nansha, on dead leaves of palm, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16696a; ex-type strain CGMCC 3.20667 (=NN 76969)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns, 40-50 µm high, basal part cylindrical, 20-35 µm wide, upper part up to 50 µm wide. Basal stroma dark brown, composed of dark brown, irregularly shaped cells. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, 2-3 septate, smooth, compact at base, more or less free toward of upper part of sporodochia, 25-50 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, lageniform, smooth- and thin-walled, 9-11 x 2-2.2 µm, without collarettes or inconspicuous, periclinal wall thickened, apex up to 1 µm wide. Microawns produced from conidiogenous cells, predominantly hamate, sigmoid, curved, 1-septate at the base, 10-27 µm long; basal part, straight, thin- and smooth-walled, with an obtuse base, 5-7 µm long, 2-2.5 µm wide; upper part tapering towards the apex, verruculose, 2-3 µm wide, with an acute apex. Conidia fusiform, curved, aseptate, hyaline, guttulate, smooth, 9-11 x 1.8-2 µm, tapering towards both ends, provided with a single filiform setula at each end, 4-5 µm long.

Colonies on PDA effuse, colonies 3-3.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey to pale brown, reverse dark brown in the center and becoming pale brown towards the margin.

Material examined: China: Guangdong Province, Guangzhou, Nansha, on dead leaves of palm, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16696a); China: Guangdong Province, Guangzhou, Nansha, on dead leaves of palm, 18 Aug. 2018, W.P. Wu (Wu16763, Wu16766, Wu16697, Wu16698). Living strain: ex-type strain CGMCC 3.20667 (=76969), 76970 (from Wu16696b), 76971 (from Wu16697a), 76972 (from 16697b), 76973 (from Wu16698a), 76974 (from Wu16698b), 77066 (from Wu16763a), 77067 (from Wu16763b), 77068 (from Wu16766).

Ecology/Substrate/Host: Saprobe on dead material of palm.

Geographical distribution: China.

Notes: *Thozetella guozhongii* is characterized by sporodochial conidiomata, hamate to sigmoid and 1-septate microawns with verruculose wall in the upper part, and small conidia (9-11 x 1.8-2 µm) with short setulae (4-5 µm long). On the morphology of microawns, it resembles *T. canadensis* Nag Raj and *T. effusa* B. Sutton & G.T. Cole, but can be distinguished by its strongly curved microawns with 1-septatum at the base (Nag Raj 1976; Sutton and Cole, 1983).

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu16696, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriaceae*, including *Thozetella* sp. (GeneBank MH268114, identities 450/458 (98%), 2 gaps (0%)), *Thozetella pandanicola* (GeneBank NR168203, identities 440/448 (98%), 1 gap (0%)), *Thozetella lithocarp* (GeneBank NR164037, identities 435/441 (99%), 1 gap (0%)), *Thozetella tocklaiensis* (GeneBank MH857817, identities 447/457 (97%), 1 gap (0%)).

Thozetella havanensis R.F. Castañeda, Revista del Jardín Botánico Nacional, Universidad de la Habana 5(1): 69, 1984.

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial; Conidial mass cream to white, pyriform, globose, cylindrical. Microawns produced from conidiophores, predominantly S-shaped, smooth, hyaline, aseptate, 21-35 x 1.3-3.5 µm. Conidia fusiform, lunate, curved, continuous, hyaline, smooth, 10.5-15 x 2-3 µm, provided with a single filiform setula at each end, 6.5-9 µm long.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Cuba.

Description and illustration: Castañeda-Ruíz (1984); Wang & Zhang (2010).

Notes: *Thozetella havanensis* was reported on decaying needle of *Pinus* sp. from Henan (HHAUF09 0336) by Wang & Zhang (2010). No specimen was examined by us and the above note is based on the literature (Wang & Zhang 2010).

Thozetella hunanensis W.P. Wu & Y.Z. Diao, sp. nov., Fig. 232, MycoBank MB841643.

Etymology: refers to the locality where this fungus was originally discovered.

Typification: China: Hunan Province, Zhangjiajie, on dead leaf sheath of bamboo, 15 Oct. 2010, W.P. Wu (Holotype WFH Wu11044c; ex-type strain CGMCC 3.20710 = NN 53378).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid, or otherwise shaped white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2–4 µm wide, up to 80 µm high. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1–2 septate, compact at base, more or less free toward of upper part of sporodochia, 30–60 x 2–3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 13–16 x 2–3 µm. Microawns produced from conidiophores, predominantly L-shaped, strongly curved, with a smooth apex, up to 100 µm long, lower part 9–15 x 3.5–4.5 µm, upper part 14–80 x 1.5–2 µm, with obtuse apex. Conidia fusiform, curved, continuous, hyaline, guttulate, smooth, 11–15 x 2 µm, provided with a single filiform setula at each end, 3–5 µm long.

Colonies on PDA effuse, colonies 1.2–1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, grey to slightly yellow, reverse soil brown in the center and becoming paler towards the margin.

Material examined: China: Hunan Province, Zhangjiajie, on dead leaf sheath of bamboo, 15 Oct. 2010, W.P. Wu (Holotype WFH Wu11044c). Living strain: ex-type strain 53378.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella hunanensis* is characterized by producing L-shaped and smooth-walled microawns and falcate to lunate conidia with one setula at each end. Morphologically *T. hunanensis* resembles *Thozetella acerosa* Paulus, P. Gadek & K.D. Hyde, *T. aculeata* P. Silva & Grandi, *T. boonjiensis* B.C. Paulus, Gadek & K.D. Hyde, *T. cubensis* R.F. Castañeda & G.R.W. Arnold, *T. gigantea* B.C. Paulus, Gadek & K.D. Hyde and *T. nivea* (Berk.) Kuntze in L-shaped microawn (Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Barbosa et al. 2011; Silva and Grandi 2013; Monteiro et al. 2016). *T. hunanensis* differs from *T. acerosa* by its microawns without serrated edge in the upper part; differs from *T. aculeata* in its inverted T-shaped microawns with a basal part resembling a foot-cell or T-shape in *T. aculeata*; differs from *T. nivea* by its smaller conidia and shorter microawns than reported for *T. nivea* (conidia 17.5–24 x 3–3.8 µm; microawn 50–70 x 1.3–4 µm); differs from *T. cubensis* and *T. gigantea* by having much longer microawns in the two later species (71–280 x 2.5–8 µm in *T. gigantea*; 49–110 µm long in *T. cubensis*). Furthermore, the ITS sequence obtained from the relevant strain is also very different from those in other known species.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu11044c, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaerales*, including *Thozetella* sp. (GeneBank EU825197, identities 422/448 (94%), 8 gaps (1%)), *Thozetella fabacearum* (GeneBank KY212754, identities 427/456 (94%), 7 gaps (1%)), *Thozetella falcata* (GeneBank AY33104, identities 427/456 (94%), 7 gaps (1%)), *Thozetella cristata* (GeneBank KJ183032, identities 423/456 (93%), 8 gaps (1%)).

Thozetella japonica W.P. Wu & Y.Z. Diao, sp. nov., Figs. 233–234, MycoBank MB841644.

Etymology: refers to the country where this fungus was originally discovered.

Typification: Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead fruit of unidentified tree, 2 Oct. 2019, W.P. Wu (Holotype WFH Wu16900a; ex-type strain CGMCC 3.20670 (=NN 77262)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns; sporodochia cylindrical, 40–50 µm high, basal part cylindrical, 25–45 µm wide, upper part up to 50 µm wide. Basal stroma dark brown, composed of dark brown, irregularly shaped cells. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, 2–3 septate, smooth, compact at base, more or less free toward of upper part of sporodochia, 45–50 x 1.5–2.5 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, lageniform, smooth- and thin-walled, 8–10 x 1.5–2.5 µm, without collarettes or inconspicuous, periclinal wall thickened, apex 1–1.5 µm wide. Microawns produced from conidiogenous cells, fusiform, clavate, ellipsoid, straight or curved, narrowed towards the obtuse base, aseptate, 17–22 (–28) µm long; basal part straight, thin- and smooth-walled, with an obtuse base, 2–2.5 µm wide; upper part verruculose, 3–3.5 µm wide, with an obtuse apex. Conidia fusiform, lunate, curved, aseptate, hyaline,

guttulate, smooth, 11-13 x 1.8-2.5 µm, tapering towards both ends, provided with a single filiform setula at each end, 5-7 µm long.

Colonies on PDA effuse, colonies 1.5-2.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead fruit of unidentified tree, 2 Oct. 2019, W.P. Wu (Holotype WFH Wu16900a); Japan: Mie Prefecture, Tsu, Tsukairaku Park, on dead fruit of *Cyclobalanopsis* sp., 2 Oct. 2019, W.P. Wu (Wu16961, 16962, 16966); Japan: Mie Prefecture, Tsu, Tsukairaku Park, On dead fruit of *Cyclobalanopsis* sp., 2 Oct. 2019, W.P. Wu (Wu16959). Living strain: ex-type strain CGMCC 3.20670 (= NN77262, from Wu16900a), 77361 (from Wu16959), 77289 (from Wu16961), 77362 (from Wu16962), 77292 (from Wu16966), 77263 (from Wu16900b).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Japan.

Notes: *Thozetella japonica* W.P. Wu & Y.Z. Diao can easily be distinguished from other known species by fusiform to clavate, ellipsoid, aseptate and verruculose microawns and smaller conidia with setulae at both ends. *T. buxifolia* Alegr. (microawns irregularly sigmoid, twisted in two planes, 25-30 x 3-3.5 µm; conidia 13.5-15 x 2.5-2.7 µm; conidial setulae 10-13 µm long), *T. canadensis* Nag. Raj (microawns vermiform, recurved, 19-30 x (1.9-)2.8 µm; conidia 10.5-14.4 x 1-2 µm; conidial setulae 4.8-7.5 µm long) and *T. effuse* B. Sutton & G.T. Cole (microawns vermiform, sigmoid, recurved, 25-35.5 x 1.9-2.8 µm; conidia 11.5-19.2 x 2.8 µm; conidial setulae 9.6-14.4 µm long) also produce similar aseptate and verruculose microawns, but in these two species, the microawns are narrower and recurved. In addition, the conidia in *T. buxifolia* and *T. effuse*, the conidia are much larger and with longer setulae (Nag Raj 1976; Sutton and Cole 1983; Allegrucci et al. 2004).

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu16959, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including unidentified leaf litter ascomycetes (GeneBank AF502902, identities 443/463 (96%), 7 gaps (1%)), *Thozetella neonivea* (GeneBank NR165579, identities 434/468 (93%), 12 gaps (2%)), *Thozetella lithocarpi* (GeneBank NR164037, identities 433/467 (93%), 13 gaps (2%)).

***Thozetella lithocarpi* R.H. Perera & K.D. Hyde, Fung. Div. 95: 147, 2019.**

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells, 30-60 µm high. Conidiophores macronematous, brown at the basal part, becoming pale brown toward apex, irregularly cylindrical, branched, 3-5 septate, compact at base, more or less free toward of upper part of sporodochia, 40-60 x 2-2.5 µm. Conidiogenous cells monophialidic, lageniform, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, collarettes inconspicuous, periclinal wall thickened, 10-13 x 1.5-2.5 µm. Microawns produced from conidiogenous cells, awn-like, L-shaped, curved or almost straight, recurved, aseptate, thin- and smooth-walled, 20-52 µm long; basal part thin- and smooth-walled, easily collapsed, 9-15 x 3-3.5 µm; upper part curved, sometimes recurved, tapering towards the obtuse apex, smooth or slightly verruculose, narrowed towards the apex, 1.5-2.5 µm wide. Conidia fusiform, curved, aseptate, hyaline, multiguttulate, smooth, 12-14 x 2-2.5 µm, provided with a single filiform setula at each end, 6-8 µm long.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead branches of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17495); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead seed pod of *Acacia* sp., 17 Oct. 2020, W.P. Wu (Wu17582); China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead fruit of unidentified tree, 17 Oct. 2020, W.P. Wu (Wu17569, Wu17570, Wu17590, Wu17591); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Wu16275). Living strain: 76704 (from Wu16313), 76603 and 76604 (from Wu16275), 78254 and 78255 (from Wu17495), 78372 (from Wu17569), 78373 (from Wu17570), 78379 (from Wu17582), 78382, 78383 and 78384 (from Wu17590), 78391 (from Wu17591).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Thailand.

Description and illustration: Perera et al. (2019).

Notes: *Thozetella lithocarpi* R.H. Perera & K.D. Hyde is a recently described species from Thailand (Phookamsak et al., 2019). The Chinese collections are identified to this species based on the ITS sequences. Morphologically they are somewhat different on both shape and size of microawns and conidia. In the original description of *T. lithocarpi*, the microawn was described as '24-54 µm long, 3-3.5 µm wide, visible as small hairs on the sporodochial mass, aseptate, variously-shaped, sigmoid or sickle-shaped, apex straight, hyaline, smooth-walled, thick-walled', while the microawns from the Chinese collections are L-shaped or awn-like, incurved, verruculose in the upper part. The conidia (20-35 x 2-3 µm) in the original description of *T. lithocarpi* are much larger than those from the Chinese connection.

Thozetella longispora W.P. Wu & Y.Z. Diao, sp. nov., Figs. 235-2369, MycoBank MB841645.

Etymology: refers to its long conidia.

Typification: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16313; ex-type strain NN 76704).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical, ovoid, or otherwise shaped white mass of conidia and microawns, stroma 45-65 μm high and 30-40 μm wide. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, 2-5-septate, branched, compact at base, more or less free toward of upper part of sporodochial, 30-50 x 1.8-2.2 μm . Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 8-10 x 2-2.5 μm . Microawns produced from conidiophores, predominantly hamate, 1-septate at the base, curved, thin-walled in lower part, refractive, with a rough apex, 20-30 x 2.8-3.2 μm . Conidia fusiform, narrow clavate, aseptate, hyaline, smooth, both ends obtuse or acute, 13-16 x 1.5-2 μm , bearing one unbranched setula at each end, 6-7 μm long.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of unidentified tree, 2 Dec. 2018, W.P. Wu (Holotype WFH Wu16313). Living strain: ex-type strain 76704.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella longispora* W.P. Wu & Y.Z. Diao is characterized by sporodochial conidiomata, awn-like and 1-septate microawns with a small, thin- and smooth-walled base and a strongly curved, verruculose upper cell, and fusiform to narrow clavate conidia (13-16 x 1.5-2 μm) bearing one unbranched and 6-7 μm long setula at each end. On shape and size of microawns, it resembles *T. canadensis* and *T. effusa*, but the strongly curved microawns and narrow and fusiform conidia in *T. longispora* can easily be distinguished from the other two species (Nag Raj 1976; Sutton and Cole 1984).

Thozetella lunata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 237, MycoBank MB841646.

Etymology: refers to its lunate-shaped conidia.

Typification: China: Guangdong Province, Guangzhou, South China Botanical Garden, On dead leaf of palm, 10 Dec 2013, W.P. Wu (Holotype WFH Wu12701; ex-type strain CGMCC 3.20657 (=NN 57647)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical, ovoid, or otherwise shaped white mass of conidia and microawns, stroma up to 60 μm wide and 30-50 μm high. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, compact at base, more or less free toward of upper part of sporodochial. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 8-13 x 2-2.5 μm . Microawns produced from conidiogenous cells, predominantly hamate, curved, thick-walled in lower part, refractive, with a rough apex, 13-21 x 2-2.5 μm . Conidia lunate, continuous, hyaline, eguttulate, smooth, both ends acute, 8-10 x 1.8-2.5 μm , no setula or sometimes with a very short setula, up to 1.5 μm long.

Colonies on PDA effuse, colonies 2.8-3.2 cm diameter in 20 days, circular, flat, margin irregular, aerial mycelium well-developed, white, slightly grey, reverse pale brown in the center and becoming paler towards the margin.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, On dead leaf of palm, 10 Dec 2013, W.P. Wu (Holotype WFH Wu12701); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaf of palm, 10 Dec. 2013, W.P. Wu (Wu12702a,b,c); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaf of palm, 10 Dec 2013, W.P. Wu (Wu12703a,b,c). Living strain: ex-type strain CGMCC 3.20657 (=NN57647), 57651 (from Wu12702c), 57652 (from Wu12702d), 57656 (from Wu12701), 57663 (from Wu12703a), 57664 (from Wu12703b), 57700 (from Wu12702a), 57701 (from 12702b), 57702 (from Wu12701c).

Ecology/Substrate/Host: Saprobe on dead material of palm.

Geographical distribution: China

Notes: *Thozetella lunata* W.P. Wu & Y.Z. Diao sp. nov. differs from all known species in the genus by having small-sized microawns (13-21 μm long) and lunate conidia (8-10 x 1.8-2.5 μm) without or with a very short setulae (<1.5 μm long) (Monteiro et al. 2016; Perera et. al. 2016). Among the known *Thozetella* species, all produce conidia bearing a setula at both ends. The strains isolated from those three specimens have the identical ITS sequences, which are significantly different from those from the known species.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu12701, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including unidentified fungal species from surface-sterilized, ungerminated, asymptomatic seed of a neotropical pioneer tree following incubation in forest soil (GeneBank KU977742, identities 451/461 (98%), 5 gaps (1%)), uncultured *Thozetella* from subtropical evergreen forest soil (GeneBank LT547757,

identities 435/444 (98%), 3 gaps (0%)), *Thozetella gigantea* (GeneBank AY331001, identities 434/460 (94%), 8 gaps (1%)), *Thozetella acerosa* (GeneBank AY330996, identities 423/446 (95%), 6 gaps (1%)).

Thozetella minima W.P. Wu & Y.Z. Diao, sp. nov., Fig. 238, MycoBank MB841647.

Etymology: refers to its small conidia.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 6 Dec. 2018, W.P. Wu (Holotype WFH Wu15211; ex-type strain CGMCC 3.20726 = NN 76016).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical, ovoid, or otherwise shaped white mass of conidia and microawns. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, compact at base, more or less free toward of upper part of sporodochia. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 8-15 x 2-2.5 µm. Microawns produced from conidiophores, predominantly hamate, curved, 25-31 µm long; basal part lageniform, thin- and smooth-walled, 3.5-4.5 µm wide, tapering towards an obtuse or truncate base, 1.5-1.6 µm wide; upper part thin-walled, verruculose, 1.3-1.5 µm wide, with an obtuse or acute apex. Conidia lunate, fusiform, slightly curved, tapering towards both ends, aseptate, hyaline, guttulate, smooth, 12-13 x 2 µm, bearing an unbranched setulae at each end and 6-8 µm long.

Colonies on PDA effuse, colonies 1.5-1.7 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Guangdong Province, Guangzhou, on dead leaves of *Eucalyptus* sp. 10 Dec. 2013, W.P. Wu (Wu12705); China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 6 Dec. 2018, W.P. Wu (Wu15211, Wu15212). Living strain: 57661 and 57662 (from Wu12705), ex-type strain 76016 (from Wu15211), 76017 and 76108 (from Wu15212).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella minima* is characterized by awn-like microawns with a lageniform, fusiform and smooth-walled base and a strongly curved and verruculose upper part, and smaller conidia with short setulae.

Thozetella moganshanensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 239-240, MycoBank MB841648.

Etymology: refers to the locality where this fungus was collected.

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead bark of *Platanus occidentalis*, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu17016; ex-type strain CGMCC 3.20671 (=NN 77338)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical, ovoid, or otherwise shaped white mass of conidia and microawns, stroma 35-50 µm high and 40-60 µm high. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, compact at base, more or less free toward the upper part of sporodochia, 35-50 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, lageniform, collarettes inconspicuous, periclinal wall thickened, 8-15 x 2-3 µm. Microawns produced from conidiophores, predominantly awn-like, L-shaped, sigmoid, or irregularly curved at the base, aseptate, rigid, hyaline, refractive, (20-)50-96 µm long; basal part lageniform, thin-walled, sometimes curved, with lumen, and frequently collapsed, smooth, 3-4 µm wide, with an obtuse base; apical part acerose, thin-walled, straight or rarely recurved, 2-2.5 µm, apex acute. Conidia lunate, fusiform, curved, aseptate, hyaline, smooth, tapering toward both the rounded ends, 10-12 x 2-2.5 µm, with a setula at both ends, 3.5-7.5 µm long.

Colonies on PDA effuse, colonies 1.8-2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse soil to dark brown in the center and becoming paler towards the margins.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead bark of *Platanus occidentalis*, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu17016). Living strains: ex-type strain CGMCC 3.20671 (=77338) and 77376 (from Wu17016).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella moganshanensis* W.P. Wu & Y.Z. Diao is characterized by aseptate, awn-like and L-shaped microawns (50-96 µm long), and falcate to fusiform, smaller conidia with shorter setulae at both ends (conidia 10-12 x 2-2.5 µm; setulae 3.5-7.5 µm long). It resembles *T. bamcusicola* H.B. Jiang, Phookamsak & K.D. Hyde (microawns straight or L-shaped, 70-100 x 3.5-5 µm; conidia 13.5-15.5 x 2.1-2.7 µm, setulae 4.8-5.7 µm long), *T. cubensis* R.F. Castañeda & G.R. W. Arnold (microawns awn-like, 37.5-105 x 2-5 µm; conidia 12.3-18 x 2.2-3.2 µm, setulae 4.8-10 µm long), *T. gigantea* B.C. Paulus, Gadek & K.D. Hyde (microawns awn-like, falcate, 100-120 µm long; conidia 11.5-17.5 x 1.7-2.5 µm, setulae 5.7-12.5 µm long), *T. pindobacuensis* T.A.B. Santos, L.B. Conc. & Gusmão (microawns awn-like, L-shaped, almost straight, 0-1-septate, 19-75 x 1.5-3.5 µm; conidia 13.5-18 x 1.5-2 µm, setulae 4.5-7 µm long) and anamorph of *Chaetosphaeria ribularia* Réblová & J. Fourn.

(microawns straight or sigmoid or irregularly curved, 0-3-septate, 65-130 x 4-6.5 µm; conidia 11-13 x 1.8-2.5 µm, setulae 2.8-4.5 µm long), but can be distinguished by the larger conidia in other species (Castañeda-Ruiz 1984; Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Barbosa et al. 2011; Silva and Grandi 2013; Ariyawansa et al. 2015; Monteiro et al. 2016; Crous et al. 2018; Hyde et al. 2020). The anamorph of *Chaetosphaeria rivularia* also produces smaller conidia, but the microawns in this species are longer and not L-shaped (Ariyawansa et al. 2015).

In the phylogenetic tree generated by using the combined LSU and ITS sequences, *T. moganshanense* is clustered together with *Chaetosphaeria rivularia* and formed a separate clade. These two species are morphologically similar on shape of microawns and smaller conidia. Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu17016, the closest matches in NCBI's GenBank nucleotide database were members of *Chaetosphaeria*, *Thozetella* and *Menispora* in *Chaetosphaeriaceae*, including *Chaetosphaeria rivularia* (GeneBank KR347356, identities 440/464 (95%), 15 gaps (3%)), *Thozetella* sp. (GeneBank MH268113, identities 415/460 (90%), 19 gaps (4%)), *Dictyochaeta mimusopis* (GeneBank MH107888, identities 408/454 (90%), 17 gaps (3%)), *Menispora minuta* (GeneBank MH857865, identities 410/458 (90%), 24 gaps (5%)), *Thozetella* sp. (GeneBank MT215494, identities 409/459 (89%), 18 gaps (3%)).

Thozetella palmicola W.P. Wu & Y.Z. Diao, sp. nov., Figs. 241-243, MycoBank MB841649.

Etymology: refers to the host plant from which the fungus was originally discovered.

Diagnosis: Morphologically similar to *T. pseudotocklaiensis* on shape of microawns, but differs by microawns with short basal cells.

Type: China: Hainan Province, Sanya, Yalongwan Park, on decaying seed of unidentified palm, 28 Dec. 2020, W.P. Wu (Holotype WFH Wu17612; ex-type strain CGMCC 3.20763 = NN 78448).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to gray, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical, ovoid, or otherwise shaped white mass of conidia and microawns. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, compact at base, more or less free toward of upper part of sporodochia. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 8-12 x 2-2.5 µm. Microawns produced from conidiophores, predominantly hamate, awn-like, curved, 1-septate, 20-28 µm long; basal part cylindrical, thin- and smooth-walled, 5-10 µm long, 2.5-3.0 µm wide, with an obtuse or truncate base; upper part thin-walled, verruculose, 3-3.5 µm wide, with an obtuse or acute apex. Conidia lunate, fusiform, slightly curved, tapering towards both ends, aseptate, hyaline, guttulate, smooth, 8-12 x 2-3 µm, bearing an unbranched setula at each end and 3-4.5 µm long.

Colonies on PDA effuse, colonies 8-15 mm diameter in 14 days, circular, flat, margin entire, aerial mycelium abundant, not only restricted to the inoculation block, grey to light brown, reverse of the same color or yellow brown.

Colonies on PDA effuse, colonies 1.7-2.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Hainan Province, Sanya, Yalongwan Park, on decaying seed of unidentified palm, 28 Dec. 2020, W.P. Wu (Holotype WFH Wu17612); China: Hainan Province, Sanya, Yalongwan Park, on decaying seed of unidentified palm, 28 Dec. 2020, W.P. Wu (Wu17610, Wu17611, Wu17612, Wu17613). Living strain: 78414 (from Wu17610), 78415 and 78448 (from Wu17612).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella palmicola* is characterized by awn-like and 1-septate microawns with a thin- and smooth-walled base and a cylindrical, verruculose apical cell, and smaller conidia (8-12 x 2-3 µm) with shorter setulae (3-4.5 µm). It resembles *T. pseudotocklaiensis* on shape and size of microawns, but differs in shorter basal cell of microawns. *T. lithocarpi* also produces similar shaped microawns, but in this species, the microawns are longer (20-47 µm long) with longer basal cells (8-17.5 µm long). Furthermore, the ITS sequences from these two species are also different.

Thozetella paragigantea W.P. Wu & Y.Z. Diao, sp. nov., Figs. 244-245, MycoBank MB841650.

Etymology: refers its similarity to *Thozetella gigantea*.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of identified trees, 10 Aug. 2018, Yu Zhang (Holotype WFH Wu15205; ex-type strains CGMCC 3.20727 = NN 76039).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, sessile, cream, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a cylindrical to ellipsoid or ovoid shaped white mass of conidia and microawns, stroma up to 50-70 µm high, and up to 50 µm wide. Conidiophores macronematous, pale brown to brown, irregularly cylindrical, branched, thin- and smooth-walled, arising from a basal plate, 35-45 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, pale brown,

irregularly cylindrical to ellipsoid, with no or minute collarete, periclinal wall thickened, 10-12 x 2-2.5 µm, tapering towards the apex, apex 1 µm wide. Microawns produced from conidiophores, predominantly L-shaped, hyaline, smooth, (37-)60-120 µm long; basal part thin-walled, aseptate, sometime collapsed, 25-30 µm long, 2-3 µm wide; apical part cylindrical, smooth and thick-walled, apical part smooth and with a rounded apex, 20-80 x 1.5-1.8 µm. Conidia falcate to lunate, aseptate, finely guttulate, hyaline and smooth, 12.5-13.5 x 2.5 µm, with one filiform setula at each end, 5-7 µm long.

Colonies on PDA effuse, colonies 1.8-2.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey to brown in the center, with pale colored margin, reverse dark brown in the center and becoming paler towards the margin.

Material examined: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of identified trees, 10 Aug. 2018, Yu Zhang (Holotype WFH Wu15205); China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of identified trees, 12 June 2015, W.P. Wu (Wu13346). Living strain: 59019 and 59024 (from Wu13346), ex-type strains 76039, 76082 (from Wu15205).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella paragigantea* W.P. Wu & Y.Z. Diao resembles *T. cubensis* R.F. Castañeda & G.R.W. Arnold and *T. gigantea* B.C. Paulus, Gadek & K.D. Hyde in L-shaped microawn (Castañeda-Ruiz and Arnold 1985b; Mercado Sierra et al. 1997; Paulus et al. 2004; Silva and Grandi 2013). *T. paragigantea* differs from *T. gigantea* by much longer microawns (71-280 µm) and big conidia (14-18 x 2.5-3 µm) in *T. gigantea*; differs from *T. cubensis* by microawns with acute apex and longer conidia (11-17 x 2-2.5 µm) in *T. cubensis*.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu15205, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in Chaetosphaeriaceae, including *Thozetella gigantea* (GeneBank AY331002, identities 445/457 (97%), 4 gaps (0%)), *Thozetella pindobacuensis* (GeneBank MH595849, identities 441/456 (97%), 2 gaps (0%)), *Thozetella acerosa* (GeneBank AY330996, identities 438/457 (96%), 3 gaps (0%)), *Thozetella pandanicola* (GeneBank NR168203, identities 438/460 (95%), 7 gaps (1%)), *Thozetella lithocarpi* (GeneBank NR164037, identities 426/444 (976%), 5 gaps (1%)), *Thozetella boonjiensis* (GeneBank AY330995, identities 434/457 (95%), 5 gaps (1%)).

Thozetella pinicola S.Y.Q. Yeung, R. Jeewon & K.D. Hyde, Can. J. Micro. 55: 681, 2009.

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid, or otherwise shaped white mass of conidia and microawns, 60-75 µm high. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 3-4 µm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1-3 septate, compact at base, more or less free toward the upper part of sporodochia, thin- and smooth-walled, 25-32 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 8.5-10 x 2-2.5 µm. Microawns produced from conidiophores, predominantly sigmoid, falcate, strongly curved, hyaline, smooth, 30-55 µm long; basal part subcylindrical, ellipsoid, lageniform, smooth- and thin-walled, 2.5-3.5 µm wide; apical part thick-walled, 1-1.5 µm, with an acute apex. Conidia lunate to fusiform, aseptate, hyaline, multi-guttulate, smooth- and thin-walled, 11-13 x 2-2.5 µm, provided with a single filiform setula at each end, 6-7 µm long.

Material examined: China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaf of *Areca* sp., 10 Dec 2013, W.P. Wu (12639b, 12639a); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of unidentified tree, 25 Dec. 2012, W.P. Wu (Wu12480); China: Guangdong Province, Guangzhou, South China Agriculture University, on dead leaves of unidentified tree, 3 Dec. 2018, W.P. Wu (Wu16360, 1Wu16361, Wu16366); China: Guangdong Province, Guangzhou, Yuexiu Garden, on dead culm of bamboo, 2 March 2012, W.P. Wu (WU12221); China: Guangdong Province, Dinghushan, on dead leaves of *Smilax* sp., 10 Oct. 1998, W.P. Wu (WU1937b); China: Guangdong Province, Guangzhou, South China Botanical Garden, on dead leaves of *Manglietia pachyphylla*; 28 Feb. 2016, W.P. Wu (Wu12725); China: Guangdong Province, Shenzhen, Lianhuashan, on dead fruit of unidentified tree, 11 Nov. 2019, W.P. Wu (Wu17258); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead fruit of *Cyclobalanopsis* sp., 25 Aug. 2019, W.P. Wu (Wu16809a, Wu16877, Wu16883); China: Sichuan Province, Ya An, Wan Guan, Bi Feng Xia, on dead leaves of identified trees, 15 Dec. 2013, W.P. Wu (Wu13193); China: Zhejiang Province, Huaian County, Qiandaohu, on dead leaves of unidentified tree, 18 Oct. 2018, W.P. Wu (Wu16055); Japan: Mie Prefecture, Tsu, Mie Center for the Arts, on dead leaves of unidentified tree, 2 Oct. 2019, W.P. Wu (Wu16920, Wu16922); Japan: Mie Prefecture, Tsu, Tsukairaku Park, on rotten seed of unidentified tree, 2 Oct. 2019, W.P. Wu (Wu16929). Living strain: 54236 (from Wu12221), 44784 (from Wu1937b), 57541 (from Wu13193), 57594 (from Wu12639a), 55292 (from Wu12480), 57612 (from Wu12639), 76211 (from Wu16055), 77119, 77120 and 77157 (from Wu16809), 77211 and 77161 (from Wu16877), 77215 (from Wu16883), 77270 (from Wu17258), 77272 and 77273 (from Wu16920),

77276 and 77350 (from Wu16929), 77280 (from Wu16946), 77325 and 76658 (from 16360), 76659 (from Wu16361), 76667 (from Wu16366)..

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Jeung, Jeewon and Hyde (2009).

Notes: *Thozetella pinicola* S.Y.Q. Yeung, R. Jeewon & K.D. Hyde was originally described from the isolate obtained from the leaf litter of *Pinus elliotti* from Hongkong, China (Yeung et al. 2009). It most closely resembles *Thozetella falcata*, *Thozetella gigantea* and *Thozetella nivea*, but can be distinguished by its distinct shape of microawns. The type material seems to be in bad shape from which no microawn was observed and only a few conidia were seen by Silva and Grandi (2013).

In the original description of *T. pinicola*, the size of conidia produced from pure culture was described as 12.5–19.5 µm long, 5–6.3 µm wide, bearing a long seta at either end, 7–11 µm long. Much smaller conidia were observed in the specimens on natural substrate collected from mainland China, they are 11–13 x 2–2.5 µm and 6–7 µm long setulae. The ITS sequences from those collections are identical to the one obtained from the type specimen (Jeewon et al. 2009).

Thozetella pseudotocklaiensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 246–247, MycoBank MB841651.

Etymology: refers its similarity of microawns to the other species *T. tocklaiensis*.

Typification: China: Hainan Province, Sanya, Yalongwan Park, on dead seed pod of *Delonix regia*, 28 Dec. 2020, W.P. Wu (Holotype WFH Wu17596; ex-type strain CGMCC 3.20762 = NN 78410).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2.5–4 µm wide, 65–90 µm high. Conidiophores macronematous, brown at the basal part, becoming pale brown toward apex, irregularly cylindrical, branched, 2–3 septate, compact at base, more or less free toward of upper part of sporodochia, 40–60 x 2–2.5 µm. Conidiogenous cells monophialidic, lageniform, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, collarettes inconspicuous, periclinal wall thickened, 10–13 x 1.5–2.5 µm. Microawns produced from conidiogenous cells, awn-like, sigmoid, fusiform, vermiform-shaped, curved or almost straight, recurved, 1-septate, thin- and smooth-walled, 20–47 µm long; basal cell thin- and smooth-walled, easily collapsed, 8–17.5 x 3–3.5 µm; apical cell curved, recurved, tapering towards the obtuse apex, verruculose, narrowed towards the apex. Conidia fusiform, curved, aseptate, hyaline, guttulate, smooth, 10–13 x 2 µm, provided with a single filiform setula at each end, 4–5 µm long. On PDA, the microawns is in similar morphology as observed on natural substrate, 17–20 x 2.5–3 µm; conidia lunate, fusiform, aseptate, 13–15 x 2 µm, bearing one setula at each end, 5–6.5 µm long.

Colonies on PDA effuse, colonies 1.5–2.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium abundant at beginning, then disappeared, not only restricted to the inoculation block, white to grey in the center, brown towards the margin, reverse dark brown.

Material examined: China: Hainan Province, Sanya, Yalongwan Park, on dead seed pod of *Delonix regia*, 28 Dec. 2020, W.P. Wu (Holotype WFH Wu17596). Living strains: ex-type strain NN 78410, 78411, and 78443 (all from the specimen 17596).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella pseudotocklaiensis* W.P. Wu & Y.Z. Diao resembles *T. canadensis* Nag Raj and *T. effusa* B. Sutton & T.G. Cole on verruculose microawns, but differs from them by strongly curved microawns and smaller conidia (Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Seifert et al. 2011; Silva and Grandi 2013; Monteiro et al. 2016; Perera et al. 2016). It is phylogenetically closely related to *Thozetella tocklaiensis* (Agnihotr.) Piroz. & Hodges, but clearly differs on morphology of microawns and conidia.

Thozetella rivularis (Réblová & J. Fourn.) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841735.

≡ *Chaetosphaeria rivularia* Réblová & J. Fourn., Fung. Div. 75: 145, 2015.

Typification: France: Midi-Pyrénées, Ariège, Rimont, Grand Bois forest, Maury brook, 650 m a.s.l., submerged wood of *Fagus sylvatica* associated with *Minutisphaera japonica*, 17 November 2009, J. Fournier J.F. 09308 (PRM 933847, holotype); ex-type living culture CBS127686.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: France.

Description and illustration: Ariyawansa et al. (2015).

Notes: *Chaetosphaeria rivularia* Réblová & J. Fourn. is transferred into *Thozetella*, based on both morphological similarity and phylogenetical analysis. On PCA, the ageing culture from single ascospore produced *Thozetella*-like sporodochia with microawns and falcate, setouse conidia. In the phylogenetic tree generated from

the combined LSU and ITS data, *C. rivularia* is clustered together with all other species of *Thozetella*. It is the only *Thozetella* species with teleomorph known so far (Ariyawansa et al. 2015).

Thozetella septata W.P. Wu & Y.Z. Diao, sp. nov., Fig. 249, MycoBank MB841652.

Etymology: refers to its septate microawns.

Diagnosis: Similar to *Thozetella guozhongii* in shape and size of microawns and conidia, but differs in microawns with diversified shapes such as awn-shaped, sigmoid, verm-shaped, and also ITS sequences.

Typification: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead petiole of unidentified palm tree, 17 Oct. 2020, W.P. Wu (Holotype WFH Wu17454; ex-type strain CGMCC 3.20756 = NN 78221).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells, 20-35 µm high, 30-40 µm wide; basal stroma composed of pale to medium brown, irregular cells 1.5-2.5 µm diam. Conidiophores macronematous, brown at the basal part, becoming pale brown toward apex, irregularly cylindrical, branched, 1-2 septate, compact at base, more or less free toward of upper part of sporodochia, 18-32 x 2.5-3.5 µm, terminated with a phialide. Conidiogenous cells monophialidic, cylindrical, integrated, determinate, terminal, light brown to subhyaline, collarettes inconspicuous, periclinal wall thickened, 8-12 x 2-2.5 µm. Microawns produced from conidiogenous cells, verm-shaped, sigmoid, awn-shaped, curved or almost straight, recurved, 1-septate, thin- and smooth-walled, 18-27.5 x 3-3.8 µm; basal cell thin- and smooth-walled, easily collapsed, 5-12 (-18) x 2.5-3.6 µm; upper part curved, sometimes recurved, tapering towards the obtuse apex, smooth or slightly verruculose, narrowed towards the apex, 2.5-3.8 µm wide. Conidia fusiform, curved, or almost straight, aseptate, hyaline, guttulate, smooth, 10-12 x 1.8-2.2 µm, provided with a single filiform setula at each end, 3-6.5 µm long.

Colonies on PDA effuse, colonies 1.8-2.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Guangdong Province, Shenzhen, Yangtaishan Forest Park, on dead petiole of unidentified palm tree, 17 Oct. 2020, W.P. Wu (Wu17454). Living strain: 78221 and 78222 (from Wu17454).

Ecology/Substrate/Host: Saprobe on dead material of palm.

Geographical distribution: China.

Notes: *Thozetella septata* is similar to *T. guozhongii* in curved and 1-septate microawns in similar size and with verruculose wall in the upper part. However, the microawns in *T. septata* are more variable in size and also shapes (awn- or verm-shaped, sigmoid). Furthermore, the ITS sequences from the ex-type strain is also different from *T. guozhongii*. *T. septata* also resembles *T. pinicola* in shape and size of microawns, but differs by smaller-sized basal cells. In addition to that, phylogenetically they can be easily distinguished.

Thozetella suttonii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 250, MycoBank MB841653.

Etymology: named after the British mycologist, Brian C. Sutton, also the PhD supervisor for one of the authors in this work (Wu).

Typification: China: Guangdong Province, Zhaoqing, Dinghushan, on dead branches of unidentified plant, 10 Oct. 1998, W.P. Wu (Holotype WFH Wu1940b; ex-type strain CGMCC 3.20637 (=NN 44785).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears a globose, ovoid, or otherwise shaped white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2-4 µm wide, up to 200 µm high, 110 µm wide. Conidiophores macronematous, brown at the basal part, becoming pale brown toward apex, irregularly cylindrical, branched, 2-3 septate, compact at base, more or less free toward of upper part of sporodochia, 40-50 x 2-2.5 µm, sounded by brown and hairy hyphae. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown to subhyaline, irregularly cylindrical, without collarettes, periclinal wall thickened, 13-16 x 2-3 µm. Microawns absent. Conidia fusiform, curved, continuous, hyaline, guttulate, smooth, 17-20 x 2.5-3 µm, provided with a single filiform setula at each end, 10-14 µm long.

Colonies on PDA effuse, colonies 2.5-2.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse very pale-yellow brown in the center and becoming paler towards the margins.

Material examined: China: Guangdong Province, Dinghushan, on dead branches of unidentified plant, 10 Oct. 1998, W.P. Wu (Holotype WFH Wu1940b). Living strain: ex-type strain CGMCC 3.20637 (=NN 44785).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella suttonii* W.P. Wu & Y.Z. Diao is unique in lacking microawn, thus not a typical member of the genus. However, the phylogenetic analysis based on the combined LSU and ITS sequence showed its close relationship with *Thozetella* (Castañeda-Ruiz and Arnold, 1985b; Paulus et al. 2004; Seifert et al. 2011; Silva and Grandi 2013; Monteiro et al. 2016; Perera et al. 2016).

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including *Thozetella queenslandica* (GeneBank AY330998, identities 422/443 (95%), 1 gap (0%)), leaf litter ascomycete strain (GeneBank AF502902, identities 422/446 (95%), 7 gaps (1%)), *Thozetella gigantea* (GeneBank AY331002, identities 417/446 (93%), 6 gaps (1%)), *Thozetella falcata* (GeneBank AY330999, identities 417/446 (93%), 7 gaps (1%)).

Thozetella tocklaiensis (Agnihotr.) Piroz. & Hodges, Can. J. Bot. 51: 171, 1973. Fig. 251

≡ *Thozetellopsis tocklaiensis* Agnihotr., Mycologia 50: 576 (1958)

= *Neottiosporella radicata* E.F. Morris, Mycologia 48: 735 (1956)

= *Thozetella radicata* (E.F. Morris) Piroz. & Hodges, Can. J. Bot. 51: 172, 1973

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial or effuse, solitary, pale brown to brown, up to 350 µm high and 250 µm wide; basal stroma pale brown to brown, fan-shaped, with narrow base and broad sporulating region. Conidiophores cylindrical, pale brown, 1-3-septate, smooth- and thin-walled, branched, terminated with a conidiogenous cell, 20-35 x 2-2.5 µm. Conidiogenous cells phialidic, pale brown to hyaline, cylindrical, monophialidic, 10-15 x 2-3 µm, collarette inconspicuous. Conidia lunate, fusiform, naviculate, hyaline, aseptate, guttulate, 11-13 x 2-2.5 µm, provided with a single setula at each end and 4-6.5 µm. Microawns awn-like, claw-like, curved, strongly recurved, hyaline, refractive, aseptate, 11-15 µm long, verruculose; basal part lageniform with lumen, thin-walled and frequently collapsed, 8-11 x 2.5-3.5 µm; apical part acuminate, curved or tortuously, thick-walled, verruculose or smooth, 10-14 x 1.3-1.5 µm.

Material examined: On dead leaves of *Acacia* sp., China: Guangdong Province, Shenzhen, Yangtaishan Park, 11 Nov. 2019, W.P. Wu (Wu17254). On dead leaves of *Acacia* sp., China: Guangdong Province, Shenzhen, Yangtaishan Park, 17 Oct. 2020, W.P. Wu (Wu17487). Living strain: 78248 and Wu78249 (from Wu17487), 77748 (from Wu171254).

Ecology/Substrate/Host: Saprobe on dead material of plants including *Camellia sinensis*.

Known distribution: Argentina, Brazil, China, India, New Zealand, Panama.

Description and illustration: Morris (1956); Agnihothrudu (1958); Pirozynski and Hodges (1973); Waipara et al. (1996); Silva and Grandi (2013).

Notes: *Thozetella tocklaiensis* was fully documented in several publications, and morphological variations on conidiomata, microawns and conidia were noticed from different specimens (Silva and Grandi 2013). The fungus from the Chinese specimen is with small-sized microawns which are strongly recurved.

Thozetella vermiformis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 252-253, MycoBank MB841654.

Etymology: refers to its verm-shaped microawns.

Diagnosis: Microawns vermiform, 1-septate; conidia fusiform curved, guttulate, smooth, 11-13 x 2-2.5 µm, setula 4-5 (-8) µm long; microconidia cylindrical, fusiform, hyaline, aseptate, eguttulate, 5-8 x 1.5 µm.

Typification: China: Sichuan Province, Dujiangyan, Qingchengshan, on rotten seed of unidentified tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17201; ex-type strain CGMCC 3.20746 = NN 77561).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2-3.5 µm wide, up to 50 µm high, basal part cylindrical, 30-40 µm wide, upper part up to 50 µm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1-4 septate, compact at base, more or less free toward of upper part of sporodochia, 32-50 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, 10-15 x 2-2.3 µm, without collarettes or inconspicuous, periclinal wall thickened, apex 1-1.5 µm. Conidia fusiform, curved, continuous, hyaline, guttulate, smooth, 11-13 x 2-2.5 µm, provided with a single filiform setula at each end, 4-5 (-8) µm long. Microconidia cylindrical, fusiform, hyaline, aseptate, eguttulate, 5-8 x 1.5 µm. Microawns produced from conidiogenous cells, vermiform-shaped, curved, recurved, slightly tapered towards both ends, 1-septate, 16-23 x 3-3.2 µm; basal cells cylindrical, thin- and smooth-walled, 7.5-14 x 2.5-2.8 µm, with obtuse or truncated base; apical cells verruculose, with obtuse apex.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: On dead leaves of identified trees, China: Sichuan Province, Ya An, Wan Guan, Bi Feng Xia, 15 Dec 2013, W.P. Wu (Wu13258); China: Sichuan Province, Dujiangyan, Qingchengshan, on rotten seed of unidentified tree, 9 Nov. 2019, W.P. Wu (Wu17201 holotype, 17200). Living strain: CGMCC 3.20656 (=57578) and 57596 (from Wu13258), 77559 and 77560 (from Wu17200), 77561 (from Wu17201).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella vermiformis* morphologically differs from other known species in the genus by a combination of vermiform-shaped microawns, falcate conidia, and production of microconidia (Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Silva and Grandi 2013; Monteiro et al. 2016; Perera et al. 2016). Morphologically, *T. queenslandica* B.C. Paulus, Gadek & K.D. Hyde and *E. canadensis* Pirozy. & Hodges are the two most closely related species with *T. vermiformis*, all produce hamate-shaped microawns. However, in *T. canadensis*, the microawns are aseptate and with a verrucose apex, while in *T. queenslandica*, the microawns are slightly wider.

Phylogenetically, on a megablast search using the ITS sequence from the Chinese collection Wu15209, the closest matches in NCBI's GenBank nucleotide database were members of *Thozetella* and *Menispora* in *Chaetosphaeriales*, including uncultured fungus clone (GeneBank KT224952, identities 542/562 (96%), 6 gaps (1%)), many unnamed *Thozetella* species (including GeneBank KU059907, identities 535/559 (96%), 8 gaps (1%)), *Thozetella fabacearum* (GeneBank KY212754, identities 518/552 (94%), 14 gaps (2%)), *Thozetella tocklaiensis* (GeneBank MH857817, identities 456/471 (97%), 2 gaps (1%)).

***Thozetella wenyingiae* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 254, MycoBank MB841655.**

Etymology: named after the Chinese mycologist Prof. Wenying Zhuang.

Typification: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Zhang Yu (Holotype WFH Wu15209; ex-type strain CGMCC3.20655 (=NN 76043)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2-4 µm wide, up to 45 µm high, basal part cylindrical, 30-45 µm wide, upper part up to 50 µm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1-3 septate, compact at base, more or less free toward of upper part of sporodochia, 45-55 x 1.5-2 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, 13-18 x 1.5-2 µm, without collarettes or with inconspicuous collarettes, periclinal wall thickened, apex 1-1.5 µm. Conidia fusiform, curved, continuous, hyaline, guttulate, smooth, 11-14.5 x 2-2.5 µm, provided with a single filiform setula at each end, 5.5-7 µm long. Microawns produced from conidiogenous cells, vermiform-shaped, curved, recurved, gradually tapered towards both ends, 0-1-septate, 15-20 x 3.3-3.8 µm; basal cells very short, thin- and smooth-walled, 3-5 µm long, with obtuse or truncated base; apical cells verruculose, with obtuse apex.

Colonies on PDA effuse, colonies 1.3-.6 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse soil to dark brown in the center and becoming paler towards the margins.

Material examined: China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Zhang Yu (Wu15209, holotype); China: Yunnan Province, Jinghong, Xishuangbanna, on dead leaves of unidentified tree, 12 June 2018, Zhang Yu (Wu15233). Living strain: 76012 (from YN03a), ex-type strain CGMCC3.20655 (=NN 76043, from Wu15209), 76044 (from Wu15209b), 76045 (from Wu15209c).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Thozetella wenyingiae* morphologically resembles *T. vermiformis* in shape and size of microawns and conidia, but differs in lacking microconidia, smaller-sized basal cell of microawns, and also ITS sequence. It also differs from other known species in the genus by a combination of vermiform microawns and falcate conidia with setulae (Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Silva and Grandi 2013; Monteiro et al. 2016; Perera et al. 2016).

***Thozetella ypsiloidea* J.S. Monteiro, R.F. Castañeda & Gusmão, Mycotaxon 131:608, 2016. Fig. 390.**

Teleomorph: Not observed. Anamorph: Colonies on natural substrate cream-colored. Mycelium partly immersed and partly superficial, composed of dark brown, septate, and branched hyphae. Conidiomata sporodochial, superficial, cream to white, forming a flat or convex hymenium on a dark brown, stromatic base, which bears an ovoid to cylindrical, white mass of conidia and microawns. Basal stroma dark brown, composed of dark brown, irregularly shaped cells of 2-3.5 µm wide, up to 60 µm high, basal part cylindrical, 30-40 µm wide, upper part up to 50 µm wide. Conidiophores macronematous, brown, irregularly cylindrical, branched, 1-3 septate, compact at base, more or less free toward of upper part of sporodochia, 30-50 x 2-3 µm. Conidiogenous cells monophialidic, integrated, determinate, terminal, light brown, cylindrical, 12-20 x 2-2.5 µm, without collarettes or inconspicuous, periclinal wall thickened, apex 1-1.5 µm. Conidia lunate, fusiform, curved, continuous, hyaline, guttulate, smooth, 11-15 x 2-3 µm, provided with a single filiform setula at each end, 5-8 µm long. Microawns produced from conidiogenous cells, Y-shaped, finally verrucose on arm which has rounded apex and partially verrucose or smooth on the other arm, partially smooth on stipe, hyphae, 12-22 x 8-13 µm, 2-4 µm at the base.

Typification: On unidentified submerged leaves, Brazil: Pará State, Área de Proteção Ambiental Ilha do Combu, 18 Oct. 2011, J.S. Monteiro (HUEFS186464).

Material examined: Puerto Rico, on dead leaves of unidentified tree, 18 July 2018, W.P. Wu (Wu15159). Living strain: 75994 and 75996 (from Wu15159).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Brazil, Potro Rico.

Description and illustration: Monteiro et al. (2016).

Notes: *Thozetella ypsiloidea* morphologically differs from all other known species in the genus by its Y-shaped microawns (Castañeda-Ruiz and Arnold 1985b; Paulus et al. 2004; Barbosa et al. 2011; Silva and Grandi, 2013; Monteiro et al. 2016; Perera et al. 2016). Phylogenetically, on a megablast search using the ITS sequence from the collection Wu15159, the closest matches in NCBI's GenBank nucleotide database were *Thozetella ypsiloidea* (GeneBank KJ183031, identities 455/455 (100%), 0 gap (0%)), *Thozetella fabacearum* (GeneBank KY212754, identities 519/551 (94%), 13 gaps (2%)).

Verhulstia Hern.-Rest., Persoonia 39: 449, 2017

Teleomorph: Unknown. Anamorph: Conidiomata sporodochial, scattered to gregarious, superficial, hyaline becoming brown with age, globose, setose with a central white conidial mass, basal stroma of textura angularis. Setae arising from outer elements of the stroma, abundant, subulate to subcylindrical, basal cell pale brown, other cells brown to dark brown, apex paler, rounded, verrucose to warty, straight to flexuous, multiseptate. Conidiophores arising from the stroma in dense layers, unbranched, cylindrical, septate, hyaline to pale brown toward the apex. Conidiogenous cells integrated, terminal, lageniform to subcylindrical, phialidic with a collarette, hyaline to pale brown. Conidia cylindrical to ellipsoidal, or obovoid, curved at the apex, aseptate, hyaline, smooth.

Type species. *Verhulstia trisororum* Hern.-Rest.

Ecology/Substrate/Host: Saprobe from soil or on dead material of plant.

Geographical distribution: China, Netherland.

Description and illustration: Crous et al. (2017).

Notes: *Verhulstia* Hern.-Rest. was created for a setose sporodochial microfungus, *V. trisororum* Hern.-Rest., isolated from soil sample in Netherland (Crous et al. 2017). It was compared with *Dinemasporium*, *Brunneodinemasporium*, *Pseudolachnea* and *Vermiculariopsiella* in producing setose conidiomata with phialidic conidiogenous cells, and hyaline conidia, but distinguished from all of them in having hyaline, lageniform conidiogenous cells that eventually become brown with age, with a conspicuous collarette and conidia without setulae. Furthermore, the phylogenetic analysis based on ITS and 28S sequences from the type species (strain CBS143234) showed it formed a separate branch close to species of *Chaetosphaeria* with *Chloridium*-like anamorph, including *C. lignicola* (F. Mangelot) W. Gams & Hol.-Jech. and *C. pini* Crous & Akulov.

In our phylogenetic study (Figs. 4, 255, 256), several isolates representing 3 different species of *Verhulstia* from China, are clustered together with *V. trisororum* Her.-Restr. and form a distinct clade with strong support.

Verhulstia biformis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 256e, f, 257, MycoBank MB841656.

Etymology: refers to two different types of conidia produced by this fungus.

Typification: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of *Rubus* sp., 17 Oct 2019, W.P. Wu (Holotype WFH Wu17174; ex-type strain CGMCC 3.20749 = NN 77655) and 77689).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, scattered to gregarious, superficial, ellipsoidal to cylindrical, setose with a central white conidial mass, 60-100 µm wide, 50-75 µm high, basal stroma of textura angularis. Setae arising from basal stroma, distributed among conidiophores, 10-13 per sporodochia, subcylindrical, apex acute, straight to flexuous, 120-210 µm long, 3.7-4.5 µm wide at the widest part, 4-7-septate, the thin-walled basal cell pale brown and 12-17 x 3-3.5 µm, other cells brown to dark brown, smooth, tapering towards the apex 1-2 µm wide at apex. Conidiophores arising from the stroma in a dense layer, branched, cylindrical, septate, pale brown, darker toward the apex, 35-55 x 1-1.5 µm. Conidiogenous cells integrated, terminal, lageniform to subcylindrical, monophialidic, with an inconspicuous collarette, subhyaline to pale brown, 8-11 µm long, 1-1.5 µm wide. Conidia cylindrical to ellipsoidal, straight or slightly curved in one end, with rounded or truncate ends, hyaline, aseptate, thin-walled, smooth, 4.5-5 x 1.2-1.6 µm, guttulate with one at each end; the second type conidia, which is fusiform, asymmetrical, with one end obtuse and tapering toward other end, 8-12 x 1.2-2 µm, are also seen among the other.

Colonies on PDA effuse, colonies 0.5-0.8 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, dark grey to brown, with white margins, reverse pale brown in the center and becoming paler towards the margins.

Material examined: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of *Rubus* sp., 17 Oct 2019, W.P. Wu (Holotype WFH Wu17174); China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of *Rubus* sp., 17 Oct 2019, W.P. Wu (Wu17175). Living strain: 77656 and 77657 (from Wu17175), ex-type strain NN 77655 and 77689.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Verhulstia bififormis* W.P. Wu & Y.Z. Diao differs from *V. trisororum* Hern.-Rest. by fewer setae per sporodochia, and production of two types of conidia. The short cylindrical conidia (4.5-5 x 1.2-1.6 µm) in *V. bififormis* is similar in shape but smaller than those in *V. trisororum* (cylindrical to ellipsoidal, 5-7 x 1-2 µm; or obovoid, 5-8 x 2-3 µm) (Crous et al. 2017). Both LSU and ITS sequences were obtained from the type specimen and its phylogenetic affinity to *Verhulstia* and other genera in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the collection Wu17174, the closest matches in NCBI's GenBank nucleotide database was members of *Verhulstia*, including *Verhulstia trisororum* (GeneBank MG022181, identities 428/454 (94%), 9 gaps (1%)).

Verhulstia elegans W.P. Wu & Y.Z. Diao, sp. nov., Figs. 256, h, 258, MycoBank MB841657.

Etymology: *elegans* (L), beautiful, refers to it beautiful sporodochia.

Typification: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified broadleaf tree, 17 Oct 2019, W.P. Wu (Holotype WFH Wu17163; ex-type strain CGMCC 3.20803 (=NN 77590)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, scattered to gregarious, superficial, ellipsoidal to cylindrical, setose with a central white conidial mass, 30-55 µm wide, 40-60 µm high, basal stroma of textura angularis. Setae arising from basal stroma, distributed among conidiophores, less than 5 per sporodochia, subcylindrical, apex rounded, straight to flexuous, 100-155 µm long, 3.5-5.5 µm wide at the widest part, septate, the thin-walled basal cell pale brown and 12.5-17 x 4-6 µm, other cells brown to dark brown, smooth, tapering towards the apex 1.2-1.5 µm wide at rounded apex. Conidiophores arising from the stroma in a dense layer, branched, cylindrical, septate, pale brown, darker toward the apex, 40-60 x 1.5-2 µm. Conidiogenous cells integrated, terminal, lageniform to subcylindrical, monophialidic, with an inconspicuous collarette, subhyaline to pale brown, 8-12 x 1.5-2 µm. Conidia cylindrical, straight or slightly curved in one end, with rounded or truncate ends, hyaline, aseptate, thin-walled, smooth, 3.2-4.8 x 1.5-2 µm, guttulate with one at each end.

Colonies on PDA effuse, colonies 0.8-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse pale to yellow brown in the center and becoming paler towards the margins.

Material examined: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified broadleaf tree, 17 Oct 2019, W.P. Wu (Holotype WFH Wu17163). Living strains: 77590 (ex-type strain), 77591 and 77688.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Verhulstia elegans* W.P. Wu & Y.Z. Diao differs from *V. trisororum* Hern.-Rest. by fewer setae per sporodochia, and smaller conidia (Crous et al. 2017). The short cylindrical conidia in *V. elegans* is similar in shape but smaller than those in *V. trisororum* (cylindrical to ellipsoidal, 5-7 x 1-2 µm; or obovoid, 5-8 x 2-3 µm) (Crous et al. 2017). Both LSU and ITS sequences were obtained from the type specimen and its phylogenetic affinity to *Verhulstia* and other genera in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the collection Wu17163, the closest matches in NCBI's GenBank nucleotide database was *Verhulstia trisororum* (GeneBank MG022181, identities 419/438 (96%), 4 gaps (0%)).

Verhulstia minima W.P. Wu & Y.Z. Diao sp. nov., Figs. 256-v, 259, MycoBank MB841658.

Etymology: refers to its small conidia.

Typification: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified broad leaf tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17227; ex-type strain CGMCC 3.20674 (=NN 77723)).

Teleomorph: Not observed. Anamorph: Conidiomata sporodochial, scattered to gregarious, superficial, brown, globose to ellipsoid, setose with a central white conidial mass, basal stroma of textura angularis. Setae arising from the cell of basal stroma, 9-13 per sporodochia, basal cell pale brown, other cells brown to dark brown, subulate to subcylindrical, apex rounded, smooth, straight, multiseptate, 140-210 µm long, 3.5-4 µm wide in the middle, basal cell 20-27 x 3.5-4.5 µm, tapering toward the 1-2 µm wide apex. Conidiophores arising from the stroma in a dense layer, branched, cylindrical, septate, pale brown, 25-35 x 1.5-2 µm. Conidiogenous cells integrated, terminal, lageniform to subcylindrical, phialidic with an inconspicuous collarette, subhyaline to pale brown, 8-11 x 1.5-2 µm long. Conidia ellipsoidal, cylindrical, 2.5-3.5 x 1.5 µm, straight or slightly curved, hyaline, aseptate, smooth, guttulate, rounded or slightly truncate at both ends.

Colonies on PDA effuse, colonies 0.5-0.7 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white then slightly grey to pale brown, reverse soil brown in the center and becoming paler towards the margins.

Material examined: China: Sichuan Province, Dujiangyan, Qingchengshan, on dead leaves of unidentified broad leaf tree, 9 Nov. 2019, W.P. Wu (Holotype WFH Wu17227). Living strains: ex-type strain CGMCC 3.20674 (=77723), 77720, and 77724 (all from the holotype specimen Wu17227).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Verhulstia minima* W.P. Wu & Y.Z. Diao differs from other species in the genus by smaller conidia (Crous et al. 2017). Both LSU and ITS sequences were obtained from the type specimen and its phylogenetic affinity to *Verhulstia* and other genera in *Chaetosphaeriaceae* was confirmed. Phylogenetically, on a megablast search using the ITS sequence from the collection Wu17175, the closest matches in NCBI's GenBank nucleotide database was *Verhulstia trisororum* (GeneBank MG022181, identities 440/449 (98%), 2 gaps (0%)).

Coelomycetous anamorphs of phialidic chaetosphaeriaceous fungi

A total of 12 coelomycetous genera are assigned to *Chaetosphaeriaceae*, including *Brunneodinemasporium* Crous & R.F. Castañeda, *Calvolachnella* Marinc., T.A. Duong & M.J. Wingf., *Conicomycetes* R.C. Sinclair, Eicker & Morgan-Jones, *Dendrophoma* Sacc., *Dinemasporium* Lev., *Hoehneliella* Bres. & Sacc., *Infundibulomyces* Plaingam, Somrith. & E.B.G. Jones, *Neopseudolachnella* A. Hashim. & Kaz. Tanaka, *Polynema* Lév., *Pseudodinemasporium* A. Hashim. & Kaz. Tanaka, *Pseudolachnea* Ranoj. and *Pseudolachenlla* Teng (Lin et al. 2019; Hashimoto et al. 2015a, b; Crous & Groenewald 2018; Li et al. 2020). Some other genera, including *Dwayalomella* Brisson, Piroz. & Pauze and *Plectronidiopsis* Nag Raj., are morphologically closely related to these assigned genera, but future phylogenetic analysis is needed to elucidate their relationship.

Conidiomata from almost all these genera are superficial, stromatic, acervular or cupulate. Conidiomatal setae, from basal stroma or excipula and presumed to contribute to conidial dispersal by trapping water drops as well as preventing small arthropods from feeding on the conidial mass (Nag Raj 1981, 1993), are found from almost all genera except for *Calvolachnella* and *Infundibulomyces*. Species in all these genera produces hyaline or very pale brown-colored conidia bearing 1 to several setulae, potentially enhancing fungal encounter with substrata by increasing the functional length of conidia (Nag Raj 1993).

The result from our phylogenetic analysis (Fig. 3) shows that all the coelomycetous genera are monophyletic (Crous et al. 2012; Hashimoto et al. 2015a, b). All species of *Pseudolachnea* and *Pseudolachnella* are clustered together as one strongly supported group, which is phylogenetically closely related to another well-supported group including *Brunneodinemasporium*, *Neopseudolachnella*, and *Pseudodinemasporium*. While the genus *Dinemasporium* is more closely related to *Menispora*.

Dinemasporium-like genera

Several genera with a morphological resemblance to *Dinemasporium* Lév. are known, including *Diarimella* B. Sutton, *Dwayalomella* Brisson, Pirozy. & Pauze, *Polynema* Lév. And *Stauronema* (Sacc.) Sydow (Sutton 1980; Nag Raj 1993). These genera share some similarity on morphology, such as acervular or cupulate and setose conidiomata which are closed at first and open at maturity exposing a slimy conidial mass, phialidic conidiogenous cells and one-celled conidia having setulae appendages at both ends and sometimes also lateral. They are delimited by morphological characters of conidiomata and conidia, which has been shown to be problematic (Léveillé 1846; Agnihothrudu, 1958, 1963a, Sutton 1980; Nag Raj and Kendrick 1986; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a; Li et al. 2020).

The insert position and number of appendages in conidial has historically been used as one of the important characters to delimit some of these genera. For example, Saccardo (1884) divided *Dinemasporium* into two subgenera on the basis of conidial appendages: *Eu-Dinemasporium* comprising species with bipolar appendaged conidia (incl. the type species *D. graminum* (Lib.) Lév.) and *Stauronema* Sacc. for species having conidia with bipolar and lateral appendages (including *D. platense* Speg. and *D. cruciferum* Ellis; Sydow et al. (1916) raised *Stauronema* to generic rank. *Polynema* differs from *Dinemasporium* and *Stauronema* by producing similar conidia with 1 apical and 3-5 basal appendages (Nag Raj 1993). However, Crous et al. (2012) assessed the phylogeny of *Dinemasporium* and its allied genera based on the sequences of nuclear ribosomal internal transcribed spacer (ITS) and nuclear large subunit (LSU) ribosomal RNA gene regions; they concluded that the circumscriptions of *Dinemasporium* and *Stauronema* placing emphasis on their conidial appendage features were artificial, and that the two genera were congeneric. Consequently, *Stauronema* was reduced to a synonym of *Dinemasporium*, even though the type species of *Stauronema* (*S. cruciferum* (Ellis) Syd. et al.) was not examined in their analyses (Crous et al. 2012). This was further confirmed by the phylogenetic analysis with additional species including the type species *S. cruciferum* (Ellis) Syd., P. Syd. & E.J. Bulter (Hashimoto et al., 2015a; Fig. 260). Furthermore, Hashimoto et al. (2015a), based on phylogenetic analysis of species highly consistent with *Diarimella* B. Sutton, also treated *Diarimella* as the synonym of *Dinemasporium*. *Polynema*, based on phylogenetic analysis of a new species *P. podocarpi* Crous & Thangavel, has been confirmed to be an independent genus from *Dinemasporium*.

(Crous and Groenewald 2018). Phylogenetic relationship of *Dwayalomella*, typified by *D. vaccinia* Brisson, Pirozy. & Pauze isolated from stems of *Vaccinium angustifolium*, remains to be studied by molecular phylogeny.

Pseudolachnea-like genera

Several genera with a morphological resemblance to *Pseudolachnea* Ranoj. are known, including *Brunneodinemasporium* Crous & R.F. Castañeda, *Dendrophoma* Sacc. *Pseudodinemasporium* A. Hashim., & Kaz Tanaka, *Conicomycetes* R.C. Sinclair, Eicker & Morgan-Jones, *Hoehneliella* Bres. & Sacc., *Neopseudolachnella* A. Hashim. & Kaz. Tanaka, *Plectronidiopsis* Nag Raj and *Pseudolachnella* Teng (Hino and Katumoto 1954, 1958, 1960, 1961; Sutton 1980; Nag Raj 1993; Hashimoto et al. 2015b). They are very similar on conidiomata (acervular or cupulate conidiomata surrounded by numerous black setae), conidial ontogeny, hyaline and septate conidia with setulae appendages at both ends, but differ on conidial septation and phylogeny (Teng 1933, 1936; Hino and Katumono 1961; Sutton 1980; Castañeda-Ruiz 1987; Nag Raj 1993; Crous et al 2012; Hashimoto et al. 2015b). Recent phylogenetic analysis showed that most of these genera are closely related, and our phylogenetic study also supports this (Fig. 397)

Pseudolachnella Teng is a genus separated from *Pseudolachnea* to accommodate a species with multiseptate conidia, *Pseudolachnea scolecospora* Teng & C.I. Shen (Teng and Ling 1933; Teng 1936). For the same reason Hino and Katumoto (1958) proposed a new genus *Chaetopatella* I. Hino & Katum. for *Pseudolachnea*-like species with phragmoconidia, probably without knowledge of the publication of *Pseudolachnella*. Sutton (1977, 1980), however, thought that conidial septation is not an important character for generic circumscription among *Pseudolachnea*, *Pseudolachnella* and *Chaetopatella* and merged the latter two genera with *Pseudolachnea*. On the other hand, Nag Raj (1993) divided *Pseudolachnea* sensu Sutton (1977, 1980) into *Pseudolachnea* with one-septate conidia and *Pseudolachnella* with multiseptate conidia and synonymized *Chaetopatella* with *Pseudolachnella*. For many years, both the broad generic concept of *Pseudolachnea* (Sutton 1977, 1980) and the narrower interpretation of *Pseudolachnea* and *Pseudolachnella* placing emphasis on the differences in conidial septation were accepted by different authors (Teng 1936; Hino and Katumoto, 1954, 1958, 1960, 1961, Castañeda-Ruiz 1987; Muthumary 1987; Nag Raj 1993; Melnik 1997; Zhao et al. 2004; Sato et al. 2008; Kirk et al. 2008; Seifert et al. 2011; Crous et al. 2012).

Conicomycetes R.C. Sinclair, Eicker & Morgan-Jones, typified by *C. transvaalensis* R.C. Sinclair, Eicker & Morgan-Jones, produces typical synnematosus and setose conidiomata with a cylindrical stalk and a slightly swollen head bearing a concave conidial hymenium which are excipulate and setose. The conidiophores are arising from the inner elements of the stalk and lining the cavity of the conidiomata, hyaline, simple or branched, septate and terminating with a phialidic conidiogenous cells. The conidia are elongate fusiform, multiseptate, hyaline, attenuated toward each end and bearing one appendage at each end (Sinclair et al. 1983; Nag Raj 1990; Liu et al. 2015).

Hoehneliella Bres. & Sacc., typified by *H. perplexa* Bres. & Sacc., has cornute to cupulate conidiomata with setae formed from basal stroma or excipulate part of the cavity of the conidiomata. The conidiophores are arising from the inner elements of the conidiomata and lining the cavity of the conidiomata, hyaline, simple or branched, septate and terminating with a phialidic conidiogenous cells. The conidia are cylindrical, fusiform to ellipsoidal, 1-septate, pale brown, bearing a breached appendage at each end (Nag Raj 1993).

Plectronidiopsis Nag Raj., typified by *P. chilensis* (Sped.) Nag Raj on culms of *Hierochloa utriculata* from Chile, produces acervular conidiomata with setae and hyaline, cylindrical and 1-septate conidia bearing 1 apical, 2-3 basal and 1-3 lateral appendages (Nag Raj 1993).

By combing the morphological examination and phylogenetic analyses of a combined dataset of nuclear rDNA sequences, the recent studies of *Pseudolachnea*-like fungi resulted in classifying them into five monophyletic genera: *Calvolachella* Marinc., T.A. Duong & M.J. Wingf., *Conicomycetes* R.C. Sinclair, Eicker & Morgan-Jones, *Neopseudolachnella* A. Hashim. & Kaz. Tanaka, *Pseudolachnea* Ranoj. and *Pseudolachnella* Teng (Crous et al. 2012, 2014; Hashimoto et al. 2015b; Hernández-Restrepo et al. 2016). From these studies, it was concluded that differences observed in the conidiomatal structure, such as thickness of basal stroma and the excipulum, were more reliable for their circumscription, instead of conidial septation for delimiting the genera. Under the new generic concept, *Calvolachella* is characterized by cupulate conidiomata without setae and pale-colored and septate conidia with appendages at both ends (Hernández-Restrepo et al., 2016); *Conicomycetes* is characterized by synnematosus conidiomata with cupulate conidiomata with numerous setae, hyaline and septate conidia with both apical and basal appendage (Sinclair et al. 1983; Liu et al. 2015); Both *Pseudolachnea* and *Pseudolachnella* produce acervular or cupulate conidiomata with black setae, hyaline conidia with appendages, and are distinguished by conidial septation (1-septate conidia in *Pseudolachnea* and multiseptate conidia in *Pseudolachnella*; Hashimoto et al., 2015b); *Neopseudolachnella* is similar to *Pseudolachnea* and *Pseudolachnella* in conidial morphology but was characterized by the conidiomata lacking an excipulum (Hashimoto et al., 2015b). Our phylogenetic analysis further supports this, and *Hoehneliella* is also added into the family. The type species

of the genus has cornute to cupulate conidiomata with setae, cylindrical to fusiform, pale brown and 1-septate conidia bearing a breached appendage at each end (Nag Raj 1993)

Key to all accepted coelomycetous genera:

1. Conidiomata without setae2
 1. Conidiomata setose3
 2. Conidiomata nidulariaceous, conidia hyaline, aseptate, with 2 appendages at each end *Infundibulomyces*
 2. Conidiomata eustromatic, conidia pale brown, septate and with 1 setulae at each end *Calvolachnella*
 3. Conidia septate4
 3. Conidia aseptate9
 4. Conidiomata synnematos *Conicomycetes*
 4. Conidiomata acervular or cupulate5
 5. Conidia 1-septate, pale brown, with branches setulae *Hoehneliella*
 5. Conidia 1 to several septate, hyaline6
 6. Conidia cylindrical to fusiform, with 1 apical and several basal setulae *Polynema*
 6. Conidia not as above7
 7. Conidiomata stromatic, acervuloid, without lateral excipulum *Neopseudolachnella*
 7. Conidiomata cupulate with lateral excipulum8
 8. Conidia 1-septate *Pseudolachnea*
 8. Conidia multiseptate *Pseudolachnella*
 9. Conidiomata no excipulum, setae formed throughout basal stroma *Brunneodinemasporium*
 9. Conidiomata with excipulum, setae formed from lateral excipulum and basal stroma 10
 10. Conidiomata superficial and stipitate, becoming cupulate *Dendrophoma*
 10. Conidiomata not stipitate *Dinemasporium* & *Pseudodinemasporium**
- (*morphologically very difficult to be distinguished, but phylogenetically different).

Dinemasporium Lév., Ann. Sci. nat., Sér.3, 5; 274, 1846.

= *Pycnidiochaeta* Sousa da Câmara, Agron. Lusit. 12:109, 1950.

= *Amphitiarospora* Agnihothr., Sydowia 16:75, 1962 (published 1963)

= *Dinemasporium* (Lév.) subg. *Stauronema* Sacc., Syll. Fung. 3:686, 1884.

= *Stauronema* (Sacc.) Syd., P. Syd. & E.J. Nutler, Ann. Mycol. 14:217, 1916

= *Belaina* Batista & Peres, Mem. Soc. Broteriana 14:50, 1961

= *Belainopsis* Batista & Maia, Rev. Biol. (Lisbon), 5:84, 1965

= *Diarimella* B. Sutton, The Coelomycetes: 452, 1980

Teleomorph: Unknown. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, conical to cupulate; basal wall of textura angulari composed of brown, thick-walled cells, the inner layer tend to be hyaline, thin-walled; lateral wall of textura porrecta composed of brown, thick-walled, long, septate and branched hyphae, inner layer pale brown to hyaline and thin-walled. Setae dark brown to black, erect, tapering towards the apex, wall thick and smooth, arising from lateral wall and sometime also from the base. Conidiophores pale hyaline to pale brown, septate, branched, or unbranched, cylindrical, formed by the inner layer of both base and lateral walls. Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth. Conidia hyaline or becoming brown, aseptate, navilicate to fusiform, curved or straight, wall thin, smooth, or rough, bearing 1 or more setulae at each end, and sometimes also lateral.

Type species: *D. strigosum* (Pers.) Sacc.

Ecology/Substrate/Host: Saprobe on dead material of plant, especially dead leaves and culm of various grass and bamboo.

Geographical distribution: Widely distributed.

Description and illustration: Sutton (1980); Nag Raj (1993); Crous et al. (2012); Hashimoto et al. (2015a).

Notes: Lévillé (1846) introduced *Dinemasporium* with *D. graminum* (Lib.) Lév. (= *D. strigosum* (Pers.) Sacc.) as type species, which is characterized by superficial, cupulate, setose conidiomata which are initially closed, becoming erumpent, and unicellular conidia with bipolar appendages. Inclusion of two additional species, *D. platense* Speg. and *D. cruciferum* Ellis, further expanded the concept of the genus to accommodate species with both bipolar and lateral conidial appendages (Spegazzini 1880; Ellis 1882). Saccardo (1884) established the subgenus *Stauronema* to accommodate taxa with conidia bearing apical, basal and lateral appendages. *Stauronema* was elevated to generic level by Sydow et al. (1916) on the basis of insertion of conidial appendages. Sutton (1980) and Nag Raj (1993) adapted this proposal and used *Dinemasporium* to include only species with aseptate conidia bearing setulae only at the end of the conidium. Conidial appendages are seen as taxonomically informative in separating species and genera (Morgan-Jones 1971; Sutton 1980; Nag Raj & Castañeda Ruiz 1989; Nag Raj 1993; Duan et al. 2007). However, the recent phylogenetic analysis showed that appendage morphology alone cannot be a defining feature at generic level, thus both *Stauronema* and *Diarimella* Sutton were reduced to synonyms of

Dinemasporium, because species under these two genera were nested within *Dinemasporium*. With these results, the generic concept of *Dinemasporium* is expanded to accommodate species having conidia with unicellular, unbranched, or branched, single or multiple, bipolar and lateral appendages at each end (Crous et al., 2012; Hashimoto et al. 2015a; Li et al. 2020).

Recent review of the genus *Dinemasporium* was given by Duan et al. (2007) and total of 14 species were accepted with a provided key. Crous et al. (2012) studied the genus and introduced 5 new species. Hashimoto et al. (2015a), by analyzing the phylogeny of ITS sequences and morphology of the Japanese materials, identified eight new species.

In this study, based on morphological and molecular study of all herbarium specimens and relevant living strains collected from China, Japan and UK, we identified 24 species of the genus *Dinemasporium*, including 7 new species (Fig. 396). The DNA barcodes are also provided for all these species, including two species previously described by us, *D. ligongense* W.P. Wu, J.X. Duan & Xin Z. Liu and *D. sinense* W.P. Wu, J.X. Duan & Xin Z. Liu. In addition, one new species and one new combination were also described based on the herbarium specimens in IMI. The living strains of many studied species were also studied on PDA (Figs. 262-263), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Key to accepted species of *Dinemasporium*

1. Conidia pale brown, 5.5-8 x 1.5-2.5 µm, setulae 5-7 µm.....	<i>D. aberrans</i>
1. Conidia colorless.....	2
2. Conidia without setulae.....	<i>D. asetulum</i>
2. Conidia with setulae.....	3
3. Conidia with terminal setulae only, simple or branched.....	4
3. Conidia with both terminal and lateral setulae.....	26
4. Conidia fusiform to ellipsoid, straight.....	5
4. Conidia naviculate to ellipsoid.....	18
5. Conidia ellipsoid, 10-16 µm long; setulae branched.....	6
5. Conidia naviculate, fusiform or ellipsoid, <10 µm in average; setulae unbranched.....	7
6. Conidia ellipsoid, 11-16 x 3-4, dicho-branched terminal setulae 6-10.5.....	<i>D. bambusicola</i>
6. Conidia ellipsoid, 10.5-14 x 2.5-3 µm, 1 branched setulae 1.5-4.5 µm.....	<i>D. rishiriense</i>
7. Conidia with setulae more than 5 µm long.....	8
7. Conidia with setulae less than 5 µm long.....	10
8. Conidia ellipsoid, 6.5-8.5 x 2-3 µm, setulae 4-7 µm long.....	<i>D. iriomotense</i>
8. Conidial setulae 7-15 µm long.....	9
9. Conidia naviculate to ellipsoid, 6.5-8 x 2-3 µm, terminal setulae 9-15 µm.....	<i>D. sasae</i>
9. Conidia fusiform, straight, 8.5-10.5 x 2.5-3.5 µm wide, setulae 7-11 µm.....	<i>D. fusiforme</i>
10. Setulae less than 2 µm long.....	11
10. Setulae 1.5-4 µm long.....	15
11. Conidia more than 6 µm long.....	12
11. Conidia less than 6 µm long.....	13
12. Conidia 6-11 x 1.2-1.5 µm, 0.5-1.2.....	<i>D. sinense</i>
12. Conidia 7-9.5 x 2.5-5 µm.....	<i>D. dugutiae</i>
13. Conidia botuliform to naviculate, 3.5-6 x 1-1.5 µm wide, 1-1.5.....	<i>D. cytosporoides</i>
13. Conidia 1.5-2.1 µm wide.....	14
14. Conidia naviculate to subellipsoidal, 3.5-5 x 1.5-2 µm, 1-1.5.....	<i>D. affine</i>
14. Conidia 3.5-5.6 x 1.7-2.1 µm.....	<i>D. neottiosporioides</i>
15. Conidia falcate to naviculate, 8-12.5 x 2.5-3.5 µm, 2-5.....	<i>D. rhodophaeum</i>
15. Conidia naviculate, less than 10 µm long in average.....	16
16. Conidia 4-7 x 2-2.5 µm, setulae 1.5-7 µm long.....	<i>D. setulosa</i>
16. Conidia setulae less than 5 µm long.....	17
17. Conidia 5-7.5 x 2-3 µm, setulae 2-4 µm long.....	<i>D. pseudodecipiens</i>
17. Conidia 4.5-9 x 2-2.5 µm, setulae 1-5 µm long.....	<i>D. decipiens</i>
18. Conidia 6.3-8 x 1.2-2 µm, setulae 2.5-4 µm long.....	<i>D. ligongense</i>
18. Setulae >5 µm long.....	19
19. Conidia 13-27 x 2-2.5 µm, setulae 4-9 µm long.....	<i>D. lanatum</i>
19. Conidia less than 15 2.5-4 µm long.....	20
20. Conidia 8-11 x 2-2.7 µm, appendage 11-20 µm long.....	<i>D. longicapillatum</i>
20. Setulae <15 µm long in average.....	21
21. Conidia 12-14 x 2.5-3 µm.....	22
21. Conidia 8-12 µm long.....	23

22. Conidia 12-13 x 2.5-3 µm, setulae (11-) 12-14 (-16) µm long	<i>D. americana</i>
22. Conidia 12-14 x 2.5-3 µm, setulae 7-10 (6-12) µm long	<i>D. morbidum</i>
23. Conidia 7-10 x 2-2.5 µm, setulae 7-12 µm long	<i>D. japonicum</i>
23. Conidia 8-13 µm	24
24. Conidia 10-12 x 2.5-3 µm, setulae 10-13 µm long	<i>D. polygonum</i>
24. Conidia 8-13 µm long, setulae 6.5-11 µm long	25
25. Conidia 8-12.5 x 1.5-2.5 µm, appendage 6.5-9 µm long	<i>D. strigosum</i>
25. Conidia 8-13 x 2-3 µm, setulae 8-11 µm long	<i>D. parastrigosum</i>
26. Conidia fusiform, ellipsoid, straight	27
26. Conidia naviculate to fusiform or ellipsoid, curved	30
27. Conidia fusoid-ellipsoid, 7-9 x 2.5-3 µm; 3 terminal appendages 3-5 µm long	<i>D. ipomoeae</i>
27. Conidia with both terminal and subterminal or lateral setulae	28
28. Conidia fusiform, 8-16 x 2.5-3.5 µm, with 1 terminal setulae at each end and 2-3 lateral setulae inserted at the middle of the conidial body, 9-15 µm long	<i>D. sacchari</i>
28. Conidia with terminal or subterminal setulae, not at the middle of conidial body	29
29. Conidia fusiform, slightly curved, 14-20 x 2.5-2.8 µm, with 1 terminal setulae at each end and 2 subapical setulae inserted right below apex, 9-17.5 µm long	<i>D. longisporum</i>
29. Conidia ellipsoid, slightly curved, 11-14 x 4-5.5 µm, with 1 terminal setulae at each end and 1-2 subapical setulae inserted right below apex, 15-25 µm long	<i>D. pingue</i>
30. Conidia naviculate, 14-22 x 3.5-4.5 µm, with 1 terminal setulae at each end and 1 lateral setulae inserted at the middle of the conidium body, 14-20 µm long	<i>D. platense</i>
30. Conidia less than 14 µm long	31
31. Conidia with only 1 lateral setulae, inserted at the middle of the conidial body	32
31. Conidia with 2-3 lateral setulae	33
32. Conidia 8-11.5 x 2-4 µm, setulae 4-10 µm long	<i>D. ambiguum</i>
32. Conidia 9-12 x 2.5-3 µm, terminal setulae 10-15 µm long, lateral 4-8 µm long	<i>D. stauroinema</i>
33. Conidia subnaviculate to allantoid, 4-7 x 2.5-3 µm, with 1 or occasionally 2 setulae at apex, usually 2 rarely 3 basal or sub-basal, and rarely 1 lateral, 1-5 µm long	<i>D. yerbae</i>
33. Conidial setulae long then 5 µm	34
34. Conidia lunate or ellipsoid, 6-12 x 3-4, with 1 setulae at each end and 2-4 lateral setulae inserted at different loci but mostly in the upper half of the conidium body, 8-13 long	<i>D. spinificis</i>
34. Conidia with 1 terminal setulae at each end and 2 lateral setulae	35
35. Conidia ellipsoid, naviculate, 7-13 x 2-3 µm, with 1 terminal setulae at each end and. 2 subapical (3-4 µm below apex) setulae, 8-20 µm long	<i>D. indicum</i>
35. Conidia 2.5-4 µm wide	36
36. Conidia 9-13 x 3-4 µm, with 1 terminal setulae at each end, 9-22 µm long; and 2 lateral setulae, 10-17 µm long	<i>D. pseudoindicum</i>
36. Conidia 9.5-13 x 2.5-3.5 µm, with 1 terminal setulae at each end, 8-13.5 µm; and 2 subapical setulae, 7-16 µm long	<i>D. cruciferum</i>

Dinemasporium ambiguum A. Hashim. & Kaz. Tanaka, Mycoscience 56: 88, 2015.

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered, cupulate, superficial, globose to elliptic, unilocular, 100-400 µm diam, up to 180 µm high, dark brown to black, with white conidial mass in center, setose; basal stroma 15-30 µm thick, composed of hyaline to very pale brown, globose, 2.5-3.5 µm diam cells; excipulum well-developed, textura porrecta, formed by dark brown, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 50-70 µm high, up to 35 µm thick, cell 2-3 µm wide; apical cells of the out layers extended into hair-like structure, curved, with acute ends. Setae arising out layer of the lateral wall or basal stroma, cylindrical, straight or curved, dark brown, thick-walled, smooth, septate, unbranched, 150-350 µm long, 4-7 µm wide at the lower part, tapering towards the apex. Conidiophores lining the basal stroma cylindrical, hyaline, simple or branched, 1-3 septate, 15-30 x 2.5-3 µm. Conidiogenous cells phialidic, cylindrical to lageniform, 7-20 x 2-2.5 µm, collarette inconspicuous. Conidia naviculate to ellipsoid, obtuse or slightly acute at the apex, truncate at the base, unicellular, hyaline, smooth, guttulate, (7-)8-11.5 x 2-4 µm, bearing one unbranched setula at each end and often lateral; setulae 5-12 µm long.

Material examined: China: Guangxi Province, Nanning, Wufengshan, on dead culm of unidentified grass, 13 Nov. 2013, W.P. Wu (Wu13050). Living strain: 57382 and 57383 (from Wu13050).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a).

Notes: *Dinemasporium ambiguum* A. Hashim. & Kaz. Tanaka was originally described from dead culms of *Miscanthus* sp. from Japan, it has *Stauroinema*-like conidia bearing one unbranched setula at each end and on the

sides (Hashimoto et al., 2015a). *D. ambiguum* superficially resembles *Stauroinema indicum* Kalani (conidia 7-13 x 2-3 µm, terminal appendage 6.5-17 µm long, terminal appendages 8-20 µm long), *D. cruciferum* (conidia 9.5-14 x 2-3.5 µm, terminal appendages 8-13.5 µm, lateral appendages 7-16 µm), *D. pseudoindicum* (conidia 9-13 x 3-4 µm, terminal appendages 9-22 µm, lateral appendages 10-17 µm and 4-6 µm) and *D. trichophoricola* Crous & Quaedvlieg (conidia 9-11 x 2.5-3 µm, terminal appendages 9-13 µm long, lateral appendages 8-11 µm long) on conidial morphology (Sutton 1980; Nag Raj 1993; Crous et al. 2012, 2014; Hashimoto et al. 2015a). Among them, *Stauroinema indicum*, *D. cruciferum* and *D. pseudoindicum* have slightly larger conidia than those in *D. ambiguum*. In addition, *S. indicum* and *D. pseudoindicum* have conidia with much longer lateral appendages (8-20 µm). *D. trichophoricola* has similar size of conidia and appendages, but it has only one appendage at each end. Furthermore, the ITS sequences from these species are also significantly different from each other.

Some variations on structure of excipulum and number of conidial setulae were observed from different specimens collected from China. In the original description of *D. ambiguum* provided by Hashimoto et al. (2015a), excipulum seems to be poorly developed and without the extended and curved apical cells, and the conidia usually have one setula at the apex, 1-2 at the base, and 1 lateral. In the Chinese collection, the excipulum of conidiomata is well-developed with extended and curved apex, and the conidia are with one basal and apical setula at each end, and one lateral setulae. However, the ITS sequences from two isolates of the Chinese collection are identical.

***Dinemasporium americana* Crous & Tuthill, Persoonia 28: 132, 2012.**

Teleomorph: Not observed. **Anamorph:** Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, up to 400 µm diam, setose with a central white to pink conidial mass; basal stroma of textura angularis, 15-35 µm thick; excipulum well-developed, textura porrecta, formed by dark brown, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 96-120 µm high, up to 30 µm thick, cells 2-3 µm wide, 5-8-septate, uniformly dark brown, thick-walled; upper part of the wall separated from each other, with an acute or obtuse apex. Setae cylindrical, erect, straight, or slightly flexuous, brown to black, simple, 5-8-septate, subulate with acute apex, verruculose, thick-walled, 130-235 (-270) × 5-10 µm, 1-1.5 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining the basal stroma, septate, branched, cylindrical, thin-walled, smooth, base pale brown, upper part hyaline, 20-35 x 2-3 µm. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical, 9-13 x 2-3 µm. Conidia hyaline, aseptate, thin-walled, smooth, naviculate to fusiform or ellipsoid, gently curved or straight, apex obtuse to subobtusely rounded, base truncate, eguttulate or guttulate at both ends, 11.5-13.5 x 2.5-3 µm, with a single, unbranched, flexuous, tubular appendage at each end, 6-10 µm; basal appendage excentric.

Material examined: On dead culm of unidentified grass, China: Shanghai, Shanghai Botanical Garden, 3 Nov. 2013, W.P. Wu (Wu15137, 15138); On dead culm of unidentified grass, China: Shan' Xi Province, Zhouzhi, Qingling mountain, 22 Aug. 2019, W.P. Wu (Wu16522); On dead leaves, culm and seed of unidentified grass, China: Shan' Xi Province, Zhouzhi, Qingling mountain, 22 Aug. 2019, W.P. Wu (Wu16534). Living strain: 5360 (from Wu15137), 57361 (from Wu15138), 76792 (from Wu16522), 76893 (from Wu16534).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, USA.

Description and illustration: Crous et al. (2012).

Notes: *D. americana* Crous & Tuthill was a recently described species from USA and is morphologically similar with *D. strigosum*. It differs from other species by size of setae, conidia and appendages (Crous et al. 2012; Hashimoto et al. 2015a).

Compared with the original description (on PNA: conidia (9-)12-13 (-16) x (2.5-)-3 µm, setulae (11-)12-14(-16) µm long), the fungus from the Chinese specimens is with well-developed excipulum and shorter conidial setulae (Crous et al. 2012). Some variations on size of setae, conidia and setulae were also observed among the Chinese specimens, for examples in the specimen Wu16534, the setae are up to 400 µm long, the conidia are 9-11 x 2-2.5 µm and with shorter setulae (6-8 µm long); while in the specimen Wu16522, the setae are up to 270 µm long, the conidia are 11.5-13.5 x 2.5-3 µm and with longer setulae (8-10 µm). In addition, the microconidia 5-8 x 1.5-2 µm were also observed. However, they have identical ITS sequences.

***Dinemasporium beijingense* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 265-266, MycoBank MB841659.**

Etymology: refers to the locality where this fungus was discovered.

Typification: China: Beijing, Huairou, Beigou, Mutianyu, on dead culms of unidentified herbaceous plant, 9 Oct. 2012, W.P. Wu (Holotype WFH Wu15095; ex-type strain CGMCC 3.20650 (=NN 54964)).

Teleomorph: Not observed. **Anamorph:** Conidiomata eustromatic, superficial, scattered or aggregated, cupulate to discoid but oblong to ovoid shaped on the top view, up to 600 mm long and 400 mm wide; basal stroma of textura angularis, 20-40 µm thick; excipulum well-developed, textura porrecta, formed by dark brown, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 130-190 µm high, up to 35 µm thick, cells 1.5-3 µm wide, 5-10-septate, uniformly dark brown, thick-walled; upper

part of the wall separated from each other, with an acute or obtuse apex. Setae brown to black, septate, cylindrical, tapering towards the apex and apex acute or obtuse, wall thick and smooth, 250-530 x 6-10 µm, arising from the outer layer of basal and lateral walls. Conidiophores hyaline, septate, simple to branched, aseptate or septate, wall smooth, cylindrical, originating from the upper cells of basal stroma and also inner layer of lateral walls, 15-35 x 1.8-2.5 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or integrated, hyaline, wall smooth, cylindrical with minute periclinal thickenings in the collarete zone, collarete inconspicuous, 6-10 x 1.8-2 µm. Conidia hyaline, aseptate, naviculate, curved or straight, smooth-walled, ends obtuse, 8-10 x 1.5-2 µm, with one setula of 6.5-9.5 µm long at each end.

Colonies on PDA effuse, colonies 1.8-2.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Beijing, Huairou, Beigou, Mutianyu, on dead culms of unidentified herbaceous plant, 9 Oct. 2012, W.P. Wu (Holotype WFH Wu15095). Living strain: ex-type strain CGMCC 3.20650 (=NN54964).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Dinemasporium beijingense* W.P. Wu & Y.Z. Diao also belongs to *D. strigosum* group with well-developed excipulum, naviculate conidia with one setula at each end. It differs from other similar species by smaller conidia and long setulae, and the ITS sequences (Sutton 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a).

Phylogenetically, *D. beijingensis* is closely related to some members in Chaetosphaeriaceae. On a megablast search using the ITS sequences from the strain obtained from the specimen Wu15095, the closest matches in NCBI's GenBank nucleotide database were *Dinemasporium strigosum* (GeneBank NR121540, identities 46/469 (98%), 3 gaps (0%)), *Dinemasporium pseudodecipens* (GeMH864432, identities 458/468 (98%), 9 gaps (1%)).

***Dinemasporium cruciferum* Ellis, Bull. Torrey Bot. Club 9:20, 1882.**

= *Stauronema cruciferum* (Ellis) Syd., P. Syd. & E.J. Bulter, Ann. Mycol. 14: 217, 1916

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, cupulate and circular to ellipsoidal on the top view, unilocular, superficial, scattered, blackish, up to 300 µm diam. Basal wall of textura angulari composed of brown, thick-walled, irregular-shaped cells and become pale brown to hyaline, thin-walled smaller cells towards the inner layers, 30-50 µm thick; excipulum well-developed, textura porrecta, formed by dark brown to blackish, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 70-150 µm high, up to 40 µm thick; upper part separated, straight or curved, darker than basal part, with acute apex. Setae present, dark brown, septate, simple, cylindrical, straight, wall smooth and thick, 250-320 x 7.5-10 µm, tapering towards an acute or obtuse apex, 5-6 µm. Conidiophores pale brown, become hyaline towards apex, 1 to 3 septate, branched at the base, cylindrical, straight, wall thin and smooth, 10-25 x 2-3 µm, arising from inner layer of both basal and lateral walls. Conidiogenous cells discrete or integrated, determinate, apical or lateral, cylindrical, straight, wall thin and smooth, apex narrow with narrow sporulating channel and prominent thickening around the channel, 10-15 x 1.5-2.5 µm. Conidia hyaline, aseptate, fusiform, slightly curved, apex obtuse, base truncate, guttulate, 11-14 x 2.5-3 µm; apical and basal appendages single, subapical appendage 1-2, 10-13 µm long.

Material examined: China: Beijing, Huairou, Beigou, Mutianyu, on dead culm of grass, 09 Oct 2012, W.P. Wu (Wu15101, Wu15102, Wu15103, Wu15104). Living strain: 54976 (from Wu15101), 54977 (from Wu15102), 54978 (from Wu15103), 54979 (from Wu15104).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan, USA.

Description and illustration: (Ellis 1882); Sydow et al. (1916); Nag Raj (1993); Hashimoto et al. (2015a); Li et al. (2020).

Notes: *Dinemasporium cruciferum* Ellis clearly belongs to a small group with a few known species under *Stauronema* (Sacc.) Syd., P. Syd. & E.J. Butler and *Dinemasporium* Lév., including *Stauronema indicum* Kalani (conidia 7-13 x 2-3 µm, terminal appendage 6.5-17 µm long, terminal appendages 8-20 µm long), *D. ambiguum* A. Hashim. & Kaz. Tanaka (conidia 8-11.5 x 2-4 µm, terminal appendages 5-12 µm, lateral appendages 4-10 µm), *D. pseudoindicum* Crous & M. Chr. (conidia 9-13 x 3-4 µm, terminal appendages 9-22 µm, lateral appendages 10-17 µm and 4-6 µm) and *D. trichophoricola* Crous & Quaedvlieg (conidia 9-11 x 2.5-3 µm, terminal appendages 9-13 µm long, lateral appendages 8-11 µm long) on conidial morphology (Nag Raj 1993; Crous et al. 2014; Hashimoto et al. 2015a). They can be easily distinguished from others by its conidial morphology (shape, size and subapical appendage) and the ITS sequences (Sutton 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a). Among them, *S. indicum* and *D. pseudoindicum* have conidia with much longer lateral appendages (8-20 µm). *D. ambiguum* and *D. trichophoricola* have smaller conidia than those in *D. cruciferum*. Furthermore, the ITS sequences from these species are also significantly different from each other.

Traditionally, the conidiogenous cells in the genus *Staurostoma* were described as enteroblastic phialidic, however the SEM photographs included in one specimen under *Staurostoma cruciferum* in Herbarium IMI clearly show it is not simple enteroblastic phialidic but closer to annellidic conidiogenous cells.

Dinemasporium fanglanii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 267-268, MycoBank MB841660.

Etymology: named after the famous Chinese mycologist, Fanglan Dai.

Typification: China: Guangdong Province, Guangzhou, Nansha, on dead leaves of unidentified grass, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16730; ex-type strain CGMCC 3.20668 (=NN 77032)).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, cupulate to discoid but oblong to ovoid shaped on the top view, 150-300 µm long and 150-250 µm wide; excipulum poorly developed, lateral wall of textura porrecta formed by hyaline to pale brown cells in the inner layer and brown to dark brown cells in the outer layer, 30-50 µm high, cells 1.5-2.5 µm wide, the apex of the outer wall separated, with acute or obtuse apex; basal stroma of textura angulari with brown, isodiametric cells which are hyaline in the upper layer. Setae cylindrical, brown to black, septate, tapering towards the apex, apex acute or obtuse, wall thick and smooth, 130-310 × 6-9 µm, arising from the outer layer of basal and lateral walls. Conidiophores hyaline, septate, simple to branched, aseptate or septate, wall smooth, cylindrical, originating from the upper cells of basal stroma and also inner layer of lateral walls, 15-25 × 2-3 µm. Conidiogenous cells phialidic, determinate, discrete or integrated, hyaline, wall smooth, cylindrical, with minute periclinal thickenings in the collarete zone, collarete inconspicuous, 8-15 × 1.5-2 µm. Conidia hyaline, aseptate, naviculate, curved or straight, smooth-walled, ends obtuse, 7-9 × 2-2.3 µm, with one setulae of 5-8 µm long at each end.

Colonies on PDA effuse, colonies 2.7-3.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly soil brown, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Guangdong Province, Guangzhou, Nansha, on dead leaves of unidentified grass, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16730); China: Guangdong Province, Guangzhou, Nansha, on dead leaves of unidentified grass, 18 Aug. 2019, W.P. Wu (Wu16713, Wu16731, 16714). Living strain: 76979, 76980, 76981 and 76982 (from Wu16713), 77034 (from Wu16731), CGMCC 3.20668 (=77032, ex-type strain) and 77033 (from Wu16730).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Dinemasporium fanglanii* is characterized by smaller conidiomata, short setae, poorly developed excipulum, and small conidia with shorter setulae (Sutton 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al., 2015a). It resembles *Dinemasporium iriomotense* A. Hashim. & Kaz. Tanaka (conidia ellipsoid, straight, 6.5-8.5 × 2-3 µm; setulae 4-6 µm long) and *D. japonicum* A. Hashim., G. Sato & Kaz. Tanaka (conidia naviculate to ellipsoid, curved, 7-10 × 2-2.5 µm; setulae 7-12 µm long), but they can be distinguished by conidial shape and length of setulae. The ellipsoid conidia in *D. iriomotense* makes it easily distinguishable from *D. fanglanii*; The conidia setulae in *D. japonicum* are much longer (7-12 µm) than those in *D. fanglanii*.

Phylogenetically, *o* a megablast search using the ITS sequences from the strain obtained from the type specimen Wu16730, the closest matches in NCBI's GenBank nucleotide database were *D. longicapillatum* (GeneBank AN900868, identities 452/463 (98%), 4 gaps (0%)), *D. cruciferum* (GeneBank AB900893, identities 441/464 (95%), 12 gaps (2%)), and *D. sasae* (GeneBank NR155038, identities 437/459 (95%), 12 gaps (2%)).

Dinemasporium iriomotense A. Hashim. & Kaz. Tanaka, Mycoscience 56: 91, 2015.

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, black, cupulate, ellipsoid to spherical in top view, 150-250 µm in diam; basal stroma of textura angularis composed of hyaline to brown, isodiametric cells; lateral wall of textura prismatica to textura porrecta formed by brown, thick-walled cells that are hyaline towards the inner layer. Setae brown to black, simple, 0-2 septate, cylindrical with an acute or obtuse apex, wall thick and smooth, 60-130 × 3-5.5 µm, arising from lateral excipulum. Conidiophores pale brown at the base, becoming hyaline towards the apex, 1-2 septate, branched or unbranched, cylindrical, wall thin and smooth, 10-20 × 1.5-2.5 µm. Conidiogenous cells enteroblastic phialidic, determinate, hyaline, cylindrical, apex with narrow channel and an inconspicuous collar, 8-10 × 1.5-2 µm. Conidia hyaline, aseptate, wall thin and smooth, ellipsoid, slightly curved, ends rounded, guttulate, 7.5-9.5 × 2.5-3.2 µm, with a single, unbranched setulae at each end, 6.5-7 µm long.

Material examined: China: Guangxi Province, Damingshan, on dead leaves of grass, 20 Dec. 1997, W.P. Wu (Wu1460a). Living strain: 43900 (from Wu1460a).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a).

Notes: *Dinemasporium iriomotense* A. Hashim. & Kaz. Tanaka is characterized by ellipsoid conidia with a single and unbranched appendage at each end. It differs from the closely related species including *D. strigosum* (Pers.) Sacc. by having naviculate to ellipsoid, shorter and broader conidia. The morphology of this fungus from the Chinese specimen is well aligned with those in the original description, although the conidia are slightly larger and with slightly longer appendages (conidia 6.5-8.5 x 2-3 µm, appendage 4-6 (-7) µm long in the original description) (Hashimoto et al. 2015a).

Dinemasporium japonicum A. Hashim., G. Dato & Kaz. Tanaka, Mycoscience 56:92, 2015.

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, black, cupulate, ellipsoid to spherical in top view, 150-800 µm in diam; basal stroma of textura angularis composed of hyaline to brown, isodiametric cells; excipulum well-developed, lateral wall of textura prismatica to textura porrecta formed by brown, thick-walled cells that are hyaline towards the inner layer, 120-180 µm high, cells 2.5-3.5 µm wide, apical cell not separated and with rounded apex. Setae brown to black, simple, septate, cylindrical with acute or obtuse apex, wall thick and smooth, 100-380 x 5-8 µm, 8.5-15 µm at the base, 3-4.5 µm at the apex, arising from out layer of lateral excipulum or basal stroma. Conidiophores hyaline, septate, branched or unbranched, cylindrical, wall thin and smooth, 10-25 x 2-3 µm. Conidiogenous cells enteroblastic phialidic, determinate, hyaline, cylindrical, apex with narrow channel and an inconspicuous collar, 8-15 x 1.5-2.5 µm. Conidia hyaline, aseptate, wall thin and smooth, naviculate, curved, ends rounded, guttulate, (6-)7-10 x 1.8-2.0 µm, with a single, unbranched setulae at each end, 5-7 (-9.5) µm long.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead leaf sheath of grass, 25 Dec. 2012, W.P. Wu (Wu12388); China: Guangdong Province, Shaoguan, Danxiashan, on dead culm of grass, 25 Dec. 2012, W.P. Wu (Wu12389, Wu12393); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves and leaf sheath of grass, 25 Dec. 2012, W.P. Wu (Wu12391); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of *Miscanthus* sp., 25 Dec. 2012, W.P. Wu (Wu12547); China: Guangdong Province, Shaoguan, Danxiashan, on dead culm of grass, 25 Dec. 2012, W.P. Wu (Wu12392); China: Guangxi Province, Damingshan, on dead culm of bamboo, 19 Dec 1997, W.P. Wu (Wu1439b, Wu1425a); On dead culms of bamboo, China: Guangxi Province, Damingshan, 19 Dec 1997, W.P. Wu (Wu11044a); China: Guangxi Province, Damingshan, on dead culms of *Miscanthus* sp., 20 Dec 1997, W.P. Wu (Wu1468); China: Hubei Province, Yichang, on dead culm of grass, 12 Aug. 2017, W.P. Wu (Wu13451); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, on dead leaves of grass, 25 Aug. 2019, W.P. Wu (Wu16824, Wu16825, Wu16826); China: Jiangsu Province, Wuxi, Wuxi Forestry Park, On dead leaves of *Photinia* sp., 25 Aug. 2019, W.P. Wu (Wu16827); China: Shan'Xi Province, Xi An, Huaqingchi, on dead leaves of grass, 15 Aug. 2016, W.P. Wu (Wu15595); China: Shan'Xi Province, Zhouzhi, Qinling mountain, on dead culm of grass, 2 Aug. 2019, W.P. Wu (Wu16592); China: Shan'Xi Province, Zhouzhi, Qingling mountain, on dead leaves and culms of grass, 2 Aug. 2019, W.P. Wu (Wu16527, Wu 16528, Wu16529, Wu16536); China: Zhejiang Province, Hangzhou, Longjing, on dead culm of grass, 1 Oct. 2013, W.P. Wu (Wu13001, Wu13002); China: Zhejiang Province, Hangzhou, Longjing, on dead leaves of grass, 1 Oct. 2013, W.P. Wu (Wu13014); China: Zhejiang Province, Hangzhou, Longjing, on dead leaves and culms of grass, 1 Oct. 2013, W.P. Wu (Wu13015); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaves of grass, 16 Oct. 2019, W.P. 13002Wu (Wu16973); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead culm of grass, 16 Oct. 2019, W.P. Wu (Wu16977, Wu16981, Wu16982, Wu16983, Wu17040); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaf petiole of palm, 16 Oct. 2019, W.P. Wu (Wu17019); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaf sheath of bamboo, 16 Oct. 2019, W.P. Wu (Wu17039); China: Zhejiang Province, Anji, Bamboo garden, on dead leaves and sheath of bamboo, 17 June 2021, W.P. Wu (Wu18003, Wu18004, Wu18005, Wu18006, Wu18011, Wu18012, Wu18013, Wu18014). Living strain: 43050 (from Wu1425), 43195 (from Wu1425a), 44077 (from Wu1439b), 44100 (from Wu1468), 53377 (from Wu11044a), 55221 (from Wu12393), 55390 (from Wu12547), 57316 (from Wu13001), 57317 (from Wu13002), 57325 (from Wu13014), 57348 (from Wu13015), 76799 (from Wu16529), 76802 (from Wu16536), 76822 and 76823 (from Wu16593a), 76824 and 76875 (from Wu15594), 76843 and 76844 (from 16592), 76863 (from Wu16527), 76798 (from Wu16528), 77122 (from Wu16824), 77123 (from Wu16825), 77124 (from Wu16826), 77125 (from Wu6827), 77329 (from Wu16973), 77294 (from Wu16977), 77295 (from Wu16982), 77296 (from Wu16983), 77310 (from Wu17040), 77330 (from Wu16981), 77304 and 77305 (from Wu17019), 77308 and 77309 (from Wu17039), 75816, 75817 and 77818 (from Wu13451), 78542 and 78543 (from Wu18004), 78544 (from Wu18006), 78548 and 78549 (from Wu18011), 78550 and 78551 (from Wu18012), 78552 and 78553 (from 18013), and 78554 and 78555 (from Wu18014).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a).

Notes: *Dinemasporium japonicum* A. Hashim., G. Sato & Kaz. Tanaka is characterized by naviculate to ellipsoid and smaller conidia with a single and unbranched appendage at each end, it can easily be distinguished

from the two closely related species, *D. iriomotense* A. Hashim. & Kaz. Tanaka and *D. strigosum* complex, by its smaller conidia with longer appendages and also very different ITS sequences. Compared to the original description, the Chinese collections are with shorter setulae (7-12 µm in the original description vs. 4-9.5 µm from the Chinese collections) (Hashimoto et al. 2015a). Among the examined collections from China, some variations were observed, for example, the conidia in the specimen Wu17019 are smaller (7-8 x 2 µm) than those in the specimens Wu13002 and Wu17698 (8-10 x 1.8-2 µm). However, the ITS sequences obtained from them are identical.

This fungus was commonly found from different woody and herbaceous plants including *Miscanthus*, *Sasa*, *Phragmites* and *Juncus* and appears to be widely distributed in Japan. Likewise, it seems to be also a rather common species from China, and collections were made from different substrates and several provinces in China.

Dinemasporium ligongense W.P. Wu, J.X. Duan & X.Z. Liu, Fung. Diversity 26:211, 2007. Figs. 269-270

Typification: on dead culms of unidentified herbaceous plant, China: Hebei Province, Chengde, 12 September 1991, W.P. Wu (Wu910508a, holotype).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, cupulate to discoid but oblong to ovoid shaped on the top view, up to 2 mm long and 1 mm wide; lateral wall of textura porrecta formed by hyaline to pale brown cells in the inner layer and brown to dark brown cells in the outer layer, the apex of the outer wall prolong into brown, aseptate or 1-septate, curved setae which are 25-40 x 1-1.5 µm; basal stroma of textura angulari with brown, isodiametric cells which are hyaline in the upper layer. Setae brown to black, septate, cylindrical, tapering towards the apex and apex acute or obtuse, wall thick and smooth, 110-750 x 3-5 µm, arising from the outer layer of basal and lateral walls. Conidiophores hyaline, septate, simple to branched, aseptate or septate, wall smooth, cylindrical, originating from the upper cells of basal stroma and also inner layer of lateral walls. Conidiogenous cells enteroblastic phialidic, determinate, discrete or integrated, hyaline, wall smooth, cylindrical with minute periclinal thickenings in the collarette zone, collarette inconspicuous, 8-16 x 1-1.8 µm. conidia hyaline, aseptate, naviculate, curved or straight, smooth-walled, ends obtuse, 6.3-8 x 1.2-2 µm, with one setulae of 2.5-4 µm long at each end

Material examined: China: Hebei Province, Chengde, on dead culms of herbaceous plants, 12 Sept 1991, Wu W.P., Wu910503, Wu910517; 05 October 1991, Wu W.P., Wu0535, Wu0536, Wu0555; China: Hebei Province, Chengde, Bishushanzhuang, on dead culms of unidentified grass, 11 Sept 2012, W.P. Wu (Wu15050, Wu15052, Wu15055). Living strain: 54653 (from Wu15050), 54665 (from 15052), 54675 (from Wu15055).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Know distribution: China.

Description and illustration: Duan et al. (2007).

Notes: *Dinemasporium ligongense* W.P. Wu, J.X. Duan & X.Z. Liu was a recently described species and differs from all other species in the genus by its two types of setae on conidiomata and smaller conidia with very shorter terminal appendages. Several species including *D. aberrans* B. Sutton, *D. affine* Speg., *D. decipiens* (De Not.) Sacc. and *D. rhodophaeum* Speg. have similar conidial morphology to *D. ligongense* (Sutton 1965, 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a). However, the conidia in *D. aberrans* are pale brown to brown with longer setulae (5.5-7 µm); the conidia of *D. affine* are smaller (3.5-5 x 1.5-2 µm) with shorter setulae (1.5 µm long); the conidia of *D. rhodophaeum* are larger (8-12.5 x 2.5-3.5 µm); and the conidia of *D. decipiens* are wider (2-2.5 µm) (Sutton 1969, 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a).

For obtaining the living strains, two fresh specimens of *D. ligongense* were collected from the same locality as the type specimen was collected and several living strains were obtained from them. Phylogenetically, *D. ligongense* is closely related to other species of *Dinemasporium*. On a megablast search using the ITS sequences from the strain obtained from the specimen Wu15050, the closest matches in NCBI's GenBank nucleotide database were *D. cruciferum* (GeneBank AB900893, identities 447/468 (96%), 8 gaps (1%)), *D. morbidum* (GeneBank NR137788, identities 447/471 (95%), 13 gaps (2%)), and *D. sasa* (GeneBank NR155038, identities 441/463 (95%), 13 gap (2%)).

Dinemasporium longicapillatum Y. Yamag. & Masuma, in Yamaguchi et al. Mycoscience 46: 367. 2005.

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, black, cupulate, ellipsoid to spherical in top view, 200-450 µm in diam; basal stroma of textura angularis composed of hyaline to brown, isodiametric cells; excipulum well-developed, lateral wall of textura prismatica to textura porrecta formed by brown, thick-walled cells that are hyaline towards the inner layer, 60-160 µm high, cells 2-3 µm wide, apical cell not separated and with obtuse or rounded apex. Setae brown to black, simple, septate, cylindrical with acute or obtuse apex, wall thick and smooth, 130-490 x 12 µm, 7-16 µm at the base, 2-4 µm at the apex, arising from out layer of lateral excipulum or basal stroma. Conidiophores hyaline, 1-3-septate, branched or unbranched, cylindrical, wall thin and smooth, 10-20 x 2-2.5 µm. Conidiogenous cells enteroblastic phialidic, determinate, hyaline, cylindrical, apex with narrow channel

and an inconspicuous collar, 7-10 x 1.5-2.5 µm. Conidia hyaline, aseptate, wall thin and smooth, naviculate, curved, ends rounded, guttulate, 7-10 x 1.8-2.3 µm, with a single, unbranched setulae at each end, 6-12 µm long.

Material examined: China, Guangdong, Guangzhou, Nansha, on dead leaves of grass, 18 Aug. 2019, W.P. Wu (Wu16735); China: Jiangsu, Zhenjiang, Mingdu Hotel, on dead leaves of grass, 23 Aug. 2015, W.P. Wu (Wu13422a); China: Jiangsu Province, Zhenjiang, Jinshan Park, on dead leaves of unidentified tree, 23 Aug. 2015, W.P. Wu (Wu13442); China: Hubei, Yichang, on dead culm of grass, 18 Aug. 2019, W.P. Wu (Wu16756). Living strain: 71169 and 71170 (from Wu13422), 71224 and 71225 (from Wu13442), 76996 and 76997 (from Wu16735), 77105, 77064 and 77083 (from Wu16756).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Yamaguchi et al. (2005); Hashimoto et al. (2015)a.

Notes: *Dinemasporium longicapillatum* Y. Yamag. & Masuma (conidia 8-11 x 2-2.7 µm, appendage 11-20 µm long from the type material) was described for a fungus isolated from sugar cane from Japan and is characterized by fusiform to allantoid conidia with longer terminal appendages (Yamaguchi et al. 2005). Hashimoto et al. (2015a) redescribed the species *D. longicapillatum* with shorter conidial setulae (conidia 8-11 x 2-3 µm, appendage 7-12 µm long) from dead stems of herbaceous plant incl. bamboo, *Miscanthus* sp. and *Saccharum officinarum*. The ITS sequences were also obtained from both ex-type culture (MAFF 239569) and also other specimens they collected. The conidia and setulae vary a lot among the different specimens from China, for example, in the specimen Wu13422, the conidia are 7-8 x 2-2.3 µm and with longer setulae (10-12 µm); in the specimen Wu16756, the conidia are longer (8-10 x 2 µm) and with longer setulae (10-15 µm), while in the specimen Wu13442 and Wu16775, the conidia are 7.5-9 x 2 µm and with shorter appendages (6-9 µm). The ITS sequences obtained from these specimens are almost identical to the reported one from the ex-type strain.

Dinemasporium longisporum W.P. Wu & Y.Z. Diao, sp. nov., Fig. 271, MycoBank MB841662.

Etymology: refers to its long conidia.

Typification: U.S.A.: Texas, Austin, Barton Creek, on *Bothriochloa auccaroides*, collected date not mentioned, J. Loftis (D65), IMI238583 (holotype).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, cupulate and circular to ellipsoidal on the top view, unilocular, superficial, scattered, blackish, up to 800 µm diam. Basal wall of textura angulari composed of brown, thick-walled, irregular-shaped cells and become pale brown to hyaline, thin-walled smaller cells towards the inner layers, 30-50 µm thick; lateral wall of textura porrecta, formed by dark brown to blackish, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, up to 40 µm thick. Setae present, dark brown, septate, simple, cylindrical, straight, wall smooth and thick, tapering towards the apex and apex acute or obtuse, 150-350 X 3-7 µm. Conidiophores hyaline, 1 to 3 septate, branched at the base or unbranched, cylindrical, straight, wall thin and smooth, 10-25 X 1.5-2 µm, arising from inner layer of both basal and lateral walls. Conidiogenous cells discrete or integrated, determinate, apical or lateral, cylindrical, straight, wall thin and smooth, apex narrow with narrow sporulating channel and prominent thickening around the channel, 7-15 X 1.5-2 µm. Conidia hyaline, aseptate, fusiform, slightly curved, apex obtuse, base truncate, guttulate, 14-20 X 2.5-2.8 µm, apical appendage single, 10-17.5 µm long, basal appendages 1 or rarely 2, 8-18 µm long, lateral appendages mostly 2, rarely 1, simple, 9-17 µm long, arising from 2 to 3 µm subapical.

Material examined: On *Bothriochloa auccaroides*, Barton Creek, Austin, Texas, U.S.A., collected date not mentioned, J. Loftis(D65), IMI238583 (Holotype); India: Uttar Pradesh; Almora, on leaves of *Eleusine*, Oct. 1988, R.C. Gupta, IMI336569

Ecology/Substrate/Host: Saprobe on dead material of plant.

Know distribution: India, USA.

Notes: *Dinemasporium longisporum* W.P. Wu & Y.Z. Diao sp. nov. differs from other species of *Dinemasporium* by longer, slightly curved, and subapical and lateral appendages (Sutton 1980; Nag Raj 1993). *Staurostoma pingue* Nag Raj also produces conidia with subapical lateral appendages but its conidia are much wider and shorter (11.2-14 x 4.2-5.5 µm) with thick and somewhat rough wall. The type specimen IMI238583 is in a good condition with abundant conidiomata in well-developed state.

Dinemasporium morbidum Crous, Persoonia 28:131, 2012.

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, 160-350 µm diam, setose with a central white to slightly pink conidial mass; basal stroma of textura angularis, composed of subhyaline to pale brown, irregularly shaped cells, 2-4 µm wide; excipulum well-developed, lateral wall of textura prismatica to textura porrecta formed by brown, thick-walled cells that are hyaline towards the inner layer, 140-160 µm high, cells 2.5-3 µm wide, apical cell not separated and with acute or obtuse apex. Setae brown to black, simple, septate, subulate with acute apex, unbranched, smooth, thick-walled, septate, 135-320 x 7-11 µm, 1.5-2 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining the basal stroma, hyaline, 1-3-septate, sparingly branched,

cylindrical, thin-walled, smooth, 15-20 x 2-3 µm. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical to lageniform, 8-11 x 1.5-2.2 µm. Conidia hyaline, aseptate, thin-walled, smooth, allantoid, subcylindrical to fusiform, gently curved or straight, apex obtuse to rounded, base truncate, eguttulate or guttulate, 9.5-11 x 2-2.2 µm, with a single, unbranched, flexuous, tubular appendage at each end, 4-6.5 µm; basal appendage excentric.

Material examined: UK: Scotland, Newton Steward, Galloway Forestry Park, on dead culm of unidentified grass, July 2019, W.P. Wu (Wu16503); China: Ningxia Province, Jingyuan County, Liupanshan, Sept 1997, on dead culm of unidentified grass, W.P. Wu (Wu1017). Living strain: 43618 (from Wu1017), 76772 and 76773 (from Wu16503).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Netherlands, New Zealand, UK.

Description and illustration: Crous et al. (2012); Li et al. (2020).

Notes: Morphologically *Dinemasporium morbidum* Crous clearly belongs to *D. simplex* group on conidial morphology (Crous et al., 2012). It resembles *D. strigosum* (Pers.) Sacc. but has longer conidia and appendages than those in *D. strigosum* (conidia 10–12 µm long, with appendages 6–9 µm long). The conidia from the examined specimens by us are with slightly smaller conidia and shorter setulae than those in the original description (conidia 12-14 x 3 µm, setulae 7-10 µm long). The ITS sequences obtained from the two collections are identical to the one from the ex-type strain.

***Dinemasporium multisetulum* W.P. Wu & Y.Z. Diao, sp. nov., Figs. 272-273, MycoBank MB841663.**

Etymology: Named after its more than one appendaged conidia

Typification: China: Beijing, Huairou, Beigou, Mutianyu, on dead culm of grass, 09 Oct 2012, W.P. Wu (Holotype WFH Wu15100; ex-type strain CGMCC 3.20651 (=NN 54975)).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, cupulate and circular to ellipsoidal on the top view, unilocular, superficial, scattered, blackish, up to 400 µm diam; basal wall of textura angulari composed of brown, thick-walled, irregular-shaped cells and become pale brown to hyaline, thin-walled smaller cells towards the inner layers, 35-45 µm thick; excipulum well-developed, lateral wall of textura porrecta, formed by dark brown to blackish, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 100-135 µm high, up to 45 µm thick. Setae present, dark brown, septate, simple, cylindrical, straight, wall smooth and thick, tapering towards the apex and apex acute or obtuse, 75-300 µm long, 7.5-10 µm wide at the base, 3.5-6 µm wide at the apex. Conidiophores pale brown to hyaline, 1 to 3 septate, branched at the base or unbranched, cylindrical, straight, wall thin and smooth, 10-20 X 1.5-3 µm, arising from inner layer of both basal and lateral walls. Conidiogenous cells discrete or integrated, determinate, apical or lateral, cylindrical, straight, wall thin and smooth, apex narrow with narrow sporulating channel and prominent thickening around the channel, 7-12 x 1.5-2.5 µm. Conidia hyaline, aseptate, fusiform, slightly curved, apex obtuse, base truncate, guttulate, 9-12 x 2.3-3.0 µm, apical and basal appendage single, 10-15 µm long, lateral appendages 0-1, 4-8 µm long, arising from 2/3 of the conidial body from the base.

Colonies on PDA effuse, colonies 1.8-2.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, slightly grey or soil brown, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: On dead culm of grass, China, Beijing, Huairou, Beigou, Mutianyu, 09 Oct 2012, W.P. Wu (Holotype WFH Wu15100, holotype); China, Beijing, Huairou, Beigou, Mutianyu, on dead culm of grass, 09 Oct 2012, W.P. Wu (Wu15098, Wu15105); China: Zhejiang Province, Hangzhou, Longjing, on dead culm of grass, 1 Oct. 2013, W.P. Wu (Wu13000). Living strain: 54971 (from Wu15098), ex-type strain CGMCC 3.20651 (=NN 54975) and 54980 (from Wu15105), 57315 (from Wu13000),

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Dinemasporium multisetulum* W.P. Wu & Y.Z. Diao differs from other species in the genus by its shorter and slightly curved conidia with long terminal appendages and shorter lateral appendages (Sutton 1980; Nag Rag 1993; Crous et al. 2012, 2014; Hashimoto et al. 2015a). The ITS sequences show high identity to those from *D. japonicum*, but morphologically it can be easily distinguished by larger conidia and with lateral appendages in *D. multisetulum* (Hashimoto et al. 2015a). Some variation on conidial setulae were observed within the same specimen and also among different collections. For example, the conidia in the specimen Wu15105 are found to be with 1 basal and apical setulae or also with 1-2 lateral setulae; the conidia in the specimen Wu15098 are only with polar setulae.

Dinemasporium multisetulum clearly belongs to a small group of a few known species under *Stauronema* (Sacc.) Syd., P. Syd. & E.J. Butler and *Dinemasporium*, including *Stauronema indicum* Kalani (conidia 7-13 x 2-3 µm, terminal appendage 6.5-17 µm long, lateral appendages 8-20 µm long), *D. ambiguum* A. Hashim. & Kaz. Tanaka (conidia 8-11.5 x 2-4 µm, terminal appendages 5-12 µm, lateral appendages 4-10 µm), *D. cruciferum* Ellis (conidia 9.5-14 x 2-3.5 µm, terminal appendages 8-13.5 µm, lateral appendages 7-16 µm), *D. pseudoindicum*

Crous (conidia 9-13 x 3-4 µm, terminal appendages 9-22 µm, lateral appendages 10-17 µm and 4-6 µm) and *D. trichophoricola* Crous & Quaedvlieg (conidia 9-11 x 2.5-3 µm, terminal appendages 9-13 µm long, lateral appendages 8-11 µm long) on conidial morphology (Nag Raj 1993; Crous et al., 2014; Crous et al., 2014; Hashimoto et al., 2015a). These species can be easily distinguished from each other by conidial morphology (shape, size and subapical appendage) and the ITS sequences (Sutton 1969, 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a). *D. multisetulum* differs from all of them by much shorter lateral appendages (4-8 µm long). Furthermore, the ITS sequences from the obtained strains are also significantly different from other known species. Phylogenetically, on a megablast search using the ITS sequences from the strain obtained from the type specimen Wu15100, the closest matches in NCBI's GenBank nucleotide database were *D. japonicum* (GeneBank NR155037, identities 452/454 (99%), 1 gap (0%)), *D. sasae* (GeneBank NR155038, identities 446/454 (98%), 1 gap (0%)), *D. cruciferum* (GeneBank AB900893, identities 443/469 (94%), 16 gaps (3%)).

Dinemasporium parastrigosum A. Hashim. & Kaz. Tanaka, Mycoscience 56: 94, 2015.

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered, cupulate, superficial, globose, unilocular, 150-500 µm, 140-160-280 µm high, dark brown to black; basal stroma 15-25 µm thick, composed of pale brown to hyaline, rectangular; excipulum composed of hyaline inner layer and brown out layer. Setae arising from the basal stroma, straight or curved, septate, brown but pale at the apex, thick-walled, unbranched, 250-500 µm long, acute and 4-7 µm wide at the apex, 7-10 µm wide at the base. Conidiophores lining the basal stroma, rectangular to cylindrical, smooth, pale brown to hyaline, unbranched, 10-25 x 2-3 µm. Conidiogenous cells phialidic, cylindrical, hyaline, smooth, 5-14 x 1.5-2.5 µm. Conidia naviculate to ellipsoid, obtuse or slightly acute at the apex, slightly truncate at the base, unicellular, hyaline, smooth, 8-13 x 2-3 µm, bearing a single unbranched appendage at each end; apical appendage 6-11 µm long, central; basal appendage excentric, similar size as apical appendage.

Material examined: China: Shan'Xi, Zhouzhi, Qinling mountain, on dead leaves of grass, 22 Aug. 2019, W.P. Wu (Wu16518); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead culm of grass, 22 Aug. 2019, W.P. Wu (Wu16617, Wu16519); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead leaves of *Phragmites australis*, 22 Aug. 2019, W.P. Wu (Wu16524). Living strain: 76789 (from Wu16518), 76790 (from Wu16519), 76793 (from Wu16524), 76857 (from Wu16617).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a).

Notes: Morphologically *D. parastrigosum* A. Hashim. & Kaz. Tanaka has close affinities with *D. strigosum*. In fact, they can hardly be distinguished from each other on conidia and appendage, but their ITS sequences have 18-22 bp differences and formed two distinct clades in the phylogenetic tree (Hashimoto et al. 2015a).

Dinemasporium pingue (Nag Raj) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841736.

≡ *Stauronema pingue* Nag Raj, Coelomycetous anamorphs with appendages-bearing conidia. p.908, 1993.

≡ *Dinemasporium pingue* (Nag Raj) W.J. Li & K.D. Hyde, Fung. Div. 100: 495, 2020 (Invalid)

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, blackish, scattered or aggregated, cupulate, unilocular, circular to oblong on top view, 150-400 µm diam and 250-350 µm high; Basal wall of textura angulari composed of brown, thick-walled cells and become pale brown to hyaline towards the inner layers, up to 35 µm thick; lateral wall of textura porrecta, formed by dark brown, thick-walled and longer cells in the outer layers and become pale brown to hyaline, thin-walled cells in inner layers, up to 30 µm thick. Setae black, 3-9 septate, straight, or slightly curved, tapering towards the apex, apex acute, wall thick and smooth, 80-160 x 3.5-6 µm. Conidiophores hyaline, 1-2 septate, unbranched or branched at the base, cylindrical, wall thin and smooth, 7-15 x 3-5 µm, arising from the inner layer of both basal and lateral walls. Conidiogenous cell discrete or integrated, determinate, hyaline, cylindrical to lageniform, wall thin and smooth, apex narrow with a prominent thickening and a narrow sporulating channel, 3.5-7.5 x 2-3.5 µm. Conidia holoblastic, hyaline, aseptate, ellipsoidal, straight or slightly curved, apex rounded, base truncate, wall thick and somewhat rough, guttulate, 11.2-14 x 4.2-5.5 µm, basal appendage single, 15-28 µm long; apical appendage single, 13-25 µm long; lateral appendages 2 or rarely 1, subapical, 15-25 µm long, located at 3.5 µm below the apex.

Material examined: Mt. Maknln Res. St., Bhilanga, N, Rhoderia, On *Rottboellia exaltata*, 20 Feb. 1962, PPNR 4033, IMI95775a.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: India, Portugal.

Description and illustration: Nag Raj (1993); Li et al. (2020)

Notes: *Stauronema pingue* Nag Raj was described from India and is characterized by much wider conidia with subapical lateral appendages (Nag Raj 1993; Li et al. 2020). The examined specimen IMI95775 (originally identified as *Stauronema* sp.) represents the second collection of this species.

Dinemasporium polygonum Crous & Verkley, Persoonia 27: 133, 2012.

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, 150-300 µm diam, setose with a central white to slightly pink conidial mass; basal stroma of textura angularis, composed of subhyaline to pale brown, irregularly shaped cells, 2-4 µm wide; excipulum well-developed, lateral wall of textura prismatica to textura porrecta formed by brown, thick-walled cells that are hyaline towards the inner layer, 140-180 µm high, cells 2.5-3 µm wide, apical cell not separated and with obtuse or rounded apex. Setae brown to black, simple, septate, subulate with acute apex, unbranched, smooth, thick-walled, septate, 110-300 × 5-10 µm, 1.5-2 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining the basal stroma, hyaline, 1-3-septate, sparingly branched, cylindrical, thin-walled, smooth, 40-50 × 2-4 µm. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical to lageniform, 15-20 × 1.5-2 µm. Conidia hyaline, aseptate, thin-walled, smooth, naviculate to fusiform or ellipsoid, gently curved or straight, apex obtuse to subobtusely rounded, base truncate, eguttulate or guttulate, 10-11.5 (-12.5) × 2-2.5 µm, with a single, unbranched, flexuous, tubular appendage at each end, 6-8 µm; basal appendage excentric.

Material examined: UK: Scotland, Newton Steward, Galloway Forestry Park, on dead culms of unidentified grass, July 2019, W.P. Wu (Wu16502). Living strains: 76775 and 76777 (from Wu16502).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Netherland, UK.

Description and illustration: Crous et al. (2012).

Notes: *Dinemasporium polygonum* Crous & Verkley has conidia (10-12 × 2.5 µm) with longer appendages (10-12 µm) than *D. strigosum* (Pers.) Sacc. though shorter than in *D. americanum* (6-9 µm long in *D. strigosum*, 11-16 µm in *D. americanum*) (Crous et al. 2012). Morphologically the fungus from the Chinese collection is well aligned with the those in the original description, except for the shorter setulae.

Dinemasporium pseudodecipens A. Hashim. & Kaz. Tanaka, Mycoscience 56: 95, 2015.

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered to gregarious, superficial, black, cupulate to discoid with lateral prosenchymatic wall of textura porrecta composed of hyaline to pale colored, septate hyphae in the inner layer and brown, septate hyphae in the outer layer; basal wall of textura angularis composed of pale brown to hyaline and thin-walled cells in the upper layer and of brown, thick-walled and isodiametric cells in the lower layer, 150-600 µm diam. Setae brown to dark brown, tapering to an acute or rounded apex, unbranched, septate, wall thick and smooth, arising from the outer layer of basal stroma and sometimes from the outer layer of lateral excipulum, 55-230 × 4.5-8.5 µm. Conidiophores hyaline, smooth-walled, septate, branched at the base, cylindrical, formed from the upper cells of basal stroma, 10-30 × 1.5-2.5 µm. Conidiogenous cells enteroblastic, phialidic, hyaline, determinate, cylindrical with a slightly tapered apex, apical channel minute and collarete not prominent, 8-20 × 1.5-2.5 µm. Conidia hyaline, aseptate, eguttulate or guttulate, naviculate, curved or straight, wall smooth, ends obtuse, 5.5-8 × 2.5-3 µm, setulae straight or curved, unbranched, 1.5-4 µm long.

Material examined: China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, on dead branches of tree, 25 Sept 2020, W.P. Wu (Wu17386a, 17386b); China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, on dead culm of unidentified grass, 25 Sept 2020, W.P. Wu (Wu17389a, Wu17389b, Wu17390, Wu17391); China: Hebei Province, Zhangjiakou, Chicheng, Haituoshan, on dead stem of unidentified grass, 25 Sept 2020, W.P. Wu (Wu17415a, Wu17415b, Wu1746a, Wu17416); China: Hebei, Shijiazhuang, on dead branched of *Sophor japonica* L., 10 September 1990, Wu W.P., Wu1529; China: Jilin Province, Dunhua, on dead branches of unidentified plant, 14 Aug. 2000, W.P. Wu & Yang Huang (Wu4562b); China, Jilin Province, Changbaishan, on dead wood of ?*Salix* sp., 5 Sept. 1998, W.P. Wu, Wu1735 a; China, Jilin Province, Changbaishan, on dead wood of ?*Alnus* sp., 5 Sept. 1998, W.P. Wu, Wu1752 b; China, Jilin Province, Changbaishan, on dead branches of *Salix* sp., 5 Sept. 1998, W.P. Wu, Wu1767a; China, Jilin Province, Changbaishan, on rotten wood of *Betula* sp., 5 Sept. 1998, W.P. Wu, Wu1823b; China: Liaoning Province, on unidentified hosts, 8 Aug. 1993, Wu W.P., Wu0571; China: Shan'Xi Province, on dead branch of *Acer* sp., 11 October 1992, Wu W.P., Wu1533; China: Shaanxi Province, on dead branches of *Syringa* sp., 3 October 1992, Wu W.P., Wu1512; China: Shaanxi Province, Xian, on unidentified hosts, 10 October 1992, Wu W.P., Wu1537, Wu1541, Wu1546; China: Yunnan, Kunming, Botanical Garden, on dead branches of unidentified plant, 22 Oct 1999, W.P. Wu and Yan Huang (Wu2526); China, Yunnan, Kunming, Shilin, on dead branches of unidentified plant, 24 Oct. 1999, W.P. Wu and Yan Huang (Wu2546a). Living strain: 44551 (from Wu1735a), 44567 (from Wu1752d), 44597 (from Wu1767a), 45693 (from Wu2546a), 47604 (from FSDA2), 46487 (from Wu4562b), 78123 (from Wu17386a), 78146 (from Wu17386b), 78124 (from Wu17389a), 78125 (from Wu17389b), 78126 (from Wu17390a), 78127 (from Wu17390), 78128 (from Wu17391), 78138 (from Wu17415a), 78139 (from Wu17415b), 78141 (from Wu17416), 78140 (from Wu17416a).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a); Li et al. (2020).

Notes: *D. pseudodecipiens* A. Hashim. & Kaz. Tanaka is similar to *D. decipiens* (De Not.) Sacc. in having small conidia with short terminal appendages but differs by narrower conidia and longer setulae in the latter species (conidia 4-6.5 x 1.0-1.6 µm, appendages 3.5-6 µm long) (Sutton 1969, 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a). For comparison, the type specimen of *D. decipiens* (IMI94869, slide ex Herb. K) was examined by us and the conidia are 4-6.5 x 1.0-1.6 µm with one setula at each end and measured 3.5-6 µm long. The type specimen of *D. robiniae* W.R. Gerard (IMI94857, slide ex Herb. K) was also examined and it was concluded that it is conspecific with *D. decipiens*. Furthermore, the ITS sequences are very different between the two species (Crous et al. 2012; Hashimoto et al. 2015a). *D. pseudodecipiens* from the Chinese collections is well aligned with those in the original description from Japan (conidia 5-7.5 x 2-3 µm, appendage 2-4 µm long). All the strains obtained from the fresh specimens in China have almost identical ITS sequences to those reported by Hashimoto et al. (2015a). *D. pseudodecipiens* is a common species on dead twigs and wood of many deciduous trees such as *Acer*, *Ailanthus*, *Fraxinus*, *Robinia*, etc. *D. acerinum* Peck reported in China by Teng (1963) and Wu (1993) should be transferred to *D. pseudodecipiens*.

Dinemasporium pseudostrigosum Crous, Persoonia 28: 134, 2012.

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, up to 350 µm diam, setose with a central buff conidial mass; basal stroma of textura angularis, layer 15-25 µm thick. Setae brown to black, simple, septate, subulate with acute apex, unbranched, smooth, thick-walled, septate, 280-510 (-550) x 5-8 µm, 1.5-2 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining the basal stroma, hyaline, septate, sparingly branched, cylindrical, thin-walled, smooth, 20-35 µm long. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical to lageniform, 12-18 x 2-2.5 µm. Conidia hyaline, aseptate, thin-walled, smooth, naviculate to fusiform or ellipsoid, gently curved or straight, apex obtuse to subobtusely rounded, base truncate, eguttulate or guttulate, 11-14.5 x 2-2.5 µm, with a single, unbranched, flexuous, tubular appendage at each end, 5-6 µm long; basal appendage excentric.

Material examined: UK: Scotland, Newton Steward, Galloway Forestry Park, on dead culm of grass, July 2019, W.P. Wu (Wu16500). Living strain: 76782 and 76783 (from Wu16500).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Cuba.

Description and illustration: Crous et al. (2012).

Notes: Morphologically *D. pseudostrigosum* Crous is similar to *D. strigosum* (Pers.) Sacc. but distinct in that it has larger conidia with longer appendages (Crous et al. 2012). The conidial setulae from the British collection are much shorter than those from the type specimen.

Dinemasporium sinense W.P. Wu, J.X. Duan & X.Z. Liu, Fung. Diversity 26: 215, 2007. Figs. 275-276

Mycelium immersed, hyaline to brown, branched, septate. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, unilocular, superficial, scattered to aggregated, setose, black, cupulate to discoid, ellipsoid to spherical on the top view, 0.3-1.2 mm long and 200-500 µm wide; basal wall of textura angulari composed of brown, thick-walled, isodiametric cells which are hyaline and thin-walled on the upper layer; lateral wall of textura prismatica with thick-walled, brown to dark brown, elongated cells, well developed or very poor. Setae black, septate, simple, wall thick and smooth, straight, cylindrical and tapering towards the apex, apex acute or obtuse, 200-600 X 5.5-8 µm. Conidiophores hyaline, 1-septate, branched or unbranched, wall thin and smooth, cylindrical, 7-12 X 1.2-2 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or integrated, hyaline, thin- and smooth-walled, cylindrical with a marked periclinal thickenings around the sporulating channel, the collar in conspicuous, 5-12 X 1.2-2 µm. conidia hyaline, aseptate, naviculate, end rounded, curved or straight, wall smooth and thin, 6-11 X 1.2-1.5 µm, with one setula of 0.5-1.2 µm long.

Material examined: China: Hebei Province, Chengde, on dead culms of unidentified grass, 12 Sept. 1991, W.P. Wu (Wu525, holotype); China: Hebei Province, Chengde, on dead culms of unidentified grass, 12 September 1991, Wu W.P. (Wu525, holotype); China: Hebei Province, Chengde, on dead culms of unidentified grass, 12 Sept. 1991, Wu W.P., Wu0552; China: Hebei Province, Chengde, on dead culms of unidentified grass, 12 Sept. 1991, Wu W.P., Wu0552; China: Hebei Province, Chengde, on dead culms of unidentified grass, 11 Sept. 1991, Wu W.P., Wu0521, Wu0551, Wu0553; China: Hebei Province, Chengde, Bishushanzhuang, on dead culms of unidentified grass, 11 Sept 2012, W.P. Wu (Wu15058); China: Hebei Province, Chengde, Bishushanzhuang, on dead culms of unidentified grass, 11 Sept 2012, W.P. Wu (Wu15059); China: Hebei Province, Chengde, Bishushanzhuang, on dead culms of unidentified grass, 11 Sept 2012, W.P. Wu (Wu15060). Living strain: 54655 (from Wu15059), 54677 (from Wu15058), 54678 (from Wu15060).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Duan et al. (2007).

Notes: *Dinemasporium sinensis* is characterized by fusiform conidia with very short appendages (<1.5 µm long) (Duan et al. 2007). Three strains were obtained from fresh specimens recently collected on the same host growing in the same locality as the holotype specimen. Except for smaller conidiomata, morphologically they are identical to the fungus from the type specimen. The ITS sequences of those 3 strains are identical and clearly different from other known species. Phylogenetically, on a megablast search using the ITS sequences from the strain obtained from the specimen Wu15060, the closest matches in NCBI's GenBank nucleotide database were *Dinemasporium pseudoindicum* (GeneBank NR137787, identities 465/482 (96%), 9 gaps (1%)), *D. pseudodecipens* (GeneBank NR155039, identities 456/476 (96%), 14 gaps (2%)), *D. americana* (GeneBank MH864432, identities 455/475 (96%), 16 gaps (3%)).

Dinemasporium spinificis (Subhedar & V.G. Rao) R. Kirschner & Yu Hung Yeh, Sydowia 68:50, 2016.

≡ *Stauroinema spinificis* Subhedar & V.G. Rao, J. Univ. Poona 48:65, 1976. [MB#324017]

Geographical distribution: China, India.

Description and illustration: Subhedar & Rao (1976); Yeh & Kirschner (2016).

Notes: This is another *Stauroinema* species which is transferred to *Dinemasporium*. Its occurrence in Taiwan, China was reported by Yeh and Kirschner (2016).

Dinemasporium strigosum (Pers.) Sacc., Michelia 2:281, 1881.

≡ *Peziza strigosa* Pers. : Fr., Syst. Mycol. 2:103, 1882.

= *Dinemasporium graminum* (Lib.) Lév., Ann. Sci. nat., 3 Sér., 5:274, 1846.

Other synonyms see Sutton (1980) and Nag Raj (1993).

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, black, cupulate, ellipsoid to spherical in top view, 150-800 µm in diam; basal stroma of textura angularis composed of hyaline to brown, isodiametric cells; excipulum well-developed, lateral wall of lateral wall of textura prismatica to textura porrecta, formed by dark brown to blackish, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 90-130 µm high, up to 40 µm thick. Setae brown to black, simple, septate, cylindrical with an acute or obtuse apex, wall thick and smooth, 250-500 µm long, 7-12 µm wide at the base, arising from basal part of conidiomata or sometimes from lateral excipulum. Conidiophores hyaline, septate, branched, or unbranched, cylindrical, wall thin and smooth, up to 30 µm long, 1.5-2.5 µm wide. Conidiogenous cells enteroblastic phialidic, determinate, hyaline, cylindrical, apex with narrow channel and an inconspicuous collar, 7-10 x 1.5-2 µm. Conidia hyaline, aseptate, wall thin and smooth, naviculate to fusiform, curved or straight, ends rounded, eguttulate or guttulate, 8-10 x 2-2.2 µm, with a single, unbranched setulae at each end, 6-8 µm long.

Material examined: UK: Scotland, Newton Steward, Galloway Forestry Park, on dead culm of grass, July 2019, W.P. Wu (Wu16501). Living strain: 76770 and 76771 (from Wu16501).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Belgium, Germany, Japan, Netherland, Portugal, South Africa, Sweden, UK, USA, Worldwide (Sutton, 1980; Nag Raj, 1993; Crous et al., 2012).

Description and illustration: wang (1955), Sutton (1980), Nag Raj (1993), Crous et al. (2012), Hashimoto et al. (2015b), Li et al. (2020).

Notes: A full account of *Dinemasporium strigosum* complex was given by Webster (1955), Sutton (1977, 1980) and Nag Raj (1993). A comparison between *D. strigosum* and some closely related species including *D. longicapillatum* Y. Yamaguchi & Masuma was given by Yamaguchi et al. (2005). Among the many collections examined by us, only one specimen collected from UK is identified to be true *D. strigosum* as defined by Crous et al. (2012). Duan et al. (2007) recorded *D. strigosum* with many collections from different substrates, but no living strain was studied at that time. Those collections are most likely a mixture of several different species yet to be studied.

Dinemasporium suttonii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 277, MycoBank MB841664.

Etymology: Named after the former CMI mycologist Brian C. Sutton.

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaves of bamboo, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu16993; ex-type strain CGMCC 3.20802 (= NN 77298)).

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, 150-350 µm diam, setose with a central white conidial mass; basal stroma of textura angularis, composed of hyaline to pale brown, irregularly shaped cells, 2-4.5 µm diam; excipulum well-developed, lateral wall of lateral wall of textura prismatica to textura porrecta, formed by dark brown to blackish, thick-walled, longer cells in the outer layer and pale brown to hyaline, thin-walled cells in the inner layers, 120-150 µm high, up to 35 µm thick, apical cell not separated and with rounded or obtuse apex. Setae brown to black, simple, septate, subulate with acute apex, unbranched, smooth, thick-walled, septate, 350-500 x 5-8 µm, 2-3 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining

the basal stroma, hyaline, septate, sparingly branched, cylindrical, thin-walled, smooth, 17–22 x 1.8–2.2 µm. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical to lageniform, 6–11 x 1.8–2.2 µm. Conidia hyaline, aseptate, thin-walled, smooth, naviculate to fusiform or ellipsoid, gently curved or straight, apex obtuse to subobtusely rounded, base truncate, eguttulate, 9.5–13 x 2–2.5 µm, with a single, unbranched, flexuous, tubular appendage at each end, 7–9 µm; basal appendage excentric.

Colonies on PDA effuse, colonies 1.8–2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey to pale yellow in the center, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaves of bamboo, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu16993); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on dead leaves of bamboo, 16 Oct. 2019, W.P. Wu (Wu16992). Living strain: 77297 (from Wu16992), ex-type strain 77298.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Dinemasporium suttonii* B. Sutton also belongs to *D. strigosum* group with naviculate to fusiform conidia and polar setulae. Morphologically it can hardly be distinguished from other species, but its ITS sequence is significantly different from other species (Sutton 1980; Nag Raj 1993; Crous et al. 2012; Hashimoto et al. 2015a).

Phylogenetically, on a megablast search using the ITS sequences from the strain obtained from the type specimen Wu16993, the closest matches in NCBI's GenBank nucleotide database were *D. decipiens* (GeneBank JQ889275, identities 433/470 (92%), 10 gaps (2%)), *D. cruciferum* (GeneBank AB900983, identities 421/463 (91%), 13 gaps (2%)), *D. parastrigosum* (GeneBank MW114342, identities 424/467 (91%), 18 gaps (3%)).

Dinemasporium tubakii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 278, MycoBank MB841665.

Etymology: named after the mycologist Tubaki from Japan.

Diagnosis: Similar to *Dinemasporium longicarpillatum* in conidial shape and size, but differs in shorter setulae and also ITS sequence.

Typification: China: Jiangsu Province, Zhenjiang, Jin Shan Park, on dead culm of grass 23 Aug. 2015, W.P. Wu (Holotype WFH Wu13446; ex-type strain CGMCC 3.20798 (= NN 71228)).

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, up to 300 µm diam, setose with a central buff conidial mass; basal stroma of textura angularis, layer 18–30 µm thick. Setae brown to black, simple, septate, subulate with acute apex, unbranched, smooth, thick-walled, septate, 140–315 x 5–7 µm, 1.5–2 µm wide at acute apex, arising from basal stroma or lateral from excipulum. Conidiophores lining the basal stroma, hyaline, septate, sparingly branched, cylindrical, thin-walled, smooth, 18–35 x 1.5–2.5 µm. Conidiogenous cells determinate, phialidic with periclinal thickening, hyaline, smooth, subcylindrical to lageniform, 10–14 x 2–2.5 µm. Conidia hyaline, aseptate, thin-walled, smooth, fusiform, gently curved, apex obtuse to subobtusely rounded, base truncate, eguttulate or guttulate, 8–10 x 2–2.5 µm, with a single, unbranched, flexuous, tubular appendage at each end, 7–10 µm long; basal appendage excentric.

Material examined: China: Jiangsu Province, Zhenjiang, Jin Shan Park, on dead culm of grass 23 Aug. 2015, W.P. Wu (Wu13442c, Wu13446-Holotype). Living strain: 71228 and 71229 (from Wu13446).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Known distribution: China.

Notes: Morphologically *D. tubakii* Crous is similar to *D. longicarpillatum*, but distinct in conidia with shorter setulae and different ITS sequence (Hashimoto et al. 2015a). Its ITS sequence is with only a few bases difference from *D. pseudostrigosum*.

Dinemasporium yongnianii W.P. Wu & Y.Z. Diao, sp. nov., Fig. 279, MycoBank MB841666.

Etymology: Named after the Chinese mycologist Prof. Yongnian Yu from Institute of Microbiology, Chinese Academy of Science.

Typification: China: Shan'Xi Province, Zhouzhi, Qinling mountain, on dead leaf, culm and seed of grass, 2 Aug. 2019, W.P. Wu (Holotype WFH Wu16535; ex-type strain CGMCC 3.20734 = NN 76866).

Mycelium immersed, composed of septate, branched, smooth and brown hyphae. Conidiomata eustromatic, superficial, black, cupulate, ellipsoid to spherical in top view, 150–400 µm in diam; basal stroma of textura angularis composed of hyaline to brown, isodiametric cells; lateral wall of textura prismatica to *textura porrecta* formed by brown, septate, thick-walled cells that are hyaline towards the inner layer, 250–290 µm high, 2–3 µm wide. Setae brown to black, simple, septate, cylindrical with an acute or obtuse apex, wall thick and smooth, 150–290 x 10–12 µm, tapering to 4–6 µm at the apex, arising from basal part of conidiomata or sometimes from lateral excipulum. Conidiophores hyaline, septate, branched, or unbranched, cylindrical, wall thin and smooth, up to 25 µm long, 1.5–3 µm wide. Conidiogenous cells enteroblastic phialidic, determinate, hyaline, cylindrical, apex with

narrow channel and an inconspicuous collar, 12-15 x 1.5-2 µm. *Conidia* hyaline, aseptate, wall thin and smooth, naviculate, curved, ends rounded, eguttulate or guttulate, 9-12 x 2-2.3 µm, with a single, unbranched setulae at each end, 6-9 µm long.

Colonies on PDA effuse, colonies 1.5-2.0 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly yellow, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Beijing, Yanqing, Changchengjiaoxia Gongshe, on dead culm of unidentified grass, 4 Nov. 2013, W.P. Wu (Wu15134, 15136); China: Beijing, Huairou, Beigou Village, on dead stem of unidentified herbaceous plant, 06 April 2012, W.P. Wu (Wu15093, Wu15094, Wu15097, Wu15106, Wu15107, Wu15108); Beijing, Huairou, Beigou Village, on dead stem of unidentified herbaceous plant, 06 April 2012, W.P. Wu (Wu15000); China, Beijing, Huairou, on dead leaves of *Phragmites* sp., 20 July 2003, W.P. Wu (CXQ1); China: Beijing, Yanqing, Songshan, on dead stem of unidentified plant, 06 Aug. 2012, W.P. Wu (Wu15007); China: Hebei Province, Chengde, Bishushanzhuang, on dead culm of grass, 11 Sept. 2012, W.P. Wu (Wu15051, Wu15053, Wu15054, Wu15061, Wu15063, Wu15075, Wu15076, Wu15064); China: Ningxia Province, Jingyuan County, Liupan Mountain, Linchang, on dead stems of grass, 23 Aug. 1997, W.P. Wu (Wu1017); China: Shan'Xi Province, Zhouzhi, Qinling mountain, on dead leaf, culm and seed of grass, 2 Aug. 2019, W.P. Wu (Wu16535, Wu16517, Wu16523, Wu16533, Wu16534, Wu16535-holotype, Wu16538, Wu16541); China, Shan'Xi, Zhouzhi, Qinling mountain, On dead leaf, culm and seed of grass, 22 Aug. 2019, W.P. Wu (Wu16520); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead culm of *Arundo donax*, 22 Aug. 2019, W.P. Wu (Wu16531); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead leaf and culm of grass, 22 Aug. 2019, W.P. Wu (Wu16537, Wu16540); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead culm of grass, 22 Aug. 2019, W.P. Wu (Wu16539, Wu16543, Wu16544, Wu16545, Wu16548, Wu16549, Wu16557, Wu16558); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead leaf of *Phragmites australis*, 22 Aug. 2019, W.P. Wu (Wu16559); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead branches of *Lilium brownii* var. *viridulum*, 22 Aug. 2019, W.P. Wu (Wu16576); China: Shan'Xi, Zhouzhi, Qinling mountain, on dead leaf of *Phragmites australis*, 22 Aug. 2019, W.P. Wu (Wu16562); other specimens no. Wu0501, 0502, 0503, 0505, 0506, 0507, 0508, 0509, 0510, 0511, 0513, 0514, 0518, 0519, 0520, 0527, 0530, 0532, 0538, 0539, 0543, 0545, 0548, 0550, 0554, 0557, HMAS33611(S), HMAS01437, HMAS06649, HMAS33255(S) and distributed in Beijing, Fujian, Hebei, Jiangsu, Liaoning, Shaanxi, Yunnan. Living strain: 54422 (from Wu15000), 54596 (from Wu15007), 54673 (from Wu15051), 54654 (from Wu15054), 54657 (from Wu15063), 54658 (from Wu15064), 54660 (from Wu15075), 54661 (from Wu15076), 54968 (from Wu15093), 54969 (from Wu15094), 54970 (from Wu15097), 54981 (from Wu15106), 54982 (from Wu15107), 54983 (from Wu15108), 76828 (from Wu16517), 76861 (from Wu16523), 76865 (from Wu16533), 76893 (from Wu16534), 16538 (from Wu16538), 76867 (from Wu16541), 47605 (from CXQ1), 54656 (from Wu15061), 57357 (from Wu15134), 57359 (from Wu15136), 76791 (from Wu16520), 76800 (from Wu16531), 76803 (from Wu16537), 76805 (from Wu16540), 76806 (from Wu16543), 76807 (from Wu16544), 76808 and 77129 (from Wu16545), 76810 (from Wu16548), 76811 (from Wu16549), 76813 (from Wu16557), 76814 (from Wu16558), 76815 (from Wu16559), 76820 (from Wu16576), 76816, 76817 and 76869 (from Wu16562), 76804 (from Wu16539), 76866 (ex-type strain).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Dinemasporium strigosum* (Pers) Sacc. has been shown to be a species complex which can only be separated by minor difference on conidial morphology (shape, size, length of setulae), but can be clearly identified by DNA sequences of molecular marker, as demonstrated by Yamaguchi et al. (2005), Crous et al. (2012), Hashimoto et al. (2015a) and this study. Among the studied specimens and strains from China, a large number of them represent a morphologically similar species to *D. strigosum* species complex, but differ from them by ITS sequences, here we name them as a new species *D. yongnianii*. Morphologically *D. yongnianii* is very similar with *D. americanum* Crous & Tuthill, *D. morbidum* Crous, *D. pseudostrigosum* Crous and *D. strigosum* (Nag Raj 1989; Crous et al. 2012; Hashimoto et al. 2015a). Among the many collections studied, most specimens belong to *D. yongnianii*, while only one strain collected from UK is a true *D. strigosum* as defined by Crous et al. (2012).

On a megablast search using the ITS sequences from the strain obtained from the specimen Wu16576, the closest matches in NCBI's GenBank nucleotide database were *D. morbidum* (GeneBank NR137788, identities 461/471 (98%), 2 gaps (0%)), *D. cruciferum* (GeneBank AB900893, identities 448/474 (95%), 9 gaps (1%)), *D. parastrigosum* (GeneBank MW114342, identities 447/476 (94%), 10 gaps (2%)), *D. strigosum* (GeneBank NR121540, identities 445/478 (93%), 17 gaps (3%)).

Brunneodinemasporium Crous & R.F. Castañeda, Persoonia 28: 128, 2012.

Teleomorph: Unknown. Anamorph: Conidiomata stromatic, scattered or aggregated, superficial, dark brown to black, cupulate, unilocular, globose, setose; basal stroma of textura angularis. Setae abundant, brown to black, simple, septate, subulate to cylindrical, unbranched, smooth, thick-walled, multi-septate, arising randomly

throughout basal stroma. Conidiophores lining the basal stroma in a dense layer, brown, septate, unbranched, cylindrical, thin-walled, smooth. Conidiogenous cells integrated, determinate, phialidic with conspicuous periclinal thickening at an attenuated apex, brown, smooth, subcylindrical to lageniform. Conidia hyaline to pale brown, aseptate, thin-walled, smooth, fusiform, gently curved or straight, apex obtuse to subobtusely rounded, base truncate, eguttulate or guttulate, with a single, cellular, unbranched, flexuous, with tubular appendage at each end, separated by a septum; basal appendage excentric.

Type species. *Brunneodinemasporium brasiliense* Crous & R.F. Castañeda

Ecology/Substrate/Host: Saprobe on dead material of plant, especially on leaves and culm of various grasses and bamboo, but also found on rotten wood.

Geographical distribution: Brazil, China.

Description and illustration: Crous et al. (2012).

The genus *Brunneodinemasporium* was introduced by Crous et al. (2012) to accommodate a *Dinemasporium*-like species with randomly distributed setae throughout the basal stroma, tightly aggregated brown conidiogenous cells and pale brown conidia, which differs from *Dinemasporium*. Except for the type species, *B. brasiliense* Crous & R.F. Castañeda, the second species, *B. jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde, was added into the genus from China (Lu et al. 2016). On the phylogenetic tree generated by using the combined ITS and LSU sequence data, all *Brunneodinemasporium* species are clustered together with several related genera, including *Neopseudolachnella* and *Pseudodinemasporium*, aligned with other report (Li et al., 2020).

Key to accepted species of *Brunneodinemasporium*

1. Conidia 6-9.5 x 1.5-2 µm, with mucilaginous balls at the end of conidia *B. jonesii*
1. Conidia with setulae appendages at both ends 2
2. Conidia fusiform, 20-23 x 2-2.5 µm; setula 6-7 µm long *B. sinensis*
2. Conidia 18-19 x 2.5-3 µm; setula 5-7 µm long *B. brasiliense*

Brunneodinemasporium jonesii Y.Z. Lu, J.K. Liu & K.D. Hyde, Mycosphere 7: 1326, 2016.

Typification: China: Guangxi Province, Fang Cheng Gang, on decaying wood in a freshwater stream, 15 May 2016, Yong-Zhong Lu, JHC17-1 (GZAAS 16-0062, holotype); ex-type living culture, GZCC 16-0050.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Lu et al. (2016).

Notes: *Brunneodinemasporium jonesii* Y.Z. Lu, J.K. Liu & K.D. Hyde was described as a novel species based on morphological distinctions and phylogenetic analysis for the fungus collected from China (Lu et al. 2016). Morphologically, *B. jonesii* and *B. brasiliense* Crous & R.F. Castañeda are similar in conidiophores and setae, but they differ from each other by conidia shape and appendage. *B. brasiliense* have a single, unbranched, flexuous, tubular appendage at each end, but *B. jonesii* lacks this feature and instead, the conidia are connected by mucilaginous balls (Crous et al. 2012; Lu et al. 2016).

Brunneodinemasporium sinense W.P. Wu & Y.Z. Diao, sp. nov., Figs. 280-281, MycoBank MB841667.

Etymology: refers to the locality where this fungus was discovered.

Typification: China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Cyclobalanopsis glauca*, 12 June 2015, W.P. Wu (Holotype WFH Wu13294a; ex-type strain CGMCC 3.20659 (=NN 58989)).

Mycelium immersed, composed of pale brown, branched, smooth, septate hyphae. Teleomorph: Not observed. Anamorph: Conidiomata sporodochia, scattered, punctiform, pulvinate, dark brown to black, setose, up to 1000 µm in diam. Setae sterile, arising from the lower cells of the stroma, subulate, acutely pointed, mid to dark brown, becoming paler towards the apex, smooth, simple, erect, straight or slightly curved, 5-10-septate, 450-1000 x 8-13 µm, acute at apex. Conidiophores macronematous, formed a close palisade over the surface of the stroma, straight or flexuous, pale brown to brown, becoming subhyaline towards the apex, smooth, 1-4-septate, 150-180 x 2.5-3.5 µm. Conidiogenous cells integrated and terminal or discrete, monophialidic, cylindrical, lageniform, 13-16 x 2.5-3 µm, with a very small apical collarette. Conidia holoblastic, solitary, hyaline, aseptate, curved, fusiform, apex acute, base slightly truncate, 20-23 x 2-2.5 µm, furnished with a setula at each end, 6-7 µm long.

Colonies on PDA effuse, colonies 1-1.4 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, yellow brown, reverse soil brown in the center and becoming paler towards the margins, with purple colored pigment diffused into agar.

Material examined: China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, on dead leaves of *Cyclobalanopsis glauca*, 12 June 2015, W.P. Wu (Holotype WFH Wu13294a); On dead leaves of *Cyclobalanopsis glauca*, China: Zhejiang Province, Hangzhou, Hangzhou Botanical Garden, 12 June 2015, W.P. Wu (Wu13295). Living strain: 58990 (from 13294b), CGMCC 3.20659 (=58989, ex-type strain), 59053 (from Wu13295).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Brunneodinemasporium sinense* W.P. Wu & Y.Z. Diao is characterized by sporodochial conidiomata, presence of setae among conidiophores, and hyaline, aseptate and large conidia (20–23 × 2–2.5 µm) with short appendages at both ends (6–7 µm long). Among the two known species in the genus, *B. jonesii* produces fusiform and smaller (6–9.5 × 1.5–2 µm) conidia with mucilaginous balls released at the conidial ends and connecting the conidia in short false chains, thus can easily be distinguished from *B. sinensis* (Lu et al. 2016). *B. brasiliense* Crous & R.F. Castañeda produces aseptate and fusiform conidia with setulae at both ends, however the conidia in this species are hyaline to pale brown and smaller in size (18–19 × 2.5–3 µm) (Crous et al. 2012).

Phylogenetically, on a megablast search using the ITS sequences from the strain obtained from the type specimen Wu13294, the closest matches in NCBI's GenBank nucleotide database were *Brunneodinemasporium brasiliense* (GeneBank NR137785, identities 499/524 (95%), 9 gaps (1%)), *Brunneodinemasporium jonesii* (GeneBank NR66384, identities 481/512 (94%), 14 gaps (2%)).

***Pseudodinemasporium* A. Hashim. & Kaz. Tanaka**

Mycology 107: 390, 2015. MycoBank MB808707

Teleomorph: Unknown. Anamorph: Conidiomata stromatic, acervular, cupulate, setose, mostly scattered to grouped, superficial, globose, or ellipsoid, dark brown to black; basal stroma well developed, composed of subglobose cells; excipulum composed of rectangular or subglobose, brown cells. Setae arising from excipulum, curved, septate, brown but pale at the apex, smooth, unbranched, thick-walled; inconspicuous setae pale brown, multiseptate. Conidiophores lining the basal stroma, cylindrical, septate, smooth, hyaline, simple or branched. Conidiogenous cells phialidic, cylindrical, hyaline, smooth. Conidia ovoid to ellipsoidal, obtuse at the apex, slightly truncate at the base, unicellular, hyaline, smooth, guttulate, bearing an appendage at each end.

Type species. *Pseudodinemasporium fabiforme* A. Hashim., G. Sato & Kaz. Tanaka

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015a).

Notes: The genus *Pseudodinemasporium* A. Hashim. & Kaz. Tanaka was established to include *P. fabiforme* A. Hashim., G. Sato & Kaz. Tanaka, a *Dinemasporium*-like species. Three genera including *Brunneodinemasporium* Crous & R.F. Castañeda, *Dendrophoma* Sacc. and *Dinemasporium* resemble *Pseudodinemasporium* on setose conidiomata and one-celled conidia with a single appendage at each end. Among these genera, *Dendrophoma* is phylogenetically close to *Pseudodinemasporium* but differs from the latter in that it has conidiomata with a stipe-like basal excipulum composed of dense textura intricata (Crous et al. 2012; Hashimoto et al. 2015a, b). *Brunneodinemasporium* is characterized by a densely aggregated layer of brown conidiogenous cells, hyaline to pale brown conidia, and the conidial appendage is apparently separated from the conidial body by a septum (Crous et al. 2012); these features are absent in *Pseudodinemasporium*. *Dinemasporium* has conidiomata with a poorly developed lateral excipulum (Hashimoto et al. 2015a, b), unlike *Pseudodinemasporium*, which has relatively large conidiomata with a well-developed peridial wall. The genus has not been reported from China and here we described two new species. These three accepted species in the genus are morphologically difficult to be distinguished from each other, but their ITS sequences are with significant difference.

***Pseudodinemasporium elegans* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 282, MycoBank MB841668.**

Etymology: *elegans* (L), beautiful, refers to its conidiomata and conidia.

Typification: China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Holotype WFH Wu12464; ex-type strain CGMCC 3.20655 = NN 55372).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, closed, becoming cupulate, up to 350 µm diam.; basal wall of textura angulari composed of brown, thick-walled cells but the inner layer tend to be hyaline, thin-walled, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched hyphae, inner layer pale brown to hyaline, thin-walled. Setae arising from outside layer of lateral wall, dark brown to black, erect, tapering towards the apex, acute, wall thick and smooth, arising from lateral wall, septate, 210–300 µm long, 4–8 µm wide at the base, 2–3 µm at the apex. Conidiophores pale brown at the base, becoming hyaline towards the apex, 1–3 septate, branched, or unbranched, cylindrical, formed by the inner layer of both base and lateral walls, 23–30 × 1.5–2.5 µm. Conidiogenous cells enteroblastic, phialidic, terminal, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth, 10–13 × 1–1.5 µm. Conidia hyaline, aseptate, naviculate to botuliform, wall thin and smooth, 3–4 (–5) × 1–1.5 µm, bearing an unbranched cellular appendage at each end, 1–2 µm long.

Colonies on PDA effuse, colonies 0.8-1.0 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey to pale brown in the center, reverse brown in the center and becoming paler towards the margins.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead branches of unidentified tree, 25 Dec. 2012, W.P. Wu (Holotype WFH Wu12464). Living strain: ex-type strain 55372.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Pseudodinemasporium elegans* W.P. Wu & Y.Z. Diao differs from the only known species in the genus *P. fabiforme* A. Hashim., G. Sato & Kaz. Tanaka (conidia reniform, ovoid to ellipsoidal, 3-5 x 1-2.5 µm; appendage 0.5-1.5 µm long) by broader conidia and shorter appendages in the latter species (Hashimoto et al. 2015a). Morphologically it is also very similar to *B. brasiliense* Crous & R.F. Castañeda and *Dinemasporium neottiosporioides*, but can be distinguished by conidial morphology and ITS sequence (Agnihotrudu 1962; Sutton 1965, 1969, 1980; Nag Raj 1993; Duan et al. 2007; Crous et al. 2012).

Phylogenetically on a megablast search using the ITS sequences from the strain obtained from the specimen Wu12464, the closest matches in NCBI's GenBank nucleotide database were *Pseudodinemasporium fabiforme* (GeneBank NR154275, identities 498/521 (96%), 5 gaps (0%)), *Neopseudolachnella magnispora* (GeneBank NR154224, identities 485/532 (91%), 17 gaps (3%)), *N. acitospora* (GeneBank NR154223, identities 479/532 (90%), 15 gaps (2%)), *N. uniseptata* (GeneBank NR154225, identities 481/532 (90%), 15 gaps (2%)), *Pseudolachnea hispidula* (GeneBank MN700937, identities 517/575 (90%), 19 gaps (3%)).

***Pseudodinemasporium minimum* W.P. Wu & Y.Z. Diao, sp. nov., Fig. 283, MycoBank MB841669.**

Etymology: refers to its small conidia.

Typification: China: Guangxi Province, Damingshan, on dead leaves of ?*Cinnamomum* sp., 18 Dec. 1997, W.P. Wu (Holotype WFH Wu1382I; ex-type strain CGMCC 3.20702 = NN 43192).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, closed, becoming cupulate, up to 300 µm diam.; basal wall of textura angulari composed of brown, thick-walled cells but the inner layer tend to be hyaline, thin-walled, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched hyphae, inner layer pale brown to hyaline, thin-walled. Setae dark brown to black, erect, tapering towards the apex, acute, wall thick and smooth, arising from lateral wall, up to 7 septate, 130-250 µm long, 4-8 µm wide at the base, 2-3.2 µm at the apex. Conidiophores pale brown at the base, becoming hyaline towards the apex, 1-3 septate, branched, or unbranched, cylindrical, formed by the inner layer of both base and lateral walls, up to 15 µm long, 1.5-2.5 µm wide. Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth, 4-5 x 1.5-2 µm. Conidia hyaline, aseptate, naviculate to botuliform, wall thin and smooth, guttulate, 2.7-3.8 x 1-1.5 µm, bearing an unbranched cellular appendage at each end, 1-1.5 µm long.

Colonies on PDA effuse, colonies 0.7-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey, reverse pale brown in the center and becoming paler towards the margins.

Material examined: China: Guangxi Province, Damingshan, on dead leaves of ?*Cinnamomum* sp., 18 Dec. 1997, W.P. Wu (Holotype WFH Wu1382I). Living strain: ex-type strain NN 43192.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Pseudodinemasporium minimum* W.P. Wu & Y.Z. Diao is morphologically very similar to *P. elegans* W.P. Wu & Y.Z. Diao (conidia naviculate to botuliform, 3-4 (-5) x 1-1.5 µm, setulae 1-2 µm long) and *P. fabiforme* A. Hashim., G. Sato & Kaz. Tanaka (conidia reniform, ovoid to ellipsoidal, 3-5 x 1-2.5 µm; appendage 0.5-1.5 µm long), and by broader conidia and shorter appendages in the latter species (Hashimoto et al. 2015a, b). It is also similar to *B. brasiliense* Crous & R.F. Castañeda and *Dinemasporium neottiosporioides*, but differs by longer conidia with setulae in these two species; furthermore, their ITS sequences are significantly different (Agnihotrudu 1962; Sutton 1965, 1969, 1980; Nag Raj 1993; Duan et al. 2007; Crous et al. 2012).

Phylogenetically on a megablast search using the ITS sequences from the strain obtained from the specimen Wu1382i, the closest matches in NCBI's GenBank nucleotide database were *Pseudodinemasporium fabiforme* (GeneBank NR154275, identities 438/457 (96%), 4 gaps (0%)), *Neopseudolachnella magnispora* (GeneBank NR154224, identities 411/456 (90%), 19 gaps (4%)), *N. acitospora* (GeneBank NR154223, identities 405/455 (89%), 19 gaps (4%)), *N. uniseptata* (GeneBank NR154225, identities 419/470 (89%), 20 gaps (4%)).

***Neopseudolachnella* A. Hashim. & Kaz. Tanaka**

Mycology 107: 385, 2015.

Teleomorph: Unknown. Anamorph: Conidiomata stromatic, acervuloid, mostly scattered, superficial, ellipsoid, dark brown to black, setose; basal stroma composed of globose to subglobose cells; excipulum absent. Setae

marginal or interspersed, arising from basal stroma, straight to slightly curved, septate, brown but pale at the apex, smooth, unbranched, thick-walled. Conidiophores absent or lining the basal stroma, cylindrical, smooth, hyaline, or pale brown, simple. Conidiogenous cells cylindrical to lageniform, smooth, hyaline, or pale brown. Conidia cylindrical to subcylindrical, acute or obtuse at the apex, truncate at the base, septate, smooth, hyaline, bearing a single to multiple appendages at each end; apical appendage central; basal appendage excentric.

Type species: *Neopseudolachnella acutispora* A. Hashim., Sat. Hatak. & Kaz. Tanaka.

Ecology/Substrate/Host: Saprobe on dead material of bamboo.

Geographical distribution: China, Japan.

Description and illustration: Hashimoto et al. (2015b).

Notes: The genus *Neopseudolachnella* A. Hashim. & Kaz. Tanaka was established to accommodate three *Pseudolachnella*-like fungal species, *N. acutispora* A. Hashim., Sat. Hatak. & Kaz. Tanaka, *N. magnispora* A. Hashim., G. Sato and *N. uniseptata* A. Hashim., Sat. Hatak. & Kaz. Tanaka & Kaz. Tanaka, which formed a fully supported phylogenetic clade and is distantly related to other lineages of known genera (Hashimoto et al. 2015b). *Neopseudolachnella* is most similar to *Pseudolachnea* and *Pseudolachnella* in having cylindrical, single- to multiseptate, hyaline conidia with bipolar appendages. It is also clearly separated from the latter two genera by the acervuloid conidiomata lacking a peridial wall compared with the acervular conidiomata with a prominent lateral excipulum present in *Pseudolachnea* and *Pseudolachnella* (Hashimoto et al. 2015b). The flattened setose conidiomata of *Neopseudolachnella* superficially resemble those present in *Rattania* Prabhug. & Bhat, but *Rattania* has sporodochial conidiomata and holoblastic conidiogenous cells sometimes extending sympodially (Prabhugaonkar and Bhat 2009; Bhat 2010). Under the genus *Neopseudolachnella*, two new species were discovered from China and are described. An identification key for all *Pseudolachnea*, *Pseudolachnella* and related fungi is provided as well.

Key to species of *Calvolachnella*, *Neopseudolachnella* (N.), *Pseudolachnea* (P.) and *Pseudolachnella* (Ps.)

1. Setae present; conidia septate, pale brown, with 1 setulae at each end *Calvolachnella guaviyunis*
1. Conidiomata with setae; conidia hyaline.....2
2. Conidiomata eustromatic, without lateral excipulum (*Neopseudolachnella*)3
2. Conidiomata cupulate, with lateral excipulum7
3. Conidia 0-1-septate, fusiform to allantoid4
3. Conidia cylindrical, with more than 3 septa6
4. Conidia aseptate, 9.4-12.5 x 1.8-2 µm; setulae 2-4 µm long *N. moganshanensis*
4. Conidia 1-septate5
5. Conidia 10.5-19.5 x 1.5-2.5 µm..... *N. uniseptata*
5. Conidia 11-12 x 2-2.5 µm, setulae 3-5 µm long..... *N. microsporma*
6. Conidia subcylindrical to fusiform, apex acute, 3-6 septate, 19-40 x 2-3 µm..... *N. acutispora*
6. Conidia cylindrical to subcylindrical, 3-7 septate, 35-62 x 2-3 µm *N. magnispora*
7. Conidia 1-septate (*Pseudolachnea*)8
7. Conidia with 3 or more septa (*Pseudolachnella*)10
8. Macroconidia 1-septate, setulae; microconidia aseptate and no setulae.....*P. fraxini*
8. Only macroconidia produced7
9. Conidia 15-18 X 2-3 µm, setulae 2-3 µm long.....*P. hispidula*
9. Conidia 17-30 X 2-3 µm, setulae 4.5-6 µm long.....*P. macrospora*
10. Conidial with more than 1 branched or unbranched setulae at each end11
10. Conidial with only 1 unbranched setulae at each end16
11. Conidia 3-septate, fusiform to oval, 15-20 x 4-6.5 µm, bearing 2-4 branched or unbranched setulae at each end, 3.5-11 µm long *Ps. fusiformis*
11. Conidia 4-11-septate, cylindrical to subcylindrical11
12. Conidia 4-7 septate, <50 µm12
12. Conidia 7-11-septate, >50 µm long14
13. Conidia (5-)7-septate, 22-28 x 3.5-7 µm, with 1-2 apical and 3-6 basal unbranched setulae.... *Ps. vermospora*
13. Conidia 4-6 septate, 30-40 µm long13
14. Conidia bearing 2-5 unbranched setulae at each end, 1-4 µm long*P. yakushimensis*
14. Conidia bearing 1 basal unbranched and 2-3 apical dichotomously branched setulae of 3-6 µm long *Ps. ryukyuensis*
15. Conidia 7-11-septate, 70-110 x 2.5-3 µm, bearing a single branched or unbranched basal setulae and 2-4 dichotomously branched apical setulae.....*Ps. coronata*
15. Conidia 7-10-septate, 62-90 x 2-3 µm, bearing 2-3 unbranched or branched setulae at each end, 5-15.5 µm long at the apex, 2-5.5 µm at the base..... *Ps. brevicoronata*
16. Conidia subcylindrical, slightly curved, 3-septate.....17
16. Conidia >3-septate20

17. Conidia <35 µm	18
17. Conidia >35 µm	19
18. Conidia 19-25 x 1.5-2.5 µm, setulae 2-4 µm long.....	<i>Ps. minima</i>
18. Conidia 28-35 x 1.5-2 µm, setulae 4-6 µm long.....	<i>Ps. indica</i>
19. Conidia 38-56 x 2.5-3 µm, setulae 2-3 µm long.....	<i>Ps. scolecospora</i>
19. Conidia 28-44 x 2-3 µm, 3-septate, setulae 2-4 µm long	<i>Ps. falcatispora</i>
20. Conidia 7-17 septate, 45-83 x 2.5-3.5 µm; apical setulae 10-47 µm long, basal setulae 8-22 µm long	<i>Ps. longicilicia</i>
20. Conidia 5-7-septate, setulae <10 µm long	21
21. Conidia 5-septate	<i>Ps. antillana</i>
21. Conidia usually 7-septate	22
22. Conidia fusiform to allantoid, (3-) 7-septate, 26-40 x 2-3 µm, setulae 1-2 µm long	<i>Ps. complanata</i>
22. Conidia bearing setulae long then 2 µm	23
23. Conidia 2-3 µm wide, subcylindrical to fusiform	24
23. Conidia 3-7 µm wide, fusiform to allantoid	25
24. Conidia, 30-44 x 2.5-3 µm, setulae 2.5-7 µm long	<i>Ps. pachyderma</i>
24. Conidia 38-57 x 2-2.5 µm, setulae 2-3 µm long	<i>Ps. setulosa</i>
25. Conidia (6-)7-septate, 35-45 x 3.2-5 µm, setulae 4.8-6.5 µm long	<i>Ps. tengii</i>
25. Conidia <35 µm long	26
26. Conidia 5-7-septate, 22-35 x 4-6 µm, setulae 2-8 µm long	<i>Ps. botulispora</i>
26. Conidia 3-5 µm wide	27
27. Conidia (6-) 7 septate, 20.5-34 x 3-5 µm, setulae 3-8 µm long	<i>Ps. asymmetrica</i>
27. Conidia (6-)7-septate, 25-35 x 3-5 µm, setulae 4-9 µm long	<i>Ps. ampylospora</i>

Neopseudolachnella microsperma W.P. Wu & Y.Z. Diao, sp. nov., Fig. 284, MycoBank MB841670.

Etymology: refers to its small conidia.

Typification: China: Hebei Province, Chengde, Bishushanzhuang, on dead culm of unidentified grass, 11 Sept 2012, W.P. Wu (Holotype WFH Wu15057; ex-type strain CGMCC 3.20649 (=NN 54767)).

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, acervuloid, mostly scattered or sometimes 2–3 grouped, superficial to subcuticular, ellipsoid or irregular, 200–400 µm long, 150–300 µm wide, up to 500 µm high, dark brown to black, with white conidial mass in center, setose; basal stroma 10–15 mm thick, composed of globose to subglobose, 2.5–4 µm diam cells; excipulum medium brown, 70–90 µm high, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched, 1–2.2 µm wide hyphae, inner layer pale brown to hyaline, thin-walled. Setae arising from basal stroma, straight or slightly curved, 7–14-septate, brown but pale at the apex, smooth, unbranched, thick-walled, 170–325 µm long, 5–7 µm wide at the lower part, basal cells swollen and 8–11 µm wide, tapering gradually toward the obtuse or acute at the apex, 2–4 µm wide at the apex. Conidiophores lining the basal stroma, cylindrical, smooth, pale brown, simple, 45–60 x 1–2.2 µm. Conidiogenous cells monophialidic, cylindrical, lageniform, pale brown to hyaline, smooth, 8–14 x 1.7–2 µm, collarette inconspicuous. Conidia fusiform to allantoid, obtuse at both ends, 1-septate, smooth, hyaline, guttulate, 11–12 x 2–2.5 µm, bearing an appendage at each end, 3–5 µm long.

Colonies on PDA effuse, colonies 0.8–1.1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse pale brown.

Material examined: China: Hebei Province, Chengde, Bishushanzhuang, on dead culm of unidentified grass, 11 Sept 2012, W.P. Wu (Holotype WFH Wu15057); China: Hebei Province, Chengde, Bishushanzhuang, on dead culm of unidentified grass, 11 Sept 2012, W.P. Wu (Wu15077). Living strain: 54768 (from Wu15077), ex-type strain CGMCC 3.20649 (=54767).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes. *Neopseudolachnella microsperma* is morphologically very similar to *N. uniseptata* A. Hashim., Sat. Hatak. & Kaz. Tanaka in producing 1-septate conidia, and distinct from the two known species with subcylindrical to fusiform and multiseptate conidia, *N. acutispora* and *N. magnispora* (Hashimoto et al. 2015b). The two species with 1-septate conidia can be distinguished by size of conidia (10.5–19 x 1.5–2.5 µm in *N. uniseptata* vs. 11–12 x 2–2.5 µm in *N. microsperma*) and ITS sequences. Based on a megablast search of GenBank nucleotide database, the closest hits using the ITS sequence from the type specimen Wu15057 are *Neopseudolachnella magnispora* (GenBank NR154224; Identities 429/465 (92%), 15 gaps (3%)), *N. acutispora* (GenBank NR154223; Identities 427/466 (92%), 15 gaps (3%)) and *N. uniseptata* (GenBank NR154225; Identities 429/469 (91%), 18 gaps (3%)).

Neopseudolachnella moganshanensis W.P. Wu & Y.Z. Diao, sp. nov., Figs. 285–286, Wu841661.

Etymology: refers to where the fungus was collected.

Typification: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead culms of unidentified grass, 16 Oct. 2019, W.P. Wu (Holotype WFH Wu16980; ex-type strain CGMCC 3.20675 (=NN 77759)).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, cupulate to discoid but oblong to ovoid shaped on the top view, up to 500 µm in diam.; lateral wall poorly developed or absent; basal stroma of textura angulari with brown, isodiametric cells which are hyaline in the upper layer. Setae brown to black, 7-11-septate, cylindrical, 150-245 x 3.5-6 µm, tapering towards the acute or obtuse apex, wall thick and verruculose, basal cell swollen and 6-8 µm wide, arising from the outer layer of basal stroma. Conidiophores pale brown to yellow brown, septate, simple to branched, 2-4-septate, wall smooth, cylindrical, originating from the upper cells of basal stroma, 50-65 x 1-2 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or integrated, pale brown, wall smooth, cylindrical with minute periclinal thickenings in the collarete zone, collarete inconspicuous, 8-11 x 1-1.8-2.2 µm. Conidia hyaline, aseptate, naviculate, fusiform, curved, smooth-walled, apex obtuse, base truncate with a scar, 9.4-12.5 x 1.8-2 µm, with one setula of 2-4 µm long at each end.

Colonies on PDA effuse, colonies 0.7-1 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Zhejiang Province, Deqing, Moganshan, Luhadang, on dead culms of unidentified grass, 16 Oct. 2019, W.P. Wu (Wu16980). Living strain: ex-type strain CGMCC3.20675 (=NN 77759) and 77634 (all from type specimen).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: Among the two described species under the genus, *Neopseudolachnella moganshanensis* resembles *N. uniseptata* in producing smaller conidia, but can be distinguished by smooth-walled setae, and 1-septate and larger conidia (10.5-19.5 x 1.5-2.5 µm) in the later species (Hashimoto et al. 2015b). *N. microsperma*, the other new species described here, is also similar with *N. moganshanensis*, but can be distinguished by 1-septate and symmetrical conidia in *N. microsperma*. Phylogenetically, on a megablast search using the ITS sequences from the strain obtained from the type specimen Wu16980, the closest matches in NCBI's GenBank nucleotide database were *Neopseudolachnella magnispora* (GeneBank NR154224, identities 430/465 (92%), 15 gaps (3%)), *N. acitospora* (GeneBank NR154223, identities 428/466 (92%), 15 gaps (3%)), *N. uniseptata* (GeneBank NR154225, identities 430/469 (92%), 18 gaps (3%)), *Brunneodinemasporium brasiliense* (GeneBank NR137785, identities 422/475 (89%), 20 gaps (4%)).

Pseudolachnea Ranoj., Annls Mycol. 8: 393 (1910)

= *Dinemasporiella* Bubák & Kabát, Hedwigia 52: 358. 1912; non *Dinemasporiella* Speg., Annales Mus. Nac. Buenos Aires 20: 366. 1910 (nom. dub.).

= *Dinemasporiopsis* Bubák & Kabát, nom. nov., apud Died., Krypt.-Fl. Mark Brandenburg 9: 750. 1915.

= *Chaetopatella* Hino & Katum., J. Jap. Bot. 33: 238. 1958.

Teleomorph: Unknown. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, cupulate, basal wall of textura angulari composed of brown, thick-walled cells but the inner layer tend to be hyaline, thin-walled, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched hyphae, inner layer pale brown to hyaline, thin-walled. Setae dark brown to black, erect, tapering towards the apex, wall thick and smooth, arising from the base and also lateral wall. Conidiophores hyaline, septate, branched, or unbranched, cylindrical, formed by the inner layer of both base and lateral walls. Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth. Conidia hyaline, 1-septate, naviculate to fusiform, curved of straight, wall thin and smooth, bearing one setulae at each end.

Type species: *Pseudolachnea hispidula* (Schröd. : Fries) B. Sutton.

Ecology/Substrate/Host: Saprobe on dead material of plant

Geographical distribution: Widely distributed.

Description and illustration: Sutton (1980); Nag Raj (1993); Crous et al. (2012); Hashimoto et al. (2015b).

Notes: *Pseudolachnea* Ranoj. is a coelomycetous genus typified by *P. hispidula* (Schröd.) B. Sutton (Ranojević 1910). This genus is characterized by acervular or cupulate conidiomata surrounded by numerous black setae and one-septate conidia with an appendage at both ends, and the constituent species occur on twigs or wood of various angiosperms (Ranojević 1910; Sutton 1980; Nag Raj 1993; Hashimoto et al. 2015b). Morphologically it differs from *Pseudolachnella* Teng by multiseptate scolecospore in the latter genus. In the phylogenetic tree generated by the combined ITS and LSU data, the two genera are clustered into two different groups with strong support. *Pseudolachnea* is more closed to *Pseudodinemasporium*, *Brunneodinemasporium* and *Neopseudolachnella*. Most species described under the genus *Pseudolachnea* were transferred to *Pseudolachnella*, which left *Pseudolachnea* as a small genus with only 2 accepted species, *Pseudolachnea hispidula* (Schröd.) B. Sutton and *Pseudolachnea fraxini* Crous. Here we add another species into the genus.

The living strains of many studied species were also studied on PDA (Figs. 266, 287), some characters such as growth rate, pigments etc can be used as additional characters to delimit the species and they are described under each species.

Pseudolachnea hispidula (Schrad.) B. Sutton, Mycol. paper 141: 167, 1977.

= *Peziza hispidula* Schrad., Syst. Mycol. 2:98, 1923.

= *Dinemasporium hispidulum* (Schrad.) Curtis, Geological and National History Survey of North Carolina 3:120, 1867.

= *Pseudolachnea bubakii* Ranoj., Annls mycol. 8: 393, 1910.

Other synonyms see Sutton (1980) and Nag Raj (1993).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, cupulate, up to 900 µm diam., basal wall of textura angulari composed of brown, thick-walled cells but the inner layer tend to be hyaline, thin-walled, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched hyphae, inner layer pale brown to hyaline, thin-walled. Setae dark brown to black, erect, tapering towards the apex, wall thick and smooth, 120-450 x 5-8 µm, arising from the base and also lateral wall. Conidiophores hyaline, septate, branched, or unbranched, cylindrical, 10-30 x 1.5-3 µm, formed by the inner layer of both base and lateral walls. Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth, 8-20 x 1.5-3 µm. Conidia hyaline, aseptate, naviculate to fusiform, curved or straight, wall thin and smooth, 12-18 x 1.5-2.5 µm, bearing one setula of less than 2 µm long at each end.

Material examined: On many different dead plant materials found in Hebei, Shan'Xi, Beijing. Specimens no.0515, 0516, 0517, 0524, 0531, 0534, 0538a, 0540, 0542, 0544, 0549, HMAS33304(S), HMAS30399(S). China: Ningxia Province, Liupan Mountain, Erlonghe, on dead stem of *Berberis* sp., 24 Aug. 1997, W.P. Wu (1092c).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Czechoslovakia, Eire, Great Britain, Germany, Japan, Pakistan, U.S.A., U.S.S.R.

Description and illustration: Sutton (1980), Nag Raj (1993).

Notes: *Pseudolachnea hispidula* is widely distributed in Europe (Nag Raj 1993) and was also found to be common in north China. Morphological features of the specimens collected from China agree with the description of *P. hispidula* provided by Nag Raj (1993) and Hashimoto et al. (2015b). This species is distinguished from *Pseudolachnea fraxini* by the smaller conidia compared with those of the latter (14-21 vs 31.5-42.5 µm).

Pseudolachnea macrospora W.P. Wu & Y.Z. Diao, sp. nov., Fig. 288, MycoBank MB841672

Etymology: refers to its large conidia in this fungus.

Typification: UK: Petit Port, Guerssey, C.I's, on *Sarothaumus scoparius*, 16 Sept 1948, M.B. & J.P. Ellis, IMI34705 (Holotype).

Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, scattered or rarely aggregated, setose, 300-350 µm diam and 250-350 µm deep, basal wall of textura angulari, composed of pale brown to brown, thick-walled cells, but inner layer pale brown to hyaline, wall thin; lateral wall of textura porrecta formed by long, dark-colored and thick-walled cells, also the inner layers of hyaline, thin-walled cells. Setae erect, black, wall thick and smooth, septate, simple, tapered towards the apex, apex acute or obtuse, 120-250 x 5-9 µm. Conidiophores hyaline, septate, branched at the base or not, cylindrical, 10-30 x 1.5-3 µm, formed from inner layer of both basal and lateral wall; Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, wall thin and smooth, apex wide and with a minor channel and collar, 5-15 x 1.5-2.5 µm. Conidia hyaline, 1 septate, fusiform, curved or straight, ends acute, 17-30 x 2-3 µm, setulae 3-8 µm long, and arising from both ends.

Material examined: UK: Petit Port, Guerssey, C.I's, on *Sarothaumus scoparius*, 16 Sept 1948, M.B. & J.P. Ellis, IMI34705 (Holotype); On straw of undet, UK, 1 March 1951, P.K.C. Austwick (66), IMI44944; IMI57018; IMI33978.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: UK.

Notes: *P. macrospora* differs from *P. hispidula* (Schrad. : Fries) B. Sutton and *P. fraxini* Crous by its much longer conidia (17-30 µm versus 12-17 µm) and longer setulae (3-8 µm versus 1-2 µm). Teng (1933) described a variety of *P. bubakii* Ran. with conidia of 15-22 x 2-2.5 µm and setulae of 2.5-3 µm long. However, the type specimen was not found in HMAS (personal communication) or BPI (Nag Raj 1993), where most of Teng's specimens were held.

Pseudolachnella Teng, Sinensia 7:775, 1936.

= *Chaetopatella* I. Hino & Katum., J. Jap. Bot. 33:238, 1958.

Teleomorph: Unknown. Anamorph: Conidiomata eustromatic, superficial, scattered or aggregated, blackish, cupulate, basal wall of textura angulari composed of brown, thick-walled cells but the inner layer tend to be hyaline, thin-walled, lateral wall of textura porrecta composed of brown, thick-walled, long, septate, branched hyphae, inner layer pale brown to hyaline, thin-walled. Setae dark brown to black, erect, tapering towards the apex, wall thick and smooth, arising from the base and also lateral wall. Conidiophores hyaline, septate, branched, or unbranched, cylindrical, formed by the inner layer of both base and lateral walls. Conidiogenous cells enteroblastic, phialidic, determinate, discrete, hyaline, cylindrical, straight, wall thin and smooth. Conidia hyaline, multi-septate, naviculate to fusiform, curved of straight, wall thin and smooth, bearing 1 to several unbranched or branched setulae at each end.

Type species: *Pseudolachnella scolecospora* (Teng & C.I. Shen) Teng.

Ecology/Substrate/Host: Saprobe on dead material of plant, especially dead culm of various bamboo species.

Geographical distribution: Widely distributed where bamboo grows.

Description and illustration: Sutton (1980); Nag Raj (1993); Hashimoto et al. (2015b).

Notes: *Pseudolachnella* Teng was segregated from *Pseudolachnea* to accommodate a species with multiseptate conidia, *Pseudolachnea scolecospora* Teng & C.I. Shen (Teng and Ling 1933; Teng 1936). Historical reviews on taxonomy and nomenclature for the genus and other related genera including *Pseudolachnea* and *Chaetopatella* were provided by Sutton (1977, 1980), Nag Raj (1993), Crous et al. (2012) and Hashimoto et al. (2015b). Recent molecular phylogenetic study has further validated the difference between *Pseudolachnella* and several related genera including *Brunneodinemasporium*, *Neopseudolachnella*, *Pseudolachnea* and *Pseudodinemasporium* (Crous et al., 2012; Hashimoto et al., 2015b). Under the genus *Pseudolachnella*, a total of 17 species are accepted and for many of them the DNA bar codes with ITS and LSU are available in the various database. In our study of chaetosphaeriaceous fungi from China, we found 2 new species and they are described here together with several known species.

Pseudolachnella indica (V.G. Rao & Varghese) Nag Raj, The coelomycetous anamorph with conidia bearing appendages: 725, 1993.

= *Chaetopatella indica* V.G. Rao & Varghese, Norw. J. bot. 24:45, 1977

= *Chaetopatella indica* R.C. Rajak & Soni, Curr. Sci. 47:136, 1978.

Material examined: on dead stem of *Bambusa* sp., India, 23 March 1977, R.C. Rajak (S-6), IMI212440 (Type).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: India.

Description and Illustration: Rao and Verghese (1977), Rajak and Soni (1978), Nag Raj (1993).

Notes: For comparison and identification of many related Chinese collections, the type collection of *P. indicais* in IMI was examined. This species is characterized by smaller and 3-septate conidia. In the type specimen (IMI212440), the conidia are cylindrical, curved, with a rounded apex and truncated base, 3-septate, 28-35 x 1.5-2 µm, both base and apex with a single unbranched setula of 4-6 µm long.

Pseudolachnella longiciliata (I. Hino & Katum.) Nag Raj, The Coelomycetous anamorph with conidia bearing setulae: 725, 1993.

= *Chaetopatella longiciliata* I. Hino & Katum., J. Jap. Bot. 33:238, 1958

= *Pseudolachnea longiciliata* (I. Hino & Katum.) B. Sutton, The Coelomycetes: 461, 1980

Caulicolous. Teleomorph: Not observed. Anamorph: Conidiomata stromatic, cupulate, oval to elongate in outline, 400-650 µm wide, setose, black. Setae dark brown to black, septate, smooth, acute, 100-280 µm long, 4-6 µm wide below, tapering to 3-3.5 µm at the apex. Conidia hyaline, narrow clavate to fusiform, with a tapering apex and a truncate base, straight or slightly curved, 11-14-septate, 60-72 x 3.5-4.5 µm, 1.5-2 µm at the base; apical appendage single, unbranched, filiform, flexuous, 20-42 µm long; basal appendage single, unbranched, filiform, flexuous, excentric, 10-16 µm long.

Material examined: China: Taiwan, Kaohsiung, Yako, Liyuan, on *Miscanthus floridulus*, 29 Jan. 1988, A. Sivanesan, IMI323938; Japan: prov. Ugo., Mt. Nyutozan, on *Sasa kurilensis* Makino & Shibata, 4 Aug 1957, H. Muroi, IMI110665 (A portion of type specimen).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Kunashir Island, India, Japan, Russia.

Description and Illustration: Hino and Katumoto (1958); Sutton (1980); Nag Raj (1993); Hashimoto et al. (2015b).

Notes: This species is readily distinguished from others in *Pseudolachnella* by its mucronate to ampliform conidiomata up to 490 µm high and the 8-18-septate conidia with longer apical and shorter basal appendages (Sutton 1980; Nag Raj 1993; Hashimoto et al. 2015b). The above description is based on the collection IMI323938 from Taiwan. It is slightly different from the type specimens of *P. longiciliata* (Hino & Katumoto) B. Sutton in having more fusiform or clavate conidia (Hino and Katumoto 1958; Sutton 1980; Nag Raj 1993; Hashimoto et al.

2015b). Zhao et al. (2004) recorded its occurrence on living twigs of *Yuchania vigens* from Yunnan, but no description was provided.

Pseudolachnella minima W.P. Wu & Y.Z. Diao, sp. nov., Figs. 289-290, MycoBank MB841673.

Etymology: refers to the small conidia in this fungus.

Diagnosis: Similar to *Pseudolachnella scolecospora* but differs in smaller conidia.

Typification: China: Guangdong Province, Guangzhou, Orchard Garden, on dead culm of bamboo, 29 Dec. 2012, W.P. Wu (Holotype WFH Wu12378; ex-type strain CGMCC3.20714 = NN 55219).

Caulicolous. Mycelium immersed, brown, septate, branched. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, separate, black, at first closed then opening to become flattened or conical, 150-300 x 100-250 µm; periclinal wall pseudoparenchymatous, composed of brown textura angularis towards the inside, extending into textura porrecta at the periphery. Setae brown to black, simple, straight, or slightly curved, 1-4 septate, tapering towards the apex, apex acute or obtuse, wall thick and smooth, (50-) 70-260 x 3-5 µm. Conidiophores hyaline, branched at the base, sparingly septate at the base, wall thin and smooth, cylindrical, 10-25 x 2.5-3 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or occasionally integrated, hyaline, wall thin and smooth, cylindrical with a minute collarette and narrow channel, 10-15 x 2.5-3 µm. Conidia hyaline, 3 (-4) septate, wall thin and smooth, cylindrical, straight or curved irregularly, guttulate, apex and base obtuse, 19-25 x 1.5-2.5 µm, with a single and unbranched setulae at each end which are of 2-4 µm long.

Colonies on PDA effuse, colonies 1-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey in the central part, reverse yellow to soil brown.

Material examined: China: Guangdong Province, Guangzhou, Orchard Garden, on dead culm of bamboo, 29 Dec. 2012, W.P. Wu (Wu12374, Wu12375, Wu12372, Wu12373, Wu12432, Wu12433); China: Guangdong Province, Shaoguan, Danxiashan, on dead culm of bamboo, 26 Dec. 2012, W.P. Wu (Wu12384, Wu12378, Wu12382); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead leaf shelf of bamboo, 2 March 2012, W.P. Wu (Wu12227); On dead culm of bamboo, China: Guangdong Province, Guangzhou, Orchard Garden, 29 Dec. 2012, W.P. Wu (Holotype WFH Wu12378); China: Guangdong Province, Guangzhou, Yuexiu Park, on dead culm of bamboo, 2 March 2012, W.P. Wu (Wu12595); China: Guangxi Province, Damingshan, on dead culm of *Miscanthus* sp., 20 Dec 1997, W.P. Wu (1467a); China: Shanghai, Shanghai Botanical Garden, on dead culm of bamboo, 22 May 2012, W.P. Wu (Wu13005); China: Zhejiang, Hangzhou, Longjing, on dead culm of bamboo, 30 Sept. 2013, W.P. Wu (Wu13004, Wu13005, Wu13006, Wu13007); China: Guangxi, Nanning, Nanning Subtropical Botanical Garden, on dead culm of bamboo, 15 Nov. 2013, W.P. Wu (Wu13160); China: Yunnan, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 10 April 2015, W.P. (Wu12914, Wu12916, Wu12917, Wu12931, Wu12933); China: Yunnan, Baoshan, Tengchong, Gaoligongshan, on dead culm of bamboo, 17 Oct 2003, W.P. Wu (Wu7025); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten wood, W.P. Wu (Wu17066); China: Yunnan Province, Kunming, on dead culms of *Phyllostachys* sp., 09 March 1994, Wu W.P. (0559).

Living strain: 44098 (from Wu1467a), 55219 (ex-type strain), 55220 (from Wu12384), 55226 (from Wu12383), 55227 (from Wu12375), 55244 (from Wu12373), 55267 (from 12374), 55276 (from Wu12432), 55279 (from Wu12433), 57319 (from Wu13004), 57320 (from Wu13005), 57321 (from Wu13006), 57345 (from Wu13007), 57480 and 57481 (from Wu13160), 58854 and 58856 (from Wu12916), 58889 (from Wu12917), 58871 and 58871 (from Wu12931), 58873 (from Wu12933), 58874 (from Wu12914), 58928 (from Wu13005), 58942 (from Wu13031); 58949 (from Wu13005), 77468 (from Wu17066),

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Pseudolachnella minima* is morphologically similar with *P. asymmetrica* A. Hashim., Y. Harada & Kaz. Tanaka (conidia (6-) 7-septate, 20.5-34 x 3-5 µm; appendages 3-7.5 µm long), *D. falcatispora* A. Hashim. & Kaz. Tanaka (conidia 3-septate, 28-44 x 2-3 µm; appendages 2-4 µm long), *P. inidca* (Vasant Rao & Verhese) Nag Raj (conidia 3-septate, 24-38 x 2-2.5 µm; appendage 3-4 µm long), *P. scolecospora* (Teng & C.I. Shen) Teng (conidia 3 (-5)-septate, 30-44.5 x 2-3 µm; appendages 1.5-3.5 µm long). All these species have longer conidia than those in *P. minima*. In addition, the conidia in *P. scolecospora* and *P. asymmetrica* have more than 3 septa. Some variations on conidiomata, setae and conidia were seen from different specimens studied, for example in the specimen Wu7025: the conidiomata are 200-300 µm diam, setae 0-2 septate, 50-70 x 3-4 µm, conidia cylindrical, curved, 3-4 septate, 20-24 x 1.7-2.0 µm, conidial appendages 2-4 µm long; from the specimen Wu1381a: setae dark brown to black, acute, straight, 100-265 x 5-7 µm, tapering to 3-4 µm wide at the apex, conidia cylindrical, curved or straight, 3-septate, 19-22 x 2.5-3 µm, basal appendage 2.5-4 µm long, apical appendage 4-5 µm long.

Pseudolachnella scolecospora (Teng & Shen) Teng, Sinensia 7: 775, 1936. Fig. 291

≡ *Pseudolachnea scolecospora* Teng & Shen, Contr. Biol. Lab., Sci. Soc. China Bot. 8: 277. 1933

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, acervular, setose, shallow cupulate, oval in outline, 400–700 µm long, 300–450 µm wide, 100–150 µm high; basal stroma 7–12 mm thick; excipulum 15–35 mm thick, poorly developed. Setae 100–155 µm long, acute and 2–3 mm wide at the apex, 3–4 µm wide at the base. Conidiophores 10–23 x 2–2.5 µm. Conidiogenous cells 5–8 x 2–3 µm. Conidia 26–34 x 1.8–2 µm, 3 (–5)-septate, subcylindrical, hyaline, slightly curved, smooth, bearing an unbranched appendage at each end; 1 appendage 1–3 µm long.

Material examined: China: Guangdong Province, Guangzhou, Yuexiu Park, on dead culm of bamboo, 2 March 2012, W.P. Wu (Wu12227); China: Shanghai, Shanghai Botanical Garden, on dead culm of bamboo, 22 May 2012, W.P. Wu (Wu12967, Wu12975, Wu12979, Wu12984, Wu12986, Wu12987, Wu12999, Wu129681; Wu13031); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten wood, W.P. Wu (Wu17066); China: Zhejiang Province, Deqing, Moganshan, Luhudang, on rotten wood, W.P. Wu (Wu17065), China: Zhejiang, Huaian County, Qiandaohe, on dead culm of bamboo, W.P. Wu (Wu16094); Living strain: 77468 (from Wu17066), 54233 (from Wu12227); 54233 (from Wu12227), 58938 (from Wu12986), 58902 (from Wu12967), 58909 (from Wu12999), 58910 (from Wu12979), 58911 (from Wu12984), 58912 (from Wu12975), 58940 (from Wu12968), 76322 (from Wu16094), 77487 (from Wu17065).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *P. asymmetrica* A. Hashim., Y. Harada & Kaz. Tanaka (conidia (6–) 7-septate, 20.5–34 x 3–5 µm; appendages 3–7.5 µm long), *D. falcatispora* A. Hashim. & Kaz. Tanaka (conidia 3-septate, 28–44 x 2–3 µm; appendages 2–4 µm long), *P. inidca* (Vasant Rao & Verhese) Nag Raj (conidia 3-septate, 24–38 x 2–2.5 µm; appendage 3–4 µm long) and *P. scolecospora* (Teng & C.I. Shen) Teng (conidia 3 (–5)-septate, 30–44.5 x 2–3 µm; appendages 1.5–3.5 µm long) are a few species with similar morphology and in fact can be difficult to be distinguished on conidial morphology. The ITS sequences of *P. scolecospora* and *P. asymmetrica* are identical, but they can be distinguished by much wider conidia in *P. asymmetrica* (Hashimoto et al. 2015b).

Pseudolachnella tengii W.P. Wu & Y.Z. Diao, sp. nov., Figs. 292, MycoBank MB841674.

Etymology: Named after the Chinese mycologist Shuqun Teng, who described the genus *Pseudolachnella*.

Typification: China: Yunnan, Kunming, Botanical Garden, on dead culm of *Phyllostachys* sp., 21 Aug. 2003, W.P. Wu (Holotype WFH Wu7544; ex-type culture CGMCC 3.20791 (= NN 47882).

Caulicolous. Mycelium immersed, brown, septate, branched. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, separate, black, at first closed then opening to become flattened or conical, 150–500 x 100–300 µm; periclinal wall pseudoparenchymatous, composed of brown textura angularis towards the inside, extending into textura porrecta at the periphery. Setae brown to black, simple, straight, or slightly curved, septate, tapering towards the apex, apex acute or obtuse, wall thick and smooth, 120–250 x 4–6 µm. Conidiophores hyaline, branched at the base, sparingly septate at the base, wall thin and smooth, cylindrical, 15–30 x 2.5–4.5 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or occasionally integrated, hyaline, wall thin and smooth, cylindrical with a minute collarette and narrow channel, 10–20 x 2.5–4.5 µm. Conidia hyaline, 7-septate, rarely 6 septate, wall thin and smooth, cylindrical, straight or curved irregularly, guttulate, apex and base obtuse, 35–45 x 3.2–5 µm, with a single and unbranched setula at each end and measured 4.8–6.5 µm long.

Colonies on PDA effuse, colonies 1.0–1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, reverse pale brown in the center and becoming paler towards the margins.

Material examined: China, Yunnan Province, Kunming, Kunming Botanical Garden, n *Phyllostachys* sp., 09 March 1994, Wu W.P. (Wu623); China, Yunnan, Kunming, Botanical Garden, on dead culm of *Phyllostachys* sp., 22 Oct. 1999, Wu W.P. and Yan Huang (Wu2607); China, Yunnan Province, Kunming, Kunming Botanical Garden, on dead culm of *Phyllostachys* sp., 09 March 1994, Wu W.P. (Wu0560); China, Yunnan, Kunming, Botanical Garden, on dead culm of *Phyllostachys* sp., 21 Aug. 2003, W.P. Wu (Holotype WFH Wu7544; ex-type culture NN 47882). Living strain: 45726 (from Wu2607), 47882 (from Wu7544).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: *Pseudolachnella tengii* differs from all other species in the genus by its broader verm-like conidia with one setula at each end. Among the known species, *Pseudolachnella asymmetrica* A. Hashim., Y. Harada & Kar. Tanaka (conidia 6–7 septate, 20.5–34 x 3–5 µm, appendages 3–8 µm long), *P. botulispora* A. Hashim., G. Sato & Kaz. Tanaka (conidia 5–7 septate, 22–35 x 4–6 µm, appendages 2–8 µm long), *P. campylospora* A. Hashim., G. Sato & Kaz. Tanaka (conidia 6–7 septate, 25.5–35.5 x 3–5 µm, appendages 4–9 µm long), *P. complanata* A. Hashim. & Kaz. Tanaka (conidia (3–) 7-septate, 26–40 x 2–3 µm, appendages 1–2 µm long), *Pseudolachnella vermospora* R.L. Zhao, Y.M. Yang & G.C. Zhao (conidia (5–) 7-septate, 22–28 x 3.5–7 µm, 3–6 appendages 5–13 µm) also produce multiseptated and verm-like conidia. These species can be distinguished from *P. tengii* by conidial septation, number of appendage and size of conidia (Sutton 1980; Nag Raj 1993; Zhao et al. 2004; Sato et al. 2008; Hashimoto et al. 2015b).

Pseudolachnella vermospora R.L. Zhao, Y.M. Yang & G.C. Zhao, Fung. Div. 15: 256, 2004

Caulicolous. Conidiomata 257-772 µm diam., 200-330 µm high. Excipulum absent. Conidiomatal setae marginal, dark brown to black and paler towards the inside, up to 310 µm long, 3.5-5 µm wide. Conidiophores 25-36 × 1.2-2 µm, filiform, bearing 1-2 conidiogenous cells on the apex. Conidiogenous cells discrete, cylindrical to subcylindrical with marked periclinal thickenings in the collarette zone, colorless, smooth, 5-10 × 2-3 µm. Conidia vermicular, fusiform, acerose, colorless, (5-)7-septate, smooth, guttulate, 22-28 × 3.5-7 µm, length/width ratio = 5:1, bearing appendages at both ends. Appendages filiform, flexuous, colorless, unbranched, 5-13 µm; basal appendages 3-6, eccentric and discrete; apical appendages 1-2, scarcely 3-4, same length or not.

Typification: China: Yunnan Province, Gaoligong Mountain Nation Natural Reserve, altitude 3400m, on living twigs of *Yushania vigens* Yi, May 2001, G.C. Zhao, R.L. Zhao and Y.M. Yang and S.B. Tan, deposited in Plant Pathology Herbarium of Southwest Forestry College Kunming, Yunnan, China (Holotype: HSFC 010534).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Zhao et al. (2004); Zhao and Zhao (2012).

Notes: *Pseudolachnella vermospora* R.L. Zhao, Y.M. Yang & G.C. Zhao differs from other known species in number of septa, setulae, and length/width ratio of conidia. Among the known species, *P. brevicoronata* A. Hashim. & Kaz. Tanaka (conidia 7-10 septate, 62-90 × 2-3 µm; 2-4 unbranched or branched setulae), *P. yakushimensis* G. Sato, Kaz. Tanaka & Hosoya (conidia 3 septate, 15-33 × 2-3 µm, 2-4 setulae of 1-4 µm long), and *P. fusiformis* A. Hashim., G. Sato & Kaz. Tanaka (conidia 3-septate, 15-20 × 4-6.5 µm, 2-4 unbranched setulae) produce conidia with more than 1 appendage at each end of the conidia, they can be distinguished from *P. vermospora* by the length/width ratio which is 5:1 in *P. vermospora* and smaller than that of other species. The conidia of *P. vermospora* have three to six unbranched basal appendages. The only other species with several appendages is *P. coronata* (I. Hino & Katum.) Nag Raj, but the appendages in this species are branched, and the conidia are considerably longer (Sutton 1980; Nag Raj 1993; Zhao et al. 2004; Sato et al. 2008; Hashimoto et al. 2015b).

Pseudolachnella yunnanense W.P. Wu & Y.Z. Diao, sp. nov., Figs. 293-294, MycoBank MB841675

Etymology: refers to the location, Yunnan Province in China, where the species was originally found.

Diagnosis: Similar to *Pseudolachnella scolecospora* but differs in ITS sequence.

Typification: China: Yunnan, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 10 April 2015, W.P. Wu (Holotype WFH Wu12902; ex-type strain CGMCC 3.20720 =NN 58842).

Caulicolous. Mycelium immersed, brown, septate, branched. Teleomorph: Not observed. Anamorph: Conidiomata eustromatic, superficial, separate, black, at first closed then opening to become flattened or conical, 150-450 × 100-250 µm; periclinal wall pseudoparenchymatous, composed of brown textura angularis towards the inside, extending into textura porrecta at the periphery, apical cell separated and with acute or rounded apex. Setae brown to black, simple, straight, or slightly curved, 2-4-septate, tapering towards the apex, apex acute or obtuse, wall thick and smooth, 110-250 × 2-4.5 µm. Conidiophores hyaline, branched at the base, sparingly septate at the base, wall thin and smooth, cylindrical, 15-25 × 2-3 µm. Conidiogenous cells enteroblastic phialidic, determinate, discrete or occasionally integrated, hyaline, wall thin and smooth, cylindrical with a minute collarette and narrow channel, 6-12 × 2-2.5 µm. Conidia cylindrical, straight or curved irregularly, hyaline, 3-5-septate, wall thin and smooth, guttulate, slightly tapering towards the obtuse apex and truncated base, (25-)30-38(-40) × 1.8-2.5 µm, with a single and unbranched setula at each end and measured 2-4 µm long.

Colonies on PDA effuse, colonies 1.3-1.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, white, slightly grey, reverse yellow to soil brown in the center and becoming paler towards the margins.

Material examined: China: Yunnan, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 10 April 2015, W.P. Wu (Holotype WFH Wu12902); China: Yunnan, Kunming, Kunming Botanical Garden, on dead culm of bamboo, 10 April 2015, W.P. Wu (Wu12918, Wu12930); China: Yunnan, Shilin, on dead culm of bamboo, 24 Oct. 1999, Wenping Wu and Yan Huang (Wu2555b). Living strain: 45671 (from Wu2555b), 58858 (from Wu12918), 58870 (from Wu12930), ex-type strain 58842.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Teng (1936); Sutton (1980); Nag Raj (1993); Hashimoto et al. (2015b).

Notes: *Pseudolachnella falcatispora* A. Hashim. & Kaz. Tanaka (conidia 28-44 × 2-3 µm), *P. indica* (V.G. Rao & Varghese) Nag Raj (conidia 24-38 × 2.5-5 µm) and *P. scolecospora* (conidia 30-43 × 1.6-2.0 µm) bear a strong resemblance to *P. yunnanensis* in conidial morphology, i.e. 3-septate and falcate conidia with short appendage at both ends, they can be distinguished by size of conidia and also ITS sequences (Sutton 1980; Nag Raj 1993; Hashimoto et al. 2015b).

Conicomycetes R.C. Sinclair, Eicker & Morgan-Jones, *Mycologia* 75 (6): 1100, 1983.

Teleomorph: Unknown. Anamorph: Conidiomata stromatic, seemingly superficial and synnematus, subperidermal in origin, more or less cornute with a long dark brown to black stalk and a slightly swollen head bearing a concave conidial hymenium, setose, with a terminal, white globose mass of conidia; basal stroma of an intraperidermal, lower texturea globulosa of dark brown, thick-walled cells, and an upper, thin textura epidermoidea of similar cells; stalk composed of textura intricate, elements moderately thick-walled, brown to pale brown, often giving rise to peripheral setae. Conidiomatal setae profuse, unbranched, straight, or variously curved, acuminate at the apex, septate, thick-walled, and often with a narrow lumen, smooth, dark brown in the middle part, paler toward the extremities. Conidiophores lining the cavity of the conidioma, arising from the inner textura intricate of the apical part of the stalk, unbranched or irregularly branched, euseptate, pale brown to colorless, smooth, invested in mucus. Conidiogenous cells discrete or integrated, subcylindrical to cylindrical or clavate, hyaline, smooth, phialidic, with annellidic proliferation. Conidia acerose with a narrow truncate base, multiseptate, hyaline, smooth, bearing an apical cellular appendage; appendage cellular, narrow, and attenuated, unbranched, flexuous, separated from the conidium body by a septum, and invested (at least in one species) in a thin, persistent layer of mucus.

Type species: *Conicomycetes transvaalensis* R.C. Sinclair, Eicker & Morgan-Jones

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Canada, China, Japan, South Africa.

Description and illustration: Sinclari et al. (1983); Nag Raj (1993).

Notes: The genus *Conicomycetes* R.C. Sinclair, Eicker & Morgan-Jones was created to accommodate synnematus hyphomycetes with phialidic conidiogenous cells and hyaline, septate and acerose conidia with apical cellular appendages (Sinclari et al. 1983; Nag Raj 1993; Seifert et al. 2011). Four species are known in the genus: *C. contortus* Illman & G.P. White, *C. nassensis* Seifert, *C. pseudotransvaalensis* A. Hashim., G. Sato & Kaz. and *C. transvaalensis* R.C. Sinclair, Eicker & Morgan-Jones, which can be distinguished by conidial morphology (Sinclari et al. 1983; Illman and White 1984, 1985a, b; Seifert 1999; Liu et al. 2015).

Key to species of *Conicomycetes*:

1. Conidia 63-90 x 3.5-4.5 μm , with the appendage 20-30 μm long*C. contortus*
1. Conidia >100 μm long2
2. Conidia 11-21 septate, 96-116 x 4-5 μm , apical appendage 48-66 μm long*C. nassensis*
2. Conidia longer than >120 μm long in average3
3. Conidia 19-29 septate, 122-200 x 5.5-7.3 μm , appendage 30-84 μm*C. transvaalensis*
3. Conidia 15-22 septate, 105-170 x 7.5-10 μm , appendage 40-80 μm*C. pseudotransvaalensis*

Conicomycetes transvaalensis R.C. Sinclair, Eicker & Morgan-Jones, *Mycologia* 75 (6): 1100, 1983.

Caulicolous. Teleomorph: Not observed. Anamorph: Conidiomata stromatic, seemingly superficial and synnematus, subperidermal in origin, more or less cornute with a long dark brown to black stalk and a slightly swollen head bearing a concave conidial hymenium, up to 1200 μm high, 120-200 μm wide at the base, up to 350 μm wide at the apex, setose, with a terminal, white globose mass of conidia; basal stroma of an intraperidermal, lower texturea globulosa of dark brown, thick-walled cells, and an upper, thin textura epidermoidea of similar cells; stalk composed of textura intricate, elements moderately thick-walled, brown to pale brown, often giving rise to peripheral setae. Conidiomatal setae profuse, unbranched, straight or variously curved, acuminate at the apex, up to 350 μm long, up to 8 μm wide at the base, 2-2.5 μm wide at the apex, septate, thick-walled and often with a narrow lumen, smooth, dark brown in the middle part, paler toward the extremities. Conidiophores lining the cavity of the conidioma, arising from the inner textura intricate of the apical part of the stalk, unbranched or irregularly branched, euseptate, pale brown to colorless, smooth, invested in mucus. Conidiogenous cells discrete or integrated, subcylindrical to cylindrical or clavate, hyaline, smooth, phialidic, with annellidic proliferation, 20-35 x 2-2.5 μm . Conidia acerose with a narrow truncate base, 16-19-septate, hyaline, smooth, 98-140 x 4.5-5.5 μm , bearing an apical cellular appendage; appendage cellular, narrow and attenuated, unbranched, flexuous, 10-50 μm long, separated from the conidium body by a septum.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead branch of unidentified plant, 2 Jan. 1997, W.P. Wu (Wu1248a).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, South Africa.

Description and illustration: Sinclari et al. (1983); Nag Raj (1993); Liu et al. (2015).

Notes: *Conicomycetes transvaalensis* R.C. Sinclair, Eicker & Morgan-Jones can be distinguished from other known species in the genus by a combination of setose synnemata and conidial morphology (septa, size, and appendage) (Sinclari et al. 1983; Illman and White 1985a, b; Seifert 1999; Liu et al. 2015).

Hoehneliella Bres. & Sacc., Verhandlungen der Zoologisch-Botanischen Gesellschaft Wien 52: 437, 1902
= *Klebahnopycnis* Kirchstein, Annls. Mycol. 37: 120, 1939

Teleomorph: Unknown. Anamorph: Conidiomata stromatic, erumpent, cornute to cupulate, unilocular, setose, black; with a moderately developed basal textura epidermoidea, merging with a textura intricate at a higher level; excipulum well developed, of textura intricate in the outer layers giving rise to conidiomatal setae and merging toward the interior with an inner textura prismatica. Conidiomatal setae subulate, unbranched, septate, thick-walled, dark brown below. Conidiophores lining the cavity of the conidiomata, septate, branched, hyaline to very pale brown, smooth, invested in a thin layer of mucus. Conidiogenous cells discrete or integrated, subcylindrical to obclavate, monophialidic, hyaline, smooth. Conidia cylindrical, fusiform or ellipsoidal, euseptate, pale brown to almost colorless, smooth, bearing cellular appendages at both ends; appendages polar, arising as cellular extensions of the conidium body and separated from the latter by septa, branched or unbranched, attenuated, flexuous; basal appendage excentric.

Type species: *Hoehneliella perplexa* Bresadola & Sacc.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, China.

Description and illustration: Rao and Sutton (1975); Nag Raj (1993).

Notes: *Hoehneliella* Bres. & Sacc. was treated as member of both hyphomycetes and coelomycetes in literature due to different understanding of its conidiomata (Nag Raj 1993). Rao and Sutton (1975) redescribed the type species and concluded that the conidiomata of the fungus are cupulate, beset with brown setae, and the conidiophores arise from cells lining the wall. Nag Raj (1993) also examined the type specimen of the type species and described a bit more complex wall structure of conidiomata. *Paramenisporopsis* Matsush., typified by *P. undulisetulata* Matsush., has very similar conidiomata, conidiogenesis and conidial morphology and it might belong to the same genus as *Hoehneliella* (Matsushima 2003). Two species were discovered from China, and they can easily be distinguished by conidial septation and size.

In the phylogenetic analysis, *Hoehneliella perplexa* Bres. & Sacc., the type species of the monotypic genus *Hoehneliella* Bres. & Sacc., is grouped together with *Dendrophoma*, *Psedolachnella*, *Pseudochena* and *Neopseudolachnella* with strong support and well assigned to the *Chaetosphaeriaceae*. On the conidiomatal structure, *H. perplexa* resembles *Conicomycetes* and some species of *Dinemasporium* and *Pseudolachnea*, all these genera produce synnematus conidiomata with setae and well-developed excipulum (Nag Raj 1993; Seifert et al. 2011). Two species under the genus were discovered from China and are described here.

Key to known species of *Hoehneliella*

- 1. Conidia 1-septate, 7-11 x 2-2.5 μm *H. perplexa*
- 1. Conidia 3-septate, 18-23 x 4-6 μm *H. triseptata*

Hoehneliella perplexa Bres. & Sacc., Verhandlungen der Zoologisch-Botanischen Gesellschaft Wien 52: 437, 1902. Fig. 295

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, erumpent, cornute to cupulate, unilocular, setose, black, up to 250-500 μm high, 100-200 μm wide; with a moderately developed basal textura epidermoidea, merging with a textura intricate at a higher level; excipulum well developed, of textura intricate in the outer layers giving rise to conidiomatal setae and merging toward the interior with an inner textura prismatica. Conidiomatal setae arising from the excipular textura intricate, subulate, unbranched, straight or curved, septate but hardly seen, smooth- and thick-walled, dark brown to black, apex acute, 180-300 x 2.5-3.5 μm . Conidiophores lining the cavity of the conidiomata, septate, branched, hyaline to very pale brown, smooth, up to 100 μm long, 1.5-2 μm wide, invested in a thin layer of mucus. Conidiogenous cells discrete or integrated, subcylindrical to obclavate, monophialidic, hyaline, smooth- and thin-walled, 7-30 x 1.5-2 μm . Conidia formed in black and wet spore mass, cylindrical, fusiform or ellipsoidal, 1-septate, pale brown to almost colorless, smooth, 7-11 x 2-2.5 μm , bearing cellular appendages at both ends; appendages polar, arising as cellular extensions of the conidium body and separated from the latter by septa, branched or unbranched, attenuated, flexuous, 3-6 μm long; basal appendage excentric.

Material examined: On dead stem of unidentified tree, China: Sichuan Province, Ya An, Wangan County, Bifengxia, 15 Dec. 2013, W.P. Wu (Wu13238); On dead branches of unidentified plant, China: Guangdong Province, 9 Oct. 1998, W.P. Wu (Wu2251a). Living strain: 57688 (from Wu13238).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, China.

Description and illustration: Rao and Sutton (1975); Nag Raj (1993).

Notes: The fungus collected from China seems to have smaller conidia (9-15 x 2.5-3.5 μm) compared to those from the type specimen (Nag Raj 1993), otherwise it is very similar. Phylogenetically, on a megablast search using the LSU sequence from the specimen (Wu13238), the closest matches in NCBI's GenBank nucleotide

database were *Pseudolachnea fraxini* (GeneBank NG057956, identities 861/895 (96%), 3 gaps (0%)), *Dendrophoma cytosporoides* (GeneBank NG059108, identities 859/896 (96%), 3 gaps (0%)).

Hoehneliella triseptata W.P. Wu & Y.Z. Diao, sp. nov. Fig. 296, MycoBank MB841748.

Etymology: refers to its 3-septate conidia.

Typification: China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu2252).

Teleomorph: Not observed. Anamorph: Conidiomata stromatic, erumpent, cornute to cupulate, unilocular, setose, black, 150–400 µm high, 100–200 µm wide; with a moderately developed basal textura epidermoidea, merging with a textura intricate at a higher level; excipulum well developed, of textura intricate in the outer layers giving rise to conidiomatal setae and merging toward the interior with an inner textura prismatica, hyphae 1.5–2 µm. Conidiomatal setae arising from the excipular textura intricate, subulate, unbranched, straight or curved, 3–6-septate and hardly seen in basal part, smooth- and thick-walled, dark brown to black, apex rounded, 130–230 x 4–5.5 µm. Conidiophores lining the cavity of the conidiomata, septate, branched, hyaline to very pale brown, smooth, up to 100 µm long, 1.5–2 µm wide. Conidiogenous cells discrete or integrated, subcylindrical to obclavate, monophialidic, hyaline, smooth- and thin-walled, 7–25 x 1.5–2 µm. Conidia formed in black and wet spore mass, cylindrical, fusiform or ellipsoidal, 3-septate, pale brown to brown, smooth- and thick-walled, 18–23 x 4–6 µm, bearing cellular appendages at both ends; appendages polar, arising as cellular extensions of the conidium body and separated from the latter by septa, branched or unbranched, attenuated, flexuous, 3–6 µm long; basal appendage excentric.

Material examined: China: Guangdong Province, on dead branches of unidentified plant, 9 Oct. 1998, W.P. Wu (Holotype WFH Wu2252).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: Morphologically *Hoehneliella triseptata* W.P. Wu & Y.Z. Diao fits well to the generic concept of *Hoehneliella*, such as cup-shaped conidiomata with setae, phialidic conidiogenous cells forming from conidiophores arising from inner layer of the cup, pale brown, and septate conidia with mucilaginous appendage. It differs from the only known species in the genus *H. perplaxa* by having 3-septate and larger conidia (Rao and Sutton 1975; Nag Raj 1993). No strain was obtained for molecular study.

Excluded species from Chaetosphaeriaceae

Plectosphaerellaceae W. Gams, Summerbell & Zare (*Glomerellales*)

Plectosphaerellaceae W. Gams, Summerbell & Zare, typified with *Plectosphaerella*, was erected by Zare et al. (2007). Hyde et al. (2017) updated phylogeny of this family and eleven genera were recognized. *Acremoniisimulans* Tibpromma & K.D. Hyde, typified by *A. thailandensis* Tibpromma & K.D. Hyde was recently introduced to the genus (Zare et al. 2007; Tibpromma et al. 2018).

Several *Chloridium*-like fungi with pigmented conidiophores and pale brown conidia were studied from the fresh collection made in China. Morphologically they are similar with *Chloridium phaeophorum* W. Gams & Hol.-Jech., and phylogenetically they belong to *Plectosphaerellaceae* rather than *Chaetosphaeriaceae* where most other *Chloridium* species including the type species belong to. Furthermore, based on their morphology and phylogeny, no current genus can accommodate these fungi, thus 2 new genera are created for these 3 fungal species.

Phaeochloridium W.P. Wu & Y.Z. Diao, gen. nov., MycoBank MB841742.

Etymology: refers to its similarity with *Chloridium* but with colored spore.

Type species: *Phaeochloridium geniculata* (Van Emden) W.P. Wu & Y.Z. Diao comb. nov. ($\equiv$ *Phialophora geniculata* Van Emden, Acta Bot. Neerl. 24:194, 1975).

Teleomorph: Unknown. Anamorph: Lignicolous. Sexual morph unknown. Conidiomata absent. Mycelium composed of hyaline or pigmented hyphae. Conidiophores pale brown, unbranched, macronematous, septate, terminated with conidiogenous cell, often with sympodial proliferation. Conidiogenous cells phialidic, integrated, subcylindrical, proliferating sympodially, geniculate, irregularly widened at the proliferations, dark brown and paler toward the tip, tapering slightly toward the collarette; collarettes slightly funnel-shaped. Conidia oblong, ellipsoid, pale to medium brown, aseptate, truncate at the base, obtuse at the apex, arranged in wet spore heads.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: The new genus *Phaeochloridium* is characterized by solitary, brown conidiophore with or without percurrent or sympodial proliferation, phialidic conidiogenous cells with funnel-shaped collarettes, and pale brown, ellipsoidal, cylindrical conidia with a darker hilum at the base. Morphologically it is similar to several

genera such as *Phialophora*, *Chloridium*, *Phaeoacremonium*, but phylogenetically they belong to different families.

Phaeochloridium gamsii W.P. Wu & Y.Z. Diao, sp. nov. Figs. 297a, b and 298, MycoBank MB841749.

Etymology: refers to the mycologist W. Gams who contributed significantly for this group of fungi.

Typification: China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of *Musa* sp., 18 Oct. 2020, W.P. Wu (Holotype WFH Wu17434; ex-type strain CGMCC 3.20755 = NN 78202).

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5–3 µm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or 2–3 in group, cylindrical, erect, unbranched, straight or slightly flexuous, 2–6-septate, pale to medium brown, dark brown at the base, becoming paler towards the apex, smooth, thick-walled at the basal part, thin-walled towards the upper part, 45–108 x 3–4 µm, basal cell 7–10 µm. Conidiogenous cells integrated, terminal, monophialidic, pale brown, smooth, thin-walled, 25–30 x 3–4 µm, 1–2 irregular percurrent proliferation, occasionally with 1–2 sympodial proliferations; collarette funnel-shaped, 2–2.5 µm wide, 1–1.5 µm deep, slightly darker than other part of the conidiogenous cells. Conidia produced singly, aggregated in a brown slime masses, oblong, ellipsoidal, rounded at both ends, distinctly with a dark hilum at one or both ends, 6.5–8 (–10) x 3–3.5 µm.

Colonies on PDA effuse, colonies 0.7–0.9 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, dark brown, with pale colored margin, reverse pale brown to brown.

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of *Monstera deliciosa*, 25 Dec. 2012, W.P. Wu (Wu12504); China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of *Musa* sp., 25 Dec. 2012, W.P. Wu (Wu12587); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of *Ananas* sp., 11 Nov. 2019, W.P. Wu (Wu17074); China: Guangdong Province, Shenzhen, Lianhuashan Park, on dead leaves of *Musa* sp., 18 Oct. 2020, W.P. Wu (Wu17434-holotype, Wu17435). Living strain: 55347 (from Wu12504), 55401 (from Wu12587), 77412 (from Wu17055), 77730 (from Wu17074), 78202 (ex-type strain) and 78203 (from Wu17434), 78204 (from Wu17435).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: Our phylogenetic analysis by using the combined data set of ITS and LSU clearly showed that *Phaeochloridium gamsii* is closely related to *Phialophora geniculata* and *Chloridium phaeophorum*. Morphologically these three fungi also shared similarity on pigmented conidiophores, monophialidic conidiogenous cell with funnel-shaped collarette often percurrently proliferating, and pale brown, aseptate and oblong conidia with a dark hilum; they can be distinguished by much bigger conidia in *P. gamsii* (6.5–8 x 3–3.5 µm vs. 3–6 x 2–2.5 µm in *P. geniculata*; 4–5 x 1.7–2.2 µm in *C. phaeosporum*).

The ITS sequences were determined from several strains obtained from the fresh collections in China. The ITS sequences from Wu12587 and Wu17434 are identical, while they differ with 7 bps from the one obtained from Wu12504. Morphologically the fungi from these different specimens are almost identical. In the specimen Wu17434, the fungus forms well-developed basal stroma from which up to 15 conidiophores are formed, and biguttulate and slightly larger conidia (7.5–10 x 2.5–3 µm). Phylogenetically, based on a megablast search using the ITS sequences from the Chinese collection Wu12504, the closest matches in NCBI's GenBank nucleotide database were members of *Plectosphaerellaceae*, including *Phialophora geniculata* exotype strain CBS562.73 (GeneBank MH860773, identities 455/487 (93%), 14 gaps (2%)), *Phialophora geniculata* IFM50532 (GeneBank AB190395, identities 455/487 (93%), 14 gaps (2%)), *Gibellulopsis nigrescens* (GeneBank KR014364, identities 450/486 (93%), 15 gaps (3%)).

Phaeochloridium geniculatum (Van Emden) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 299, MycoBank MB841747.

≡ *Phialophora geniculata* Van Emden, Acta Bot. Neerl. 24:194, 1975

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5–2.5 µm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or in group, cylindrical, erect, unbranched or occasionally irregularly branched, straight or slightly flexuous, tapering gradually towards the apex, 2–4-septate, brown, dark brown at the base, becoming paler towards the apex, smooth- and thin-walled, 45–85 x 2.3–3 µm, with 0–2 sympodial proliferations. Conidiogenous cells integrated, terminal, monophialidic, pale brown, smooth, 20–25 x 1.5–2.2 µm; collarette funnel-shaped or subcylindrical, darker, 1–1.3 µm wide, up to 1 µm deep. Conidia produced singly, aggregated in a brown slime masses, ellipsoidal, cylindrical, rounded at both ends, distinctly with a dark scar at base, guttulate, 4.5–5.5 (–6) x (1.8) 2–2.2 µm.

Material examined: China: Yunnan Province, Xishuangbanna, on dead leaves of unidentified plant, 16 Oct. 1999, W.P. Wu & Yan Huang (Wu2735b). Living strain: 46009 (from Wu2735b).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Surinam, USA.

Description and illustration: Van Emden (1975); Gams and Holubová-Jechová (1976); Morgan-Jones et al. (1992).

Notes: The genus *Phialophora* Medlar, typified by *P. verrucosa* Medlar, includes structurally simple, dematiaceous hyphomycetes with pigmented conidiophores, flask-shaped phialides often with a flaring collarette, and one-celled conidia (Medlar 1915; Gams and Holubová-Jechová 1976). A total of 99 valid names were listed in Mycobank (23 March 2021) and these species are highly pleomorphic in different ascomycete groups (Gams 2000) as demonstrated by the phylogenetic analysis (Gams 2000; Réblová et al. 2011a, b, 2013, 2017). The type species of the genus *P. verrucosa*, together with several other species, belongs to the *Herpotrichiellaceae* (*Chaetothyriales*, *Eurotiomycetes*), while many other species have been reassigned to several different genera (for example *Hyphodiscus*, *Rhopalophora*, *Lasiosphaeris*, *Cyphellophora* etc) (Gams 2000; Li et al. 2017; Réblová et al. 2013, 2017).

Phialophora geniculata Van Emden was originally described with geniculate conidiophores and aseptate, light colored, oblong conidia with a darker hilum (4-5 x 2-2.5 µm) (Van Emden 1975). It was compared on the conidiophores with those of *Phialogeniculata* Matsush. and *Codinaea* Maire, but the conidia are different from those of the species of both genera by their lack of septation and of appendages. The DNA sequences are available for several strains including the ex-type strain, and our phylogenetic analysis shows it clearly belongs to *Plectosphaerellaceae* W. Gams, Summerbell & Zare. Based on both molecular phylogeny and morphological characters, the new genus *Phaeochloridium* is introduced to accommodate this fungus. Morphologically it resembles *Acremoniisimulans* Tibpromma & K.D. Hyde, and some species with dark spore in *Chloridium* and *Phialophora*, but can be distinguished by pale brown conidia with dark hilum (Medlar 1915; Gams and Holubová-Jechová 1976; Gams, 2000; Seifert et al. 2011; Li et al. 2017; Réblová et al. 2013, 2017).

Morphologically the fungus from the Chinese specimen is well aligned with the original description from the type specimen, except for the more sympodial proliferations in the original description (from pure culture); the ITS sequence obtained from the Chinese collection is only 6 bp difference from those reported in the GeneBank including the exotype strain CBS562.73. Based on a megablast search using the ITS sequences from the Chinese collection Wu2735b, the closest matches in NCBI's GenBank nucleotide database were members of *Plectosphaerellaceae*, including *Phialophora geniculata* exotype strain CBS562.73 (GeneBank MH860773, identities 476/484 (98%), 0 gap (0%)), *Phialophora geniculata* IFM50532 (GeneBank AB190395, identities 476/484 (98%), 0 gap (0%)), *Gibellulopsis nigrescens* (GeneBank KR014364, identities 468/485 (96%), 5 gaps (1%)).

Phaeochloridium phaeosporum (W. Gams & Hol.-Jech.) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 300, MycoBank MB842078

≡ *Chloridium phaeosporum* W. Gams & Hol.-Jech., Study. Mycol. 13:27, 1976

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-2.5 µm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or in group, cylindrical, erect, unbranched, or occasionally irregularly branched, straight or slightly flexuous, 3-11-septate, brown, dark brown at the base, becoming paler towards the apex, smooth, 50-100 x 2.5-3 µm. Conidiogenous cells integrated, terminal, phialidic, pale brown, smooth, 18-22 x 3-3.5 µm, with 1-2 irregular percurrent proliferation. Conidia produced singly, aggregated in a brown slime masses, ellipsoidal, rounded at both ends, distinctly with a dark scar at base, 5-6 x 2-2.5 µm.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culm of bamboo, 2 Jan. 1997, W.P. Wu (Wu1300d).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, USA.

Description and illustration: Gams & Holubová-Jechová (1976), Morgan-Jones et al. (1992).

Notes: *Chloridium phaeosporum* and *Phialophora geniculata* Van Emden are very similar on conidiophores, conidiogenous cells and conidia (Emden 1975; Gams and Holubová-Jechová 1976). The difference is that in *P. geniculata*, the conidiophores have sympodial proliferation and the conidia are slightly wider (4-5 x 2-2.5 µm), while in *C. phaeosporum*, the conidiophores are with percurrent proliferation and narrower conidia (4-5 x 1.7-2.2 µm). No molecular data is available for *C. phaeosporum*.

Sinochloridium W.P. Wu & Y.Z. Diao, gen. nov. MycoBank MB841743.

Etymology: *Sino-*, China, refers to where this fungus was discovered. *Chloridium* (L), a similar fungal genus.

Type species: *Sinochloridium bambusicola* W.P. Wu & Y.Z. Diao sp. nov.

Teleomorph: Unknown. Anamorph: Lignicolous. Sexual morph unknown. Conidiomata absent. Mycelium composed of hyaline or pigmented hyphae. Conidiophores pale brown, unbranched, macronematous, septate, terminated with conidiogenous cell. Conidiogenous cells phialidic, integrated, subcylindrical, dark brown and

paler toward the tip, tapering slightly toward the collarette, with a single sporulating locus; collarettes inconspicuous. Conidia oblong, ellipsoid, hyaline, aseptate, arranged in wet spore heads.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Sinochloridium bambusicola W.P. Wu & Y.Z. Diao, sp. nov. Figs. 301, MycoBank MB841948.

Etymology: refers to its occurrence on bamboo.

Typification: China: Guangdong Province, Guangzhou, Nansha, : on dead culm of bamboo, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16678; ex-type strain CGMCC 3.20735NN 76961).

Lignicolous. Sexual morph unknown. Colonies effuse, hairy. Mycelium composed of hyaline or pigmented hyphae, 2-3.5 µm. Teleomorph: Not observed. Anamorph: Conidiophore macronematous, single or 2-3 in clusters, cylindrical, unbranched, 5-9-septate, straight, or slightly flexuous, dark brown at base, paler towards the apex, smooth-walled, 55-105 x 3-4 µm, basal cell swollen and 6-9 µm wide, terminated with a conidiogenous cell. Conidiogenous cells monophialidic, integrated, subcylindrical, lageniform, tapering towards apex, 23-25 x 2-3 µm, pale brown at the base, becoming subhyaline towards the apex, smooth- and thin-walled; collarette inconspicuous, 0.8-1.2 µm wide, with a single sporulating locus. Conidia oblong, ellipsoid, hyaline, aseptate, biguttulate, 4.5-5.5 x 2.0-2.3 µm, slightly tapering towards ends, arranged in wet spore heads.

Colonies on PDA effuse, colonies 1-1.3 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey in the central part, reverse brown to dark brown.

Material examined: China: Guangdong Province, Guangzhou, Nansha, : on dead culm of bamboo, 18 Aug. 2019, W.P. Wu (Holotype WFH Wu16678). Living strain: ex-type strain 76961, 78253 and 76962 (from Wu16678).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Notes: This dematiaceous microfungi on dead culm of bamboo is similar with some *Chloridium* species in producing macronematous, pigmented and septate conidiophores, terminal phialidic conidiogenous cells, and hyaline and aseptate conidia aggregated into wet spore head (Gams and Holubová-Jechová 1976; Seifert et al. 2011). However, our phylogenetic analysis based on the integrated dataset of ITS and LSU showed that it represents another genus in *Plectosphaerellaceae* W. Gams, Summerbell & Zare, thus a new genus is created here. Morphologically it resembles *Phaeophialophora*, *Acremoniiisimulans* Tibpromma & K.D. Hyde, and some species in *Chloridium* and *Phialophora*, but can be distinguished by a combination of clustered conidiophores, terminal and monophialidic conidiogenous cells, and hyaline, ellipsoid and aseptate conidia (Medlar 1915; Gams and Holubová-Jechová 1976; Gams 2000; Seifert et al. 2011; Li et al. 2017; Réblová et al. 2013, 2017; Tibpromma et al. 2018).

In molecular level, based on a megablast search using the ITS sequences from the Chinese collection Wu16678, the closest matches in NCBI's GenBank nucleotide database were members of *Plectosphaerellaceae*, including unclassified *Plectosphaerellaceae*, (GeneBank MW619966, identities 573/587 (98%), 1 gap (0%)), *Acremonium furcatum* (GeneBank MG250388, identities 537/600 (90%), 20 gaps (3%)), *Acremonium antarcticum* (GeneBank MG250387, identities 538/601 (90%), 23 gap (3%)).

Rhamphoriaceae Réblová, Mycologia 11: 754, 2018. (*Sodariomycetidae*)

The family Rhamphoriaceae was introduced for two new genera with Phaeoisaria- and Idriella-like anamorphs. *Xylolentia* is one of the genus (Réblová & Štěpánek 2018). Based on morphological comparison and phylogenetic analysis, *Chloridium reniforme* Matsush. is transferred into the genus *Xylolentia*, and a new species is also added into the genus.

Xylolentia Réblová, Mycologia 11: 754, 2018.

Ascomata perithecial, nonstromatic, immersed or partially erumpent becoming superficial, solitary, or aggregated; venter globose, collapsing laterally, glabrous, black, with a cylindrical neck. Ascomatal wall two-layered. Ostiole periphysate. Paraphyses persistent, cylindrical, septate. Asci unitunicate, cylindrical-clavate, long-stipitate, 8-spored; apex with a distinct, nonamyloid apical annulus. Ascospores ellipsoidal to obovoid, brown prior to discharge, septate, smooth-walled, without sheath or appendages. Conidiophores macronematous, mononematous, unbranched, septate. Conidiogenous cells terminal, integrated, polyblastic, with sympodially extending rachis. Conidia hyaline becoming brown, aseptate.

Type species: *Xylolentia brunneola* Réblová.

Xylolentia matsushimae W.P. Wu & Y.Z. Diao, nom. nov., MycoBank MB841949.

≡ *Chloridium reniforme* Matsush., Icon. Microfung. A Mats. Iect., Kobe: 28, 1975.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 μm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or in group, cylindrical, erect, unbranched, straight, or slightly flexuous, 6-9-septate, brown, dark brown to black at the base, becoming paler towards the apex, smooth, 60-160 x 3.5-5 μm , swollen up to 7 μm wide at the base. Conidiogenous cells integrated, terminal, phialidic, pale brown, becoming paler towards the apex, smooth, 15-30 x 2.5-3 μm , inflated to 3.5-4.5 μm near the tip, but strongly constricted at the hardly visible collarette. Conidia produced singly, aggregated in a slime mass, more or less reniform, 3-4 x 2-2.5 μm .

Colonies on PDA effuse, colonies 0.6-1.4 cm diameter in 20 days, circular, flat, margin entire or irregular, aerial mycelium well-developed, grey, with pale colored margin, reverse brown in the center and becoming paler towards the margins.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead culms of bamboo, 2 Jan. 1997, W.P. Wu (Wu1266f); China: Hain Province, on rotten wood, 20 Dec. 2000, W.P. Wu (Wu5554); China: Hunan Province, Mangshan, on rotten wood, 15 April 2002, W.P. Wu (Wu6108). Living strain: 43170 (from 1266f).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Japan.

Description and illustration: Matsushima (1975); Holubová-Jechová and Gams (1976).

Notes: This fungus was originally described as *Chloridium reniforme* and it is unique in producing terminal monophialidic conidiogenous cell with multispore-producing loci within the collarette, and reniform conidia (Matsushima 1975; Holubová-Jechová and Gams 1976). Our phylogenetic analysis with the combined ITS and LSU sequences showed that it belongs to *Xylolentia* in *Rhamphoriaceae* Réblová (Réblová & Štěpánek, 2018; Yuan et al., 2020), and should be excluded from the genus *Chloridium* (*Chaetosphaeriaceae*). Since *Xylolentia reniformis* C.G. Lin, K.D. Hyde & Jian K. Liu already exists for a different species, a new name *Xylolentia matsushimae* is proposed for *Chloridium reniforme* Matsush.

Morphologically it is indistinguishable from *Xylolentia reniformis* C.G. Lin, K.D. Hyde & Jian K. Liu, both are with terminal conidiogenous cell with slightly swollen subapical region, multispore-producing loci within the inconspicuous collarette, and hyaline and reniform conidia with similar size (3-4.5 x 1.8-3 μm (Matsushima 1975; Yuan et al. 2020). However, their ITS sequences are with significant difference (98% identity).

Xylolentia palmicola W.P. Wu & Y.Z. Diao, sp. nov. Fig. 302, MycoBank MB841984.

Colonies effuse, brown, hairy. Mycelium mostly immersed in the substrate, composed of brown, septate, subhyaline to pale brown, smooth, 1.5-3 μm wide hyphae. Teleomorph: Not observed. Anamorph: Conidiophores solitary or in small group, cylindrical, erect, unbranched, straight, or slightly flexuous, 8-12-septate, brown, dark brown at the base, becoming paler towards the apex, smooth, 100-175 x 3.5-4.5 μm ; basal cell swollen and lobbed, 7-10 μm wide. Conidiogenous cells integrated, terminal, monophialidic, brown, becoming paler towards the apex, smooth, 23-29 x 2.5-2.7 μm , inflated to 3-4.2 μm near the tip, but strongly constricted at the hardly visible collarette. Conidia produced singly, aggregated in a slime mass, more or less reniform, 4-5 x 1.7-2 μm .

Material examined: China: Guangdong Province, Shaoguan, Danxiashan, on dead leaves of palm, 25 Dec. 2012, W.P. (Wu12519). Living strain: 55349 (from Wu12519).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Matsushima (1975); Holubová-Jechová and Gams (1976).

Notes: Morphologically *X. palmicola* is indistinguishable from *Xylolentia matsushimae* and *X. reniformis*, both are with terminal conidiogenous cell with slightly swollen subapical region, multispore-producing loci within the inconspicuous collarette, and hyaline and reniform conidia with similar size (3-4.5 x 1.8-3 μm (Matsushima, 1975; Yuan et al., 2020). However, their ITS sequences are with significant difference (98% identity). The conidia in *X. palmicola* is slightly longer and narrower, and its ITS sequence is with significant difference with the other two species.

Xylolentia reniformis C.G. Lin, K.D. Hyde & Jian K. Liu, Fung. Div. 104: 93, 2020.

Teleomorph: Not observed. Anamorph: Conidiophores scattered, erect, simple, straight or slightly flexuous, smooth, thick-walled, septate, cylindrical, dark brown at the base, paler towards the apex, 65-160 μm long, 3-9.5 μm thick at the base, slightly tapering towards the conidiogenous cells just below the apex then swelling again. Conidiogenous cells polyblastic, integrated, sympodial, terminal, clavate, subhyaline to pale brown, 14-40 x 3-4.5 μm . Conidia aggregated in slimy masses, acropleurogenous, simple, smooth, aseptate, reniform, hyaline, 3.2-4.6 μm long, 1.8-3.0 μm thick in the broadest part.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Yuan et al. (2020).

Notes: As noticed above, morphologically *X. reniformis* can hardly be distinguished from *X. matsushimae*. Their ITS sequences are with 98% identity (Matsushima 1975; Yuan et al. 2020).

Xyladictyochaetaceae Crous & Hern.-Restr. Fungal Systematics & Evolution (FUSE) 1: 212, 1981.

(*Xylariales*, *Xyladictyochaetaceae*)

Mycelium consisting of medium brown, smooth, septate, branched hyphae, forming globose, intercalary, brown, smooth, chlamydospore-like structure. Conidiophores erect, brown, smooth, subcylindrical, flexuous, multiseptate. Conidiogenous cells terminal and intercalary, polyphialidic; phialidic opening lacking flared collarettes. Conidia solitary, aggregating in slimy mass, hyaline, smooth, fusoid-ellipsoid, slightly curved, apex subacute, base truncate, medianly 1-septate; each end with flexuous, unbranched appendage.

Type genus: *Xyladictyochaeta* Hern.-Restr., R.F. Castañeda & Gené.

Xyladictyochaeta Hern.-Restr., R.F. Castañeda & Gené, Stud. Mycol., 86: 94, 2017.

Mycelium partly superficial and partly immersed, consisting of medium brown, smooth, septate, branched hyphae, forming globose, intercalary, brown, smooth, chlamydospore-like structure. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, setiform, unbranched or rarely branched, erect, brown, smooth, subcylindrical, flexuous, multiseptate. Conidiogenous cells terminal and intercalary, mono- or polyphialidic and sympodial; collarette inconspicuous, usually intercalary and cylindrical with a lateral extension near a septum bearing terminally the conidiogenous loci, sometime also terminal and usually lageniform, collarette inconspicuous. Conidia solitary, aggregating in slimy mass, hyaline, smooth, fusoid-ellipsoid, slightly curved, apex subacute, base truncate, medianly 1-septate; each end with flexuous, unbranched appendage.

Type species : *Xyladictyochaeta eucalypti* (Sutton & Hodges) W.P. Wu & Y.Z. Diao ($\equiv$ *Codinaea eucalypti* B. Sutton & Hodges; $\equiv$ *Dictyochaeta eucalypti* (B. Sutton & Hodges) Whitton, McKenzie & K.D. Hyde; = *Xyladictyochaeta eucalypti* Hern.-Restr., R.F. Castañeda & Gené).

The genus *Xyladictyochaeta* was recently created for a microfungus on *Eucalyptus* sp. collected from Portugal (Hernandez-Restrepo et al. 2017) and shortly after also found in Australia (Crous et al., 2018). Apart from the type species, the second species *X. tristaniopsidis* Crous was added into the genus (Crous et al. 2020). Morphologically, *Xyladictyochaeta* is mostly similar to *Dictyochaeta* in having similar conidiophores appearance, producing wet spore mass and hyaline conidia with setulae, but differs in having setiform conidiophores with intercalary and terminal polyblastic and sympodial conidiogenous cells. Moreover, *Xyladictyochaeta* phylogenetically belongs to *Xylariales*, while members of *Dictyochaeta* are phylogenetically associated with *Chaetosphaeriaceae* (Ellis 1971, 1976 ; Réblová et al. 1999; Réblová 2000, 2004 ; Fernández and Huhndorf 2005; Fernández et al. 2006; Seifert et al. 2011; Hernandez-Restrepo et al. 2017; Crous et al. 2018).

During an examination of *Eucalyptus* leaf litter collected in China, one fungus similar to *Codinaea eucalypti* B. Sutton & Hodges was often seen from a number of collections. They are very similar on conidiophores and conidial appearances, and also collected from the same host genus (*Eucalyptus* spp.), and can only be distinguished by conidiogenous cells, ie. monophialidic in *C. eucalypti* and polyphialidic and sympodial in the Chinese collection (same as in *Xyladictyochaeta eucalypti*) (Sutton and Hodges, 1975; Hernandez-Restrepo et al. 2017; Crous et al. 2018). This brings our attention to reexamine the type specimen of *Codinaea eucalypti* in herbarium IMI, and from this it was confirmed that the conidiogenous cells from this type specimen are morphologically identical to what we observed in the Chinese collection and also what was described in *X. eucalypti*. Instead of phialidic conidiogenous cells with collarettes in *Codinaea* and *Dictyochaeta*, the conidiogenous cells in these species are found to be with polyblastic and sympodial denticles as found in *Dactylaria* and *Idriella*. Furthermore, it was also concluded that these fungus from Brazil, China and Portugal are identical, and this was further confirmed by ITS sequence comparison. Thus, the following new combination *Xyladictyochaeta eucalypti* (Sutton & Hodges) W.P. Wu & Y.Z. Diao (= *Codinaea eucalypti* B. Sutton & Hodges) is made here as the type species of the genus *Xyladictyochaeta*.

Xyladictyochaeta eucalypti (Sutton & Hodges) W.P. Wu & Y.Z. Diao, comb. nov. Fig. 303, MycoBank MB841738.

$\equiv$ *Codinaea eucalypti* B. Sutton & Hodges, Nova Hedwigia 26: 517, 1975.

$\equiv$ *Dictyochaeta eucalypti* (B. Sutton & Hodges) Aramb. & Cabello, Mycotaxon 34: 682, 1989.

= *Xyladictyochaeta eucalypti* Hern.-Restr., R.F. Castañeda & Gené, Stud. Mycol., 86: 94, 2017.

Colonies effuse, spreading, diffuse, brown. Mycelium partly immersed and partly superficial, sparse, formed of smooth, septate, branched, pale brown, thin- and smooth-walled hyphae, 23–4 μ m wide. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, scattered or occasionally aggregated at the base, erect, straight, or slightly flexuous, simple, unbranched, cylindrical, medium to dark brown, up to 20 septate, smooth, up to 170 μ m long and 7–8 μ m wide, the distance between septa averaging 6–7 μ m. Conidiogenous cells integrated, indeterminate, terminal and intercalary, polyblastic, cylindrical, pale brown to brown, smooth,

conidiogenous loci unthicken, flattened, and closely aggregated on an ejection from the conidiogenous cells just below septa except the apical conidiogenous cells where the conidiogenous loci distributed on the apical regions, ejection hyaline to pale brown, up to 3 µm long and 1.5 µm wide. Conidia holoblastic, solitary, aggregated at the base, hyaline, 0-1-septate, falcate, tapering towards both ends, 11-13.5 x 2-2.5 µm, with an unbranched setulae at each end, 3.5-7.5 µm.

Colonies on PDA effuse, colonies 0.7-1.2 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, dark grey to pale brown in the central part, becoming paler toward the margins, reverse yellow to soil brown in the center and becoming paler towards the margins.

Typification: On dead leaves of *Eucalyptus saligna*, Brazil: Sao Paulo: Nr. Bauru, 15 Jan. 1973, I.A.S. Gibson, IMI 173094a (Holotype)

Material examined: Brazil: Sao Paulo: Nr. Bauru, on dead leaves of *Eucalyptus saligna*, 15 Jan. 1973, I.A.S. Gibson, IMI 173094a (Holotype); Brazil: Sao Paulo: Itepetininga, on dead leaves of *Eucalyptus saligna*, 9 June 1973, C.J. Hodges, IMI 176992a; Brazil: Espirito Santo: Aracruz, on dead leaves of *Eucalyptus citriodora*, 30 May 1973, C.S. Hodges, IMI 176988d; Brazil: Sao Paulo: Assis, 10 June 1973, C.S. Hodges, IMI 176991a; Brazil: Minas Gerais: Vicosia, C.S. Hodges, on dead leaves of *E. paniculata*, 18 Dec. 1973, C.S. Hodges, IMI 181534a; Brazil: Sao paulo: Rio Claro, 6 June 1974, C.S. Hodges, IMI 186981g; Brazil: Sao Paulo: Nr. Franca, on dead leaves of *Eucalyptus* sp., 14 Jan. 1973, I.A.S. Gibson, IMI 173093c; Brazil: Espirito Santo: Viana, 11 Dec. 1973, C.S. Hodges, IMI 181532b; Brazil: Espirito Santo: Aracruz, 10 Dec. 1973, C.S. Hodges, IMI 181531b; Brazil: Sao paulo: Rio Claro, 6 June 1974, C.S. Hodges, IMI 186980b, 186979b, 186978b, 186976b, 186977a; China: Yunnan Province: Kunming: Kunming Botanical Garden, on dead leaves of *Eucalyptus* sp., 24 Nov. 1995, W.P. Wu (Wu993b); On dead leaves of undetermined tree, China: Yunnan Province: Kunming: Kunming Botanical Garden, 24 Nov. 1995, W.P. Wu (Wu960b); China: Guangxi Province, Shiwandashan, on dead leaves of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1603b); China: Guangxi Province, Shiwandashan, on dead leaves of *Eucalyptus* sp., 31 Dec. 1997, W.P. Wu (Wu1607 d); China: Guangxi Province, Nangning, on dead leaves of *Eucalyptus* sp., 3 Jan 1998, W.P. Wu (Wu1646b). Living strain: 43959 (from Wu1646b), 43979 (from Wu1603b).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Australia, Brazil, China, Portugal.

Description and illustration: Sutton and Hodge (1975); Hernandez-Restrepo et al. (2017); Crous et al. (2018).

Notes: Morphologically, the fungus collected from China fits well to *Codinaea eucalypti* B. Sutton & Hodges as reported from Australia, Brazil, and Portugal. In molecular level, based on a megablast search using the ITS sequences from the Chinese collection, the closest matches in NCBI's GenBank nucleotide database were members of *Xyladiectochoaeta*, *Castanediella*, *Beltrania*, *Beltraniopsis*, *Phlogicylindrium* and *Anungitea* in *Xylariales*, including *X. lusitanica* (GeneBank NR154542 from the type and KY853479, identities 551/559 (99%), 4 gaps (0%)), *X. lusitanica* (GeneBank MH107927, identities 529/536 (99%), 3 gaps (0%)), *X. lusitanica* (GeneBank MH107926, identities 533/542 (98%), 3 gaps (0%)), *Castanediella eucalyptigena* (GenBank NR_156348 from the type, identities 499/544(92%), 13 gaps (2%)), *Castanediella malysiana* (GenBank KX306752, identities 503/567 (89%), 24 gaps (4%)), *Beltrania* sp. (GenBank KP133171, 507/569 (89%), 22 gaps (3%)), *Anungitea eucalyptigena* (GenBank KY173383; identities 485/550 (88%), 19 gaps (3%)) and *Beltraniopsis neolitiseae* (GenBank NR_148072; Identities 505/567 (89%), 19 gaps (3%)). The highest similarities using the LSU sequence were *Xyladiectochoaeta*, *Castanediella*, *Beltrania*, *Beltraniopsis*, *Polyscytalum*, *Phlogicylindrium*, *Anungitea* and *Pseudodidriella* in *Xylariales*, including *X. lusitanica* (GenBank MH107973; identities 840/845 (99%), 1 gap (0%)), *Phlogicylindrium eucalypti* (GenBank DQ923534; identities 882/905 (97%), 1 gap (0%)), *Castanediella eucalypti* (GenBank KR476758; identities 874/905 (97%), 1 gap (0%)). It is also notified that all these closely related genera from megablast search with both ITS and LSU sequences are dematiaceous hyphomycetes with denticules and sympodial conidiogenous cells, as observed in *X. eucalypti*.

Vermiculariopsiellaceae Hern.-Rest., J. Mena, Gené & Crous

(Sordariomycetes, Vermiculariopsiales Hern.-Rest., J. Mena, Gené & Crous)

Tubulicolla Réblová & Hern. & Hern.-Restr., Mycologia, 113:420, 2021.

Colonies effuse, hairy, dark brown to black on the natural substrate. Mycelium composed of subhyaline to pale brown hyphae aggregated to form small stromata, from which setae and conidiophores arise. Teleomorph: Unknown. Anamorph: Setae unbranched, upright, straight, cylindrical, dark brown becoming pale brown toward the apex, apical cell clavate developing into a monophialidic. Conidiophores arise in groups around the setae, shorter than the setae, macronematous, mononematous, unbranched, upright, straight, brown. Conidiogenous cells phialidic, clavate to lageniform, terminal, integrated, with a tubular extension at the apex, with a single apical opening. Collarettes funnel-shaped, hyaline. Conidia subcylindrical to cylindrical, obtuse at each end, straight or slightly curved, smooth, accumulating in slimy, colorless fascicles at the tip of the conidiogenous cells.

Type species: *Tubulicolla cylindrospora* (Morgan- Jones & E.G. Ingram) Réblová & Hern.-Restr.

The genus *Tubulicolla* Réblová & Hern. & Hern.-Restr. is a recently described genus for *Codinaea cylindrospora* Morgan-Jones & E.G. Ingram, which is phylogenetically different from other known *Codinaea* and *Dictyochaeta* species in the phylogenetic analysis from the combined LSU and ITS sequences (Réblová et al. 2021c). Morphologically it is unique in producing several short conidiophores clustered together with one long fertile setiform conidiophores, and both are ended with a single clavate phialide bearing a apical, funnel-shaped, stalked collarette (Morgan-Jones and Ingram, 1976; Hernández-Restrepo et al. 2017; Réblová et al. 2021c).

As pointed by Réblová et al. (2021c), the tubular neck between the funnel-shaped collarette and the body of the conidiogenous cell is the prominent character of *Tubulicolla*. Apart from *Codinaea cylindrospora*, presence of the tubular neck between the funnel-shaped collarettes and the body of conidiogenous cells are also found in 2 other described *Dictyochaeta* species, *Dictyochaeta microcylindrospora* (conidia subcylindrical, 4.8–7.2 x 1–1.5 µm) (Whitton et al., 2000) and *D. stipitocolla* (conidia spear-shaped with basal protuberances, 12.7–17.5 x 2.6–4 µm) (Kuthubutheen and Nawawi, 1991b). They are also transferred to the genus *Tubulicolla* and their phylogenetic relationship with *Tubulicolla* needs to be further studied when fresh specimens are recollected.

Tubulicolla cylindrospora (Morgan-Jones & E.G. Ingram) Réblová & Hern.-Restr., Mycologia 113:420, 2021.

≡ *Codinaea cylindrospora* Morgan-Jones & E.G. Ingram, Mycotaxon 4 (2): 504 (1976)

= *Dictyochaeta cylindrospora* (Morgan-Jones & E.G. Ingram) Aramb. & Cabello, Mycotaxon 34: 681, 1989.

= *Dictyochaeta cylindrospora* (Morgan-Jones & E.G. Ingram) Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 137, 2000.

Colonies hypophyllous, effused, dark brown to almost black. Mycelium composed of immersed, semi-immersed or superficial, branched, septate, subhyaline to pale brown hyphae, 1.5–2.5 µm wide, aggregated to form small stromata at the bases of setae and conidiophores. Stromatic cells globose or angular, thick-walled, brown, up to 7 µm wide. Teleomorph: Not observed. Anamorph: Setae arising from dark brown, swollen basal cells, erect, straight, smooth, up to 6-septate, dark brown and thick-walled in the lower part, paler above, fertile, terminating in a single, narrowly clavate phialide, 105–125 x 3–4 µm, 6–7 µm wide at the bulbous base. Conidiophores macronematous, mononematous, arising in groups of up to four near the base of each seta, cylindrical, with a somewhat swollen basal cell, simple, septate, smooth, 30–60 x 2.5–4 µm, terminating in a single, pale brown to subhyaline, narrowly clavate phialide, each phialide bearing a single apical, funnel shaped, stalked cellarette. Conidia extruded in slimy colorless droplets, continuous, hyaline, cylindrical, straight, or very lightly curved, obtuse at each end, 8–11 x 2–2.5 µm.

Colonies on PDA effuse, colonies 0.3–0.5 cm diameter in 20 days, circular, flat, margin entire, aerial mycelium well-developed, grey, reverse brown.

Material examined: China: Guangxi Province, Shangsi, Shiwandashan, Wangle, on dead leaves of ?*Quercus* sp., 2 Jan. 1997, W.P. Wu (Wu1323d). Living strain: 43188 (from Wu1323d).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China, Cuba, Malaysia, Mexico, USA

Description and illustration: Morgan-Jones (1976); Castañeda-Ruiz and Kendrick (1990a, b); Kuthubutheen and Nawawi (1991); Heredia et al. (2000); Réblová and Seifert (2007), Réblová et al. (2021c).

Notes: *Tubulicolla cylindrospora* (Morgan-Jones & E.G. Ingram) Réblová & Hern.-Restr. seems to be a rather common fungus and recorded on decaying leaves of *Pinanga* sp., *Pinus* sp., *Quercus* spp. from broad geographic areas. The conidia (6–7.5 x 1.5–2 µm) from the specimen collected in Mexico are significantly smaller than the type specimen (Heredia et al. 2000).

Tubulicolla microcylindrospora (Whitton, McKenzie & K.D. Hyde) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841739.

≡ *Dictyochaeta microcylindrospora* Whitton, McKenzie & K.D. Hyde, Fung. Div. 4: 141, 2000.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Brazil, China.

Description and illustration: Whitton, McKenzie & Hyde (2000).

Notes: *Dictyochaeta microcylindrospora* Whitton, McKenzie & K.D. Hyde fits well to concept of the recently described genus *Tubulicolla* on presence of cylindrical neck between collarette and conidiogenous cells, and cylindrical, aseptate conidia without setulae.

Tubulicolla stipitocolla (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841740.

≡ *Dictyochaeta stipitocolla* Kuthub. & Nawawi, Mycol. Res. 95: 1214, 1991.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Malaysia.

Description and illustration: Kuthubutheen and Nawawi (1991).

Notes: *Dictyochaeta stipitocolla* Kuthub. & Nawawi resembles *Tubulicolla cylindrospora* on presence of sterile setae, clustered conidiophores with setae, terminal and monophialidic conidiogenous cells with a

cylindrical neck below the funnel-shaped collarete, and aseptate and aseptate conidia. Its conidia have broad base and is similar with those in *Vermiculariopsiella*.

Doubtful species in Chaetosphaeriaceae

Bahusutrabeeja Subram. & Bhat, Can. J. Bot. 55: 2204, 1977.

Based on the phylogenetic study, *Bahusutrabeeja dwaya* Subram. & Bhat, the type species of the genus *Bahusutrabeeja*, is recently transferred to *Codinaea* Maire, and *Bahusutrabeeja* become one of the synonyms for *Codinaea*. The remaining known species under the genus needs to be revised for reclassification. These species are *B. angularis* V.G. Rao & de Hoog, *B. bunyensis* McKenzie, *B. dwaya* Subram. & Bhat, *B. dubhashii* Bhat, *B. exappendagiculata* Xiao X. Li & X.G. Zhang, *B. globosa* Bhat & W.B. Kendr. and *B. manoharacharii* Pratibha & Bhat, and they can be distinguished by their conidial morphology, including shape, size, number and size of conidial appendages (Subramanian and Bhat 1977; Rao and de Hoog 1986; Bhat and Kendrick 1993; Bhat 1994; McKenzie 1997; Pratibha and Bhat 2005; Li et al. 2013). Morphologically two other *Bahusutrabeeja* species, *B. bunyensis* and *B. globosa*, closely resemble *C. dwaya* in having globose to subglobose, multi-setulate conidia. The conidia of *B. angularis* have an angular outline and should be compared with *Nawawia*. Other species differ in conidial shape and lack setulae. Their taxonomic treatment needs to be resolved using phylogenetic analysis in future study (Réblová et al. 2021e).

Under the genus *Bahusutrabeeja*, three species, *B. angularis*, *B. dwaya* and *B. exappendagiculata*, were recently reported from China (Chang 1990; Wu and McKenzie 2003; Li et al. 2014; Gao et al. 2015). Their systematic position remains to be studied.

Key to all known species of *Bahusutrabeeja*

1. Conidia globose, without appendage *B. exappendagiculata*
1. Conidia with short or long setulae appendage 2
2. Conidia angular or obpyriform to obclavate 3
2. Conidia spherical 5
3. Conidia obpyriform, obclavate, 15-20 x 5-8 µm, with 4 basal and 2 apical setulae up to 18 µm long *B. dubhashii*
3. Conidia angular less than 15 µm diam. 4
4. Conidia 8.5-11.5 x 7.5-10 µm, with 4 setulae up to 4.5 µm long *B. manoharacharii*
4. Conidia angular, 7-8 µm, with 3-5 setulae up to 4 µm long *B. angularis*
5. Conidia less than 7-13 µm diam. 6
5. Conidia more than 15 µm diam in average 10
6. Conidiogenous cells polyblastic, conidia 13-15 x 8-10 µm, with 3 setulae *B. trisetula*
6. Conidiogenous cells monoblastic 7
7. Conidiophores smooth, conidia 8-11 x 6.5-7.5 µm, with 1 apical and 2 lateral setulae appendages of 2-3 µm long *B. subminima*
7. Conidiophores verruculose 8
8. Conidia 7.5-10.5 µm, setulae 5-9 µm long *B. bunyensis*
8. Conidia 11-13 µm diam, with 2-3 slender appendages, up to 5 µm long *N. microsperma*
9. Conidia 12-19 µm diam, with 8-16 setulae of 4.5-12 µm long *B. dwaya*
9. Conidia 18-22 µm diam, with 9-12 setulae of 6.5-12.5 µm long *B. globosa*

Bahusutrabeeja angularis V. Rao & de Hoog, Stud. Mycol. 28:67, 1986.

Saprobe on dead branches. Teleomorph: Unknown. Anamorph: Conidiophores cylindrical, simple, erect, straight, or slightly flexuous, dark brown, septate, smooth- and thick-walled, 145-290 x 4.5-7.5 µm. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, with a broad sporulating loci and collarete, proliferating percurrently through the collarete, 4.8-6.5 µm wide at the widest part, 2 µm wide just below the collarete; collarete funnel-shaped, 2-2.5 µm long, 3.5-4.5 µm wide at the opening. Conidia acrogenous, solitary, rounded-cubical to polygonal, aseptate, hyaline, smooth, thick-walled, 7.5-10 µm diam, one corner being the basal scar, each corner provided with a thin, hyaline appendage, 5-8 µm long, accumulating in a slime head at the tips of the conidiogenous cells.

Typification: China: Hainan Province, tropical forest of Jianfengling, on dead branches of unidentified broad leaf tree, 18 April 2014, J.M. Gao (HMAS243459).

Ecology/substrate/host: Saprobe on dead branch.

Geographical distribution: China, India.

Description and illustration: Rao and de Hoog (1985); Chan (1990); Gao et al. (2015).

Notes: *Bahusutrabeeja angularis* V. Rao & de Hoog differs from other species in the genus by round-cubical to polygonal conidia with several appendages, while in all other species they are somewhat globose or subglobose (Rao and de Hoog 1985; Chang 1990; Gao et al. 2015). The specimen preserved in HMAS was examined by us and it bears this fungus with slightly bigger conidia than those in original description (7-8 µm diam.), aligned with the description by Gao et al. (2015). Its occurrence (conidia 6.3-7.2 µm diam) on decaying twig from Taiwan was also reported by Chang (1990). Chang (1990) also studied the living strain and observed the ellipsoidal microconidia (4.5 x 1 µm) with one end sharper and no appendage formed on autoclaved corn leaf. No living strain is available for phylogenetic analysis by us, thus its phylogenetic relationship with the type species of the genus remains to be studied.

***Bahusutrabeeja exappendiculata* Xiao X. Li & X.G. Zhang, Mycotaxon 126: 228, 2013**

Saprobe on dead branches. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, cylindrical, simple or occasionally branched, erect, straight or slightly flexuous, dark reddish brown to dark brown at the base, brown above, up to 14-septate, smooth- and thick-walled, 161-275 x 5-6.5 µm. Conidiogenous cells integrated, terminal, monophialidic, cylindrical, with a broad sporulating loci and collarette, proliferating percurrently through the collarette, up to 7.5 µm wide at the widest part; collarette prominent, up to 1 µm long, 3-4 µm wide at the opening. Conidia holoblastic, acrogenous, solitary, globose, aseptate, hyaline, smooth, thick-walled, 10.5-16 µm diam, no appendage, accumulating in a slime head at the tips of the conidiogenous cells.

Typification: China: Guangxi Province, Dayaoshan Nature Reserve, on dead branches of unidentified broad leaf tree, 10 Nov. 2012, Xiao X. Li (HMAS243429, isotype).

Ecology/substrate/host: Saprobe on dead branch.

Geographical distribution: China.

Description and illustration: Li et al. (2013).

Notes: *Bahusutrabeeja exappendiculata* Xiao X. Li & X.G. Zhang differs from other species in the genus by globose conidia without appendage, while all other known species in the genus produce conidia with setulae in different number (Rao and de Hoog, 1985; Chang, 1990; Li et al., 2013; Gao et al., 2015). The isotype specimen preserved in HMAS was examined by us. This is the only species known in the genus with conidia bearing no appendage. No living strain is available for molecular study, its phylogenetic relationship with the type species of the genus remains to be studied.

***Pseudofuscophialis* Sivan. & H.S. Chang, Mycol. Res. 99: 711, 1995**

Colonies effuse, sparse, causing no discoloration on the wood. Mycelium superficial composed of branched, septate, smooth, brown hyphae. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, straight, simple, rarely branched, smooth, multiseptate, brown to dark brown. Conidiogenous cells mono- or poly-phialidic, integrated, rarely discrete, intercalary, and terminal, sympodial. Phialides terminated by a funnel-shaped collarette. Conidia proliferation at the conidiogenous locus is enteroblastic. Conidia holoblastic, endogenous, acropleurogenous, simple, straight to slightly curved, smooth apex obtuse or acute, truncate at the base, transversely multiseptate, with large, pale brown central cells and smaller, subhyaline to very pale brown end cells.

Type species: *Pseudofuscophialis lignicola* Sivan. & H.S. Chang.

This genus was described for a fungus found in Taiwan, China and is characterized by dark brown conidiophores terminated with a phialides bearing a funnel-shaped collarette from which the conidia are produced (Sivanesan and Chang 1995). The genus has been remaining to be monotypic so far. Cai & Hyde (2007) reported its occurrence in mainland China.

***Pseudofuscophialis lignicola* Sivan. & H.S. Chang, Mycol. Res. 99: 711, 1995.**

Specimen: China: Yunnan, Xishuangbanna, Menglun, on submerged wood in a small forest stream, 15 Sept. 2001, L. Cai, CAI-9BNE31.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Sivanesan and Chang (1999); Cai and Hyde (2007).

Notes: No specimen was examined by us and the above description is based on the excellent documentation by Sivanesan and Chang (1995) and Cai and Hyde (2007). This species has been known only from two collections and its funnel-shaped collarette and fusiform, versicolored, and 3-septate conidia easily distinguishes it from other hyphomycetes (Seifert et al., 2011).

***Stratiphoromyces* Goh & K.D. Hyde, Mycol. Res. 102: 1149, 1998**

Colonies on natural substratum effuse, hairy, dark brown to black. Mycelium mainly immersed in the substratum. Stroma not developed. Setae and hyphopodia absent. Teleomorph: Unknown. Anamorph: Conidiophores macronematous, mononematous, solitary, erect, unbranched, straight, or slightly flexuous, multiseptate, dematiaceous, smooth, regenerating percurrently. Conidiogenous cells integrated, terminal, with crowded repeating percurrent proliferations. Conidia holoblastic, acrogenous, solitary, euseptate, curved, dematiaceous, setulate, usually aggregated in a mass. Conidial secession rhexolytic.

Type species: *Stratiphoromyces brunneisporus* Goh & K.D. Hyde.

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Brunei, China, India.

Description and illustration: Goh & Hyde (1998).

Notes: Goh & Hyde (1998) created the new genus *Stratiphoromyces* for *S. brunneisporus*, and differentiated it from other dematiaceous hyphomycetes by its unique combination of morphological characters: solitary, erect, stout conidiophores which regenerate percurrently like those in some species of *Chloridium* and *Cacumisporium*; conidiogenous cells which repeatedly proliferate to produce a crop of solitary, rhexolytically seceding conidia; and brown, uniseptate, curved, setulate conidia. *Chloridium* and *Dictyochaeta* are closely related genera but differ from *Stratiphoromyces* by the conidial morphology. The genus is with two described species, *S. brunneisporus* and *S. raghukumarensis* D'Souza, S.K. Singh & Bhat (Goh and Hyde 1998b; D'Souza et al. 2002; Seifert et al. 2011).

***Stratiphoromyces brunneisporus* Goh & K.D. Hyde, Mycol. Res. 102: 1149, 1998. Figs. 474-475.**

Colonies on natural substratum effuse, hairy, dark brown to black, sparsely aggregated. Mycelium mainly immersed in the substratum. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, solitary, erect, stout, unbranched, straight or slightly flexuous, 100–450 µm long, more or less cylindrical to attenuated, nodulate along the length due to results of multiple regenerations of conidiogenous regions, with a conical base 25–30 µm, and gradually tapering towards the apex which is 4–5 µm wide, black and opaque near the base, dark brown to medium brown at the upper portions, pale brown near the apex, thick-walled, smooth, multiseptate, regenerating percurrently, bearing at the apex a dark brown, globular mass of conidia which is 25–40 µm diam. Conidiogenous cells integrated, terminal, with crowded repeating percurrent proliferations. Conidia produced singly at the apex of the conidiogenous cells, usually aggregated in a mass, overall shape more or less ellipsoidal, slightly curved, 12–15 x 4.5–5.5 µm, medium brown, smooth, with one setulae at each end, with a single, central euseptum, not constricted at the septum, distal cell more or less triangular, proximal cell more or less rhomboid, with a slightly protruding, obtuse hilum, bearing minute frills of wall remnants resulting from rhexolytic conidial secession. Setulae thin, (5–)8 µm long, straight to curved, hyaline, slightly swollen at the tip.

Material examined: China, Hainan Province, on dead branches of palm, 20 Dec. 2000, W.P. Wu and Yan Huang (Wu5508, Wu5509).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: Brunei, China, India.

Description and illustration: Goh and Hyde (1998b); D'Souza et al. (2002).

Notes: As the type species of the genus, *Stratiphoromyces brunneisporus* is characteristics in conidiogenous proliferation and conidial morphology. Fully description and illustration were provided by Goh and Hyde (1998b) and D'Souza, Singh and Bhat (2002). Attempt to isolate the fungus from fresh material was failed and the conidia did not germinate under the normal isolation method.

***Stratiphoromyces multifimbriatus* (R. Kirschner & C.J. Chen) W.P. Wu & Y.Z. Diao, comb. nov., MycoBank MB841741.**

≡ *Dictyochaeta multifimbriata* R. Kirschner & C.J. Chen, Mycol. Progress 1(3): 287, 2002.

Colonies effuse, velvety, brown. Setae absent. Teleomorph: Not observed. Anamorph: Conidiophores macronematous, mononematous, solitary, simple, straight, brown, smooth, with several septa, 120–450 µm long, 7–11 µm wide at the base, 6–7 µm wide at the apex, with 0 to several proliferations. Conidiogenous cell monophialidic, terminal, integrated, cylindrical, in some cases slightly widened at or above the middle, with an apical, flaring collarete, 20–35 x 6–7 µm. Conidia aggregated in a white slimy head at the top of the conidiophore, hyaline, one-celled, reniform, guttulate when fresh or with 1–2 large and several minute drops after drying and subsequent mounting in KOH, 11–13 x 6–7 µm, with a truncate, 1 µm wide abscission scar, (2)3–6 (mostly 4) sub-basal setulae and with 2–4 (mostly 3) apical setulae, setulae slightly flexuous, 8–12(15) µm long and not exceeding 0.5 µm in diam.

Typification: China: Taiwan, Kaohsiung, Chu Yun Shan Lin Dao, on dead twig on ground, associated with *Tetraploa aristate*, 28 Apr. 2001, R. Kirschner & C.J. Chen (HAST 832).

Ecology/Substrate/Host: Saprobe on dead material of plant.

Geographical distribution: China.

Description and illustration: Kirschner & Chen (2002).

Notes: *Dictyochaeta multifimbriata* R. Kirschner & C.J. Chen is unique in producing reniform conidia with excentric basal scars and several setulae at each end. The reniform-shaped conidia with 3-6 setulae at each end easily distinguish it from others (Lunghini, Rambelli & Onofri, 1982; Kuthubutheen & Nawawi, 1991; Whitton, McKenzie & Hyde, 2000). *D. multifimbriata* Kirschner & Chen is very similar to *Stratiphoromyces brunneisporus* Goh & K.D. Hyde on conidiophores, conidiogenous cells and conidia, except for the hyaline and broader conidia with multisetulae at each end, thus it is transferred into the genus. No living strain can be located for phylogenetic study.

Discussion

Based on phylogenetic analysis, the family Chaetosphaeriaceae is further expanded to accommodate 91 accepted genera, including 24 new genera and 10 newly assigned genera. It is expected that the family will be further expanded with more genera from revision of the polyphyletic genus *Chaetosphaeria* Tul. & C. Tul., availability of molecular data and phylogenetic analysis for existing genera, and diversity exploration from subtropical and tropical areas. For future study of chaetosphaeriaceous fungi, several potential interesting areas could be explored: a). phylogenetic analysis by using the whole genome sequencing and with inclusion of all representatives from different linkages might further elucidate the phylogenetic relationships of these fascinating fungi; b). molecular phylogenetic analysis and revision of several polyphyletic genera will support to establish a natural classification system for these fungi; these polyphyletic genera are *Ellisembia*, *Stanjehughesia*, *Cacumisporium*, *Chaetosphaeria*, *Chloridium*, *Craspedodidymum*, *Cryptophiale*, *Cryptophialoidea*, *Dictyochaetopsis*, *Minimidochium*, and many published species of *Codinaea* and *Dictyochaeta*; c). biodiversity exploration of these fungi, especially in subtropical and subtropical areas, could lead to further expansion of the family and also help to obtain more living strains for molecular phylogenetic study.

Non phialidic anamorphs of Chaetosphaeriaceae

The chaetosphaeriaceous fungi with non-phialidic anamorphs are polyphyletic, majority of them are *Sporidesmium*-like fungi in anamorphs and with holoblastic conidiogenous cells, multiseptate and versicolor ascospores in teleomorphs. Based on the morphological and phylogenetic analysis, ten monophyletic genera are proposed for these fungi: *Aunstrupia*, *Ellisembia*, *Falholtia*, *Linkosia*, *Lomaantha*, *Morrisiella*, *Paliphora*, *Riisgaardia*, *Stanjehughesia*, and *Zanclospora*. Most of these genera are well defined monophyletic genera in both morphology and phylogeny. However, the two relatively large genera, *Ellisembia* and *Stanjehughesia*, are probably polyphyletic and need to be further studied towards a monophyletic generic concept and revision of the established species.

Inclusion of *Ellisembia* in Chaetosphaeriaceae is still doubtful and needs to be further confirmed when the DNA sequence data will be available from fresh collection of the type species *E. coronata* (Fuckel) Subram. This will also support to redefine the concept of the genus and revision of the over 70 known species. For *Stanjehughesia*, the type species is included in the phylogenetic analysis and the genus is well defined. However, most of other known species (15/17) in the genus have not been studied with living strains and DNA sequences, their systematic positions still remains to be studied.

Chaetosphaeria is still polyphyletic and revision needed

The large genus with both anamorph and teleomorphs known and diverse on morphology, *Chaetosphaeria* Tul. & C. Tul., is polyphyletic and problematic, which is aligned with what was reported already (Réblová 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c). The species included in the analysis are distributed in many different clades on the ML tree. Some of these species have been revised and a number of species are transferred to some already established or new monophyletic genera, including *Cacumisporium*, *Catenularia*, *Chloridium*, *Dictyochaeta*, *Ellisembia*, *Exserticlava*, *Thozetella* and *Zanclospora*. However, still many other known species are phylogenetically distinct from the type species of the genus and other established genera, and they need to be reclassified. Based on our phylogenetic analysis, several published *Chaetosphaeria* species are revised here.

Several *Chaetosphaeria* species are grouped together with *Chloridium* and *Gonytrichum* species, including type species of the two anamorphic genera, *Chloridium virescens* (Pers. ex Pers.) W. Gams & Hol.-Jech. for *Chloridium* Link ex Fr. and *Gonytrichum caesium* Nees & T. Nees for *Gonytrichum* Nees & T. Nees. These *Chaetosphaeria* species are always with *Chloridium* or *Gonytrichum* anamorphs, including *C. chloroconia* (anamorph: *G. chlamydosporum*), *C. inaequalis* (anamorph: *G. caesium*), *C. vermicularioides* (anamorph: *C. virescens*) and *Melanopsammella gonytrichii* (anamorph: *Chloridium gonytrichii*). Morphologically, the conidiogenous cells of these species are monophialidic, occasionally with percurrent proliferation, and often with

meristematic tip often protruding beyond the collarette and producing several hyaline and aseptate conidia side by side from successively formed conidiogenous loci (Gams and Holubová-Jechová, 1976). Now these species are excluded from *Chaetosphaeria* and well resolved with *Chloridium* names (Réblová et al. 2016, 2021c).

Another clade with inclusion of several *Chaetosphaeria* species is the one with *Zanclospora*, and characterized by lateral phialides on the setiform conidiophores. Except for *Chaetosphaeria minuta*, all these species (*C. jonesii*, *C. lateriphiala*, *C. sylvatica* and *C. tropicalis*) are now transferred into the monophyletic genus *Zanclospora* as emended by Réblová et al. (2021a). *Chaetosphaeria minuta* resembles *Zanclospora* in setiform conidiophores bearing lateral phialides but in only one side of the conidiophores, the new genus is introduced for this fungus.

Chaetosphaeria rivularia is phylogenetically closely related to all members of the genus *Thozetella*, while distinct from other *Chaetosphaeria* species. The relationship between *Chaetosphaeria* Tu. & C. Tul. and *Thozetella* Kuntze was suggested by Paulus et al. (2004) and confirmed with *Chaetosphaeria rivularia* Réblová & J. Fourn. (Ariyawansa et al., 2015). *Chaetosphaeria rivularia*, originally described with both teleomorph and *Thozetella*-like anamorph on wood submerged in freshwater in southern France, is the only known *Chaetosphaeria* species with the *Thozetella* anamorph. Based on our phylogenetic analysis, it should be placed under *Thozetella* as an independent species.

Chaetosphaeria luquillensis F.A. Fernández & Huhndorf is phylogenetically different from all other known *Chaetosphaeria*, thus it should be excluded from the genus. Morphologically it resembles species of *Dictyochaeta* in narrow concept in presence of setae, short conidiophores clustered with setae, and hyaline conidia without setulae. However, in this species, the conidia are aciculate or obclavate, and 3-septate conidia. The anamorphic species *Dictyochaeta aciculata* S.S. Silva & Gusmão resembles the anamorph of *Chaetosphaeria luquillensis* (Silva and Gusmão, 2013). Here a new genus *Aciculadictyochaeta* is introduced for these two fungal species.

Chaetosphaeria longiseta F.A. Fernández & Huhndorf and several other *Codinaea*-like fungal species are grouped together as a strongly supported clade unrelated to other *Chaetosphaeria* species, including the type species. Morphologically these fungi are also unique in producing versicolored sterile setae with darker ultimate or penultimate cells, and multiguttulate aetose or setose conidia (Hughes and Kendrick 1968; Kuthubutheen and Nawawi 1991a, 1991f; Fernández and Huhndorf 2005; Cruz et al. 2008). The new genus *Xyladelphia* is recently introduced for this small group of species.

On the ML phylogenetic tree, many known *Chaetosphaeria* species, including *Chaetosphaeria innumera* Berk. & Broome ex Tul. & C. Tul., the type species of *Chaetosphaeria* with *Chloridium botryoideum* (Corda) S. Hughes as anamorph, are grouped together in one of the big branches where several well-known anamorphic genera such as *Kionochaeta* and *Dictyochaeta* s. str. are included. The 8 undefined *Chaetosphaeria* species in this big clusters are *C. dilabens*, *C. guttulata* (only anamorph known, conidiogenous cells not phialidic, polyblastic with many tiny protuberant conidiogenous loci), *C. lentomita* (anamorph: *Chloridium pachytrachelum*), *C. mangrovei* (no anamorph reported), *C. myriocarpa* (anamorph: *Chloridium clavaeforme*), *C. pygmaea* (anamorph: *Phialophora phaeophora*), *C. preussii* (anamorph: *Chloridium preussii*). Together with some *Chloridium* species (*C. botryoideum*, *C. clavaeforme*, *C. lignicola* (Mangenot) W. Gams. & Hol.-Jech. and *C. pini* Crous & Akulov and some undescribed species), these species need to be revised in both generic and species level. Except for *Chaetosphaeria guttulata* and *C. mangrovei* without known anamorph, the known anamorphs of these species belong to *Chloridium* section *Gongromeriza* (proliferation of the conidiophores only percurrent) and *Psilobotrys* (proliferation of the conidiophores mainly sympodial) (Gams and Holubová-Jechová 1976; Constantinescu et al. 1995; Réblová and Seifert 2003; Réblová 2000; Réblová and Winka 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Lin et al. 2019; Luo et al. 2019; Réblová et al. 2020, 2021a, b, c, d).

On the phylogenetic tree, all other *Chaetosphaeria* species with various anamorphs classified in *Catenularia*, *Cacumisporium*, *Kylindria*-like, *Dischloridium*, *Exserticlava*, *Obeliospora*, *Phialophora*, *Stanjehughesia* are grouped together with the *Paragaeumannomyces* to form a strongly supported clade (99/1) unrelated to the type species of the genus and other *Chaetosphaeria* species. Some of these species have been revised and transferred to already established or new monophyletic genera, including *Cacumisporium*, *Catenularia*, *Exserticlava*, *Paragaeumannomyces*, *Stanjehughesia*. Two new genera are introduced by us for 2 of these species: *Fusichloridium* for *C. fusiformis* and *Phaeochloridium* for *C. aquatica*. While several other phylogenetically distinct still need to be revised in both generic and species level, these species are *C. chalaroides* with *Fusichalara*-like anamorph, *C. conirostris* and *C. curvispora* with *Dictyochaeta*-like anamorph, *C. fennica* with *Chloridium*-like anamorph, *C. lignomollis* with *Kylindria*-like anamorph (Gams and Holubová-Jechová 1976; Constantinescu et al. 1995; Réblová and Gams 1999, 2000; Réblová 2000; Réblová and Winka 2000; Réblová and Seifert 2003; Fernández and Huhndorf 2005; Fernández et al. 2006; Atkinson et al. 2007; Hyde et al. 2018; Lin et al. 2019; Luo et al. 2019).

Revision of polyphyletic genera *Codinaea*, *Dictyochaeta* and *Tainosphaeria*

Species of *Codinaea* Marie, *Dictyochaeta* Speg. and *Tainosphaeria* F.A. Fernández & Huhndorf are polyphyletic and phylogenetically located in several different clades in the phylogenetic tree, which is aligned with previous

studies (Liu et al. 2016; Perera et al. 2016; Hernández-Restrepo et al. 2017; Tibpromma et al. 2018; Yang et al. 2018a; Lin et al. 2019; Luo et al. 2019; Hyde et al. 2020; Réblová et al. 2020, 2021a, b, c). The genus *Codinaea*, *Dictyochaeta* and *Tainosphaeria* were recently revised with monophyletic generic concept, and many generic names are introduced towards a framework for revision of existing species and assignment of new taxa (Réblová et al. 2021a, b, c, e). Under these three genera, more than 150 species names are known, proximally half of them are revised with available living strains and DNA sequence, while many other species still remained to be studied (Spegazzini 1923; Marie 1937; Index of Fungi).

Based on both morphologic and phylogenetic study, these polyphyletic genera are partly resolved for those studied species by accepting 22 monophyletic genera through: a). redelimitation of *Codinaea*, *Dictyochaeta* and *Tainosphaeria* in narrow concepts, b). acceptance of some established genera (including *Achrochaeta* Réblová & Hern.-Restr., *Anacraspedodidymum* C.R. Silva, R.F. Castañeda & Gusmão, *Codinaeella* Réblová & Hern.-Restr., *Flectospora* Réblová & Hern.-Restr., *Multiguttulispora* C.G. Lin & J.K. Liu, *Nimesporella* Réblová & Hern.-Restr., *Phialogeniculata* Matsush., *Phialoturbella* Réblová & Hern.-Restr., *Stilbochaeta* Réblová & Hern.-Restr., *Tainosphaeriella* Réblová & Hern.-Restr., *Xyladelpchia* Réblová, A.N. Mill. & Hern.-Restr.), and finally c). introducing several new genera, including *Aciculadictyochaeta* W.P. Wu & Y.Z. Diao, *Brachydictyochaeta* W.P. Wu & Y.Z. Diao, *Calceisporiella* W.P. Wu & Y.Z. Diao, *Lunatochaeta* W.P. Wu & Y.Z. Diao, *Neotainosphaeria* W.P. Wu & Y.Z. Diao, *Oxenbollia* W.P. Wu & Y.Z. Diao, *Parabahusutrabeeja* W.P. Wu & Y.Z. Diao, and *Paracodinaea* W.P. Wu & Y.Z. Diao. These 22 genera are phylogenetically distinct and most of them can also be delimited by a combination of different morphological characters, such as setae, conidiophores, conidiogenous cells, conidia and conidial appendages.

With this framework, all studied species in our analysis are properly assigned to relevant genera. However, many other species were not covered in our study and this is mainly due to lacking living strains and DNA sequences data (Kuthubutheen and Nawawi 1991a; Whitton et al. 2000; Table 5). Future phylogenetic study on some other published species are needed to provide a full solution to resolve these genera complex. For example, four synnematus species of *Codinaea* species, including *Codinaea delicata* R.F. Castañeda, Granados & O. Castro, *C. obesispora* S. Hughes & W.B. Kendr., *C. pindobacuensis* D.A.C. Almeida & Gusmão and *Dictyochaeta dendroidea* Kuthub., are with synnematus conidioma, terminal and monophialidic or polyphialidic conidiogenous cells with funnel-shaped collarete, and hyaline, aseptate conidia with setulae at both ends, none of them is available with living strain and DNA sequence and their taxonomic position remains to be solved (Hughes and Kendrick 1968; Kuthubutheen 1987; Almeida et al. 2014; Granados et al. 2014). Many non-setose species are yet to be resolved, including *D. circei* Tempesta & Rambelli, *D. curvispora* L. Cai, McKenzie & K.D. Hyde, *D. heteroderae* (Morgan-Jones) Carris & Glawe, *D. illinoensis* (Hewings & J.L. Crane) Whitton, McKenzie & K.D. Hyde, *D. lilliputiana* R.F. Castañeda, *D. lunulospora* (Hewings & J.L. Crane) Hol.-Jech., *D. minutissima* A. Hern. Gut. & J. Mena, *D. occidentalis* R.F. Castañeda & W.B. Kendr., *D. uncinata* R.F. Castañeda & W.B. Kendr., *D. zapatensis* R.F. Castañeda & W.B. Kendr., *Codinaea apiculata* Matsush., *C. curvispora* Y.L. Zhang & T.Y. Zhang and *C. setosa* S. Hughes & W.B. Kendr. (Kuthubutheen and Nawawi 1992; Whitton et al. 2000). In addition, two species with pale colored conidia, *D. multifimbriata* R. Kirschner & Chee J. Chen and *D. subfuscospora* Kuthub. & Nawawi were placed in the genus *Dictyochaeta* and their taxonomic position also remains to be studied (Kuthubutheen and Nawawi 1991a; Hernández-Gutiérrez and Portales 1996; Castañeda-Ruiz et al. 1998; Kirschner et al. 2001; Kirschner and Chen 2002; Cai et al. 2004).

Chloridium is polyphyletic and needs to be revised

Chloridium Link is polyphyletic and a systematic revision for the genus is needed. The members included in our research are grouped into several different clades in Chaetosphaeriaceae and several species need to be excluded from the genus. Based on the phylogenetic analysis, the genus is emended to include those species which are clustered together with the type species of the genus, *Chloridium virescens* (Pers. & Pers.) W. Gams & Hol.-Jech. The accepted species under the genus include all species known as *Gonytrichum* C.G. Nees & F. Nees (including *G. caesium* C.G. Nees & F. Nees (the type species, = *Chaetosphaeria inaequalis* (Grove ex Berl. & Voglino) W. Gams & Hol.-Jech.), *G. mirabile* Hol.-Jech., *G. chlamydosporium* Barron & Bhatt (= *Chaetosphaeria chloroconium* (W. Gams & Hol.-Jech) Réblová & Siefert), and *G. macrocladum* (Sacc.) S. Hughes), *Chaetosphaeria vermicularioides* (Sacc. & Roum.) W. Gams & Hol.-Jech., *Chloridium aquaticum* M.J. Wei & H. Zhang, and several undescribed *Chloridium* species (Hughes 1951; Réblová and Winka 2000; Fernández and Huhndorf 2005; Fernández et al. 2006; Crous et al. 2012; Réblová 2000; Réblová et al. 2016).

The other studied *Chloridium* species and some *Chaetosphaeria* with *Chloridium*-like anamorphs are found in several different phylogenetic clades. A systematic revision of these species, together with other known species is needed with a holistic view (Réblová 2000; Crous et al. 2018; Luo et al. 2019). Here we also excluded three species from the genus and transferred them to other fungal genera, *C. obclavata* to *Phialogeniculata*, *C. reniformis* to *Xylolentia*, *C. phaeosporum* to a new genus *Phaeochloridium* in Plectosphaerellaceae (Glomerallales) (Gams and Holubová-Jechová 1976; Réblová 2018; Yuan et al. 2020).

Craspedodidymum elatum Hol.-Jech., the type species of the genus *Craspedodidymum* Hol.-Jech., is grouped together with *Chaetosphaeria dilabens* Réblová & W. Gams with strong support. It is the first time that the ITS and LSU sequences are obtained for *Craspedodidymum*. The genus is characterized with single or branched conidiophores, terminal monophialidic conidiogenous cell with a wide funnel-shaped collarette, and ellipsoidal, brown and aseptate conidia (Holubová-Jechová 1972; Mercado Sierra et al. 1997). The genus was previously assigned to Chaetosphaeriaceae, but that is based on observation of the similar anamorphs obtained for several scolecosporous species of *Chaetosphaeria*, now known as *Paragaemannomyces* (Huhndorf and Fernández 2005; Perera et al. 2016; Réblová et al. 2020). Under the genus, 17 species names are known, and revision is needed with study including of living strain and DNA sequences in future.

Cryptophiale and related genera with lateral or intercalary phialides

The genera with lateral or intercalary phialides in Chaetosphaeriaceae are found in four different phylogenetic groups on the ML tree. The type species of *Codinaeopsis* is clustered together with *Codinaea* with setae and setose conidia; species of *Gonytrichum* are grouped together with *Chloridium*; species of *Menispora* form sister groups with *Arcuatosporea*; species of *Kionochaeta* are closely related to true *Chaetosphaeria* and *Dictyochoaeta* species; and all other genera, including *Cryptophiale*, *Cryptophialoidea*, *Paraceratocladium*, *Paracryptophiale*, *Zanclospora*, form an independent phylogenetic group with strong bootstrap support value. The monophyletic genus *Zanclospora* S. Hughes & W.B. Kendr. was recently emended and revised by Réblová et al. (2021a).

The distinction between *Cryptophiale*, *Cryptophialoidea* and *Paracryptophiale* is not well supported from the phylogenetic analysis. All studied species under *Cryptophiale* Piroz., *Cryptophialoidea* Kuthub. & Nawawi and *Paracryptophiale* Kuthub. & Nawawi are clustered together with *Paraceratocladium*, *Conicomycetes* and *Kionochaeta ivoriensis* with good support. This is aligned with the other previous publication (Yang et al. 2018a; Lin et al., 2019). In contrast to result from the molecular phylogenetic analysis, these genera are morphologically well defined and can be easily distinguished. *Cryptophialoidea* differs from *Cryptophiale* in having obvious monophialidic conidiogenous cells arranged only on one side of the conidiophore and not covered by a shield of sterile cells (Kuthubutheen and Nawawi 1987; Whitton et al. 2012); *Paracryptophiale* resembles *Cryptophiale* in having setiform conidiophores and typical *Cryptophiale*-like conidiogenous cells aggregated into a fertile region with shield cells, but differs by the dictyosporous conidia by *Paracryptophiale* (Kuthubutheen and Nawawi 1994a; Wu and McKenzie 2003). Many species have been already known under these genera, and future molecular study with inclusion of more these species will support to clarify their phylogenetic relationship and delimitation of generic concept (Goh and Hyde 1996b; Delgado et al. 2002, 2005; Marques et al. 2008; Wu and McKenzie 2003; Whitton et al. 2012; Yang et al. 2018a).

The two studied species, *P. silvestre* R.F. Castañeda and *P. polysetosum* R.F. Castañeda, are polyphyletic, and the generic name *Paraceratocladia* is introduced as a monotypic genus to accommodate *P. polysetosum*. Phylogenetically *Paraceratocladium* R.F. Castañeda, typified by *P. silvestre* R.F. Castañeda, is closely related to *Cryptophiale* Piroz., *Cryptophialoidea* Kuthub. & Nawawi and *Paracryptophiale* Kuthub. & Nawawi. Morphologically all these fungi producing setae or setiform conidiophores, monophialidic or polyphialidic conidiogenous cells with funnel-shaped collarettes, and hyaline, aseptate or septate conidia, but differ in morphology of setae, conidiophores and conidiogenous cells (Pirozynski 1968; Castañeda-Ruiz 1987; Kuthubutheen and Nawawi 1987, 1994; McKenzie and Hyde 1997; Dulymamode et al. 1998; Whitton et al. 2001; Seifert et al. 2011; Lin et al. 2019; Luo et al. 2019). The other three known species under the genus *Paraceratocladium*, including *P. bacilliforme* M. Caldich, Stehlig, Gené & Guarro, *P. malaysianum* Goh & K.D. Hyde, *P. seychellarum* Whitton, McKenzie & K.D. Hyde, *P. triseptata* Dulym., W.P. Wu & Peerally are morphologically similar to *P. silvestre*, but remain to be studied for their phylogenetic relationship (Castañeda-Ruiz 1987; McKenzie and Hyde 1997; Dulymamode et al. 1998; Whitton et al. 2001).

Obeliospora, probably an earlier name for Paragaemannomyces

One single spore isolate of *Obeliospora minima* W.P. Wu & McKenzie was clustered together with members of *Paragaemannomyces* Matsush., a re-validated genus for several *Chaetosphaeria* species with scolecosporous ascospores, and formed a well-supported group (Réblová et al. 2020). In the study of *Chaetosphaeria raciborskii* and related genera with scolecospore ascospore, Huhndorf & Fernández (2005) described several *Chaetosphaeria* species with *Obeliospora*-like anamorphs in pure culture, although they called them *Craspedodidymum*-like. On MCA and MA, all these species form poorly developed conidiophores with a few cells from hyphae, flask-shaped to obclavate conidiogenous cells with flared or cup-shaped collarette, and hyaline, aseptate, globose to subglobose conidia with or without setulae. Among them, *C. ellisii* (Barr.) Huhndorf & F.A. Fenández, *C. lapaziana* (Carroll & Munk) F.A. Fenández & Huhndorf and *C. panamensis* Huhndorf & F.A. Fenández produce non-setose conidia; *C. raciborskii* (Penz. & Sacc.) F.A. Fenández & Huhndorf produces the globose to subglobose, non-setose conidia (most strains) or the triangular conidia with 3 setulae (the strain SMH3119); while *C. rubicunda* Huhndorf

& F.A. Fenández produces the globose, subglobose to subangular conidia bearing 3 setulae. The very similar conidiophores, conidiogenous cells and conidia are also reported from the Thailand strain of *P. panamensis* by Perera et al. (2016). These anamorphs are aligned with the anamorphic genus *Obeliospora*. Recently these fungi together with several other scolecosporeous *Chaetosphaeria* species are reclassified under *Paragaemannomyces* Matsush. (Réblová et al, 2020). Combined with morphology and molecular analysis, *Obeliospora* Nawawi & Kuthub. (1990) and *Paragaemannomyces* Matsush. (2003) are most likely congeneric, and the earlier name should be *Obeliospora*. Unfortunately, the strain and DNA sequence data of the type species for the genus *Obeliospora*, *Obeliospora basispira* Nawawi & Kuthub., is not available for analysis. We recommend use the more well-established *Paragaemannomyces* for these fungi and made transferring of all *Obeliospora* species. However, these still need to be confirmed by molecular phylogenetic analysis when living strains will be available.

Menisporopsis and related genera with synnematos conidiomata

The synnematos genera in *Chaetosphaeriaceae* are polyphyletic and found in different phylogenetic groups on the ML tree. These genera include *Arcuatospora*, *Hoehneliella* Bres. & Sacc., *Menisporopsis* Piroz., *Phialoarthrobotryum* Matsush., *Polynema* and *Phialosporostilbe* Mecardo & J. Mena. However, all these genera except for *Menisporopsis*, seem to be well-defined monophyletic genera.

The genus *Menisporopsis* S. Hughes, typified by *M. theobromae* S. Hughes, is polyphyletic and the species are resolved with two very distinct phylogenetic groups. The genus was revised recently with accepting two monophyletic genera to accommodate these fungi, including emending the genus *Menisporopsis* with narrow concept and creating the new genus *Arcuatospora* (Réblová et al., 2021b). Two other synnematos genera with phialidic conidiogenous cells are newly assigned to the family *Chaetosphaeriaceae*, including *Hoehneliella* Bres. & Sacc. and *Phialoarthrobotryum* Matsush (Nag Raj 1993; Seifert et al. 2011).

Thozetella and related genera with sporodochial conidiomata

The sporodochial genera in *Chaetosphaeriaceae* are also polyphyletic and found in different phylogenetic groups on the ML tree. These genera include *Adautomilanezia* Gusmão, S.S. Silva, Fiúza, L.A. Costa & T.A.B. Santos, *Eucalyptostroma* Crous & M.J. Wingf., *Eucalyptostromiella* W.P. Wu & Y.Z. Diao, *Rattania* Prabhugaonkar & Bhat, *Minimidochium* B. Sutton, *Verhulstia* Hern.-Restr. and *Thozetella* Kunze. However, these genera seem to be well-defined monophyletic genera.

Thozetella Kunze, typified by *T. nivea* (berk.) Kuntze., was resolved as a monophyletic clade with strong support value in all analysis. Morphologically, *Thozetella* is also unique in forming sporodochial and/or synnematos conidiomata, presence of microawns, and setose, hyaline and aseptate conidia in wet spore mass (Seifert et al. 2011). The relationship between *Chaetosphaeria* Tu. & C. Tul. and *Thozetella* Kuntze was suggested by Paulus et al. (2004) and later confirmed with *Chaetosphaeria rivularia* Réblová & J. Fourn. (Ariyawansa et al. 2015). *Chaetosphaeria rivularia*, originally described with both teleomorph and *Thozetella*-like anamorph on wood submerged in freshwater in southern France, is the only known *Chaetosphaeria* species with the *Thozetella* anamorph. Phylogenetically *C. rivularia* is closely related to all members of the genus *Thozetella*, while very distinct from all other *Chaetosphaeria* species. We recommend transferring *C. rivularia* to *Thozetella*.

Three isolates identified as *Rattania* spp. from China together with *Rattania setulifera* Prabhugaonkar & Bhat, the type species of the genus, are clustered together and form a distinct clade with strong support. Phylogenetically it shows more closer relationship with *Tainosphaeria* and all *Codinaea*/*Dictyochaeta* with no setae and producing setose conidia. *Minimidochium* B. Sutton, typified by *M. setosum* B. Sutton, is characterized with sporodochial conidiomata with setae among conidiophores, monophialidic conidiogenous cells, and hyaline, falcate and setose conidia (Sutton 1970; Bhat 2010). Morphologically it resembles *Rattania*, but phylogenetically it is clustered together with all *Codinaea* and *Dictyochaeta* species with septate conidia and formed a separate branch.

Several isolates representing 3 different species of *Verhulstia* obtained from China, are clustered together with *V. trisorosrum* Her.-Restr. (the type species of the genus) and form a distinct clade with strong support. Morphologically the recently described genus *Verhulstia* resembles *Minimidochium* on sporodochial conidiomata with setae among conidiophores and differs by producing ellipsoidal conidia without setulae (Crous et al. 2017). Phylogenetically they are also very distinct, the members of *Verhulstia* shows closer relationship with several *Chaetosphaeria* species with *Chloridium*-like anamorph, including *Chloridium lignicola* and *Chloridium pini*.

Two species of *Eucalyptostroma* Crous & M.J. Wingf., *E. eucalypti* Crous & M.J. Wingf. (the type species) and *E. eucalyptorum* Crous & M.J. Wingf., and two undescribed fungi from China, are clustered together and formed a distinct group with strong support. The genus, as typified by *E. eucalypti*, is very characteristic in producing tiny orange brown sporodochial conidiomata without setae, branched conidiophores with terminal monophialidic conidiogenous cells, and hyaline, aseptate, falcate conidia in wet spore mass (Crous et al., 2016, 2019). Several isolates from decaying fruit of *Quercus* sp. collected around Beijing area produce very similar

conidiomata, conidiogenous cells and conidia as *Eucalyptostroma*, but phylogenetically very distinct and the new genus *Eucalyptostromiella* W.P. Wu & Y.Z. Diao is created to accomodate this fungus. On the phylogenetic tree, the genus *Paliphora* Sivan. & B. Sutton, with setiform conidiophores, intercalary or terminal conidiogenous cells, polytretic sporulating loci on the conidiogenous cells as seen in *Helminthosporium*, and hyaline, aseptate or septate, cylindrical to subfusiform or subacrose conidia in slimy masses, is clustered together with the genus *Eucalyptostroma* with strong support (Sivanesan and Sutton 1985; Kuthubutheen 1987; Alcorn 1996; Gusmão et al. 2008; Goh, Lau and Teo 2014; Malosso et al. 2018).

Coelomycetous genera

Aligned with previous work, all the coelomycetous genera, *Brunnepdinemasporium* Crous & R.F. Castañeda, *Calvolachnella* Marinc., T.A. Duong & M.J. Wingf., *Dendrophoma* Sacc., *Dinemasporium* Lév., *Infundibulomyces* Plaingam, Somrith. & E.B.G. Jones, *Neopseudolachnella* A. Hashim. & Kaz. Tanaka, *Polynema* Lév., *Pseudolachnea* Ranoj., *Pseudolachnella* Teng and *Pseudodinemasporium* A. Hashim. & Kaz. Tanaka are monophyletic and well-defined (Crous et al. 2012; Hashimata et al. 2015a, b). These coelomycetous genera are phylogenetically polyphyletic and distributed among different clades in the ML tree. *Infundibulomyces* and *Calvolachnella* are more closely related to some *Codinaea* species without setae. All species of *Dinemasporium* formed sister groups with *Menispora* and *Menisporopsis* and *Codinaea* species with septate conidia. All species of other genera, including *Brunnepdinemasporium*, *Dendrophoma*, *Neopseudolachnella*, *Polynema*, *Pseudolachnea*, *Pseudolachnella* are clustered together as one strongly supported group.

A list of new fungal genera:

(*not member of Chaetosphaeriaceae)

1. *Aciculadictyochaeta* W.P. Wu & Y.Z. Diao gen. nov.
2. *Aunstrupia* W.P. Wu & Y.Z. Diao gen. nov.
3. *Brachydictyochaeta* W.P. Wu & Y.Z. Diao gen. nov.
4. *Calceisporiella* W.P. Wu & Y.Z. Diao gen. nov.
5. *Curvichaeta* W.P. Wu & Y.Z. Diao
6. *Ejnerjensenia* W.P. Wu & Y.Z. Diao
7. *Eucalyptostromiella* W.P. Wu & Y.Z. Diao gen. nov.
8. *Falholtia* W.P. Wu & Y.Z. Diao gen. nov.
9. *Fusichloridium* W.P. Wu & Y.Z. Diao gen. nov.
10. *Kionochaetiella* W.P. Wu & Y.Z. Diao gen. nov.
11. *Kylindrochaeta* W.P. Wu & Y.Z. Diao gen. nov.
12. *Lunatochaeta* W.P. Wu & Y.Z. Diao gen. nov.
13. *Monosporoschisma* W.P. Wu & Y.Z. Diao gen. nov.
14. *Neotainosphaeria* W.P. Wu & Y.Z. Diao gen. nov.
15. *Oxenbollia* W.P. Wu & Y.Z. Diao gen. nov.
16. *Parabahasutrabeeja* W.P. Wu & Y.Z. Diao gen. nov.
17. *Paraceratocladia* W.P. Wu & Y.Z. Diao gen. nov.
18. *Paracodinaea* W.P. Wu & Y.Z. Diao gen. nov.
19. *Parasporendocladia* W.P. Wu & Y.Z. Diao gen. nov.*
20. *Phaeochloridium* W.P. Wu & Y.Z. Diao gen. nov.*
21. *Phaeodischloridium* W.P. Wu & Y.Z. Diao gen. nov.
22. *Pseudothozetella* W.P. Wu & Y.Z. Diao gen. nov.
23. *Riisgaardia* W.P. Wu & Y.Z. Diao gen. nov.
24. *Sinochloridium* W.P. Wu & Y.Z. Diao gen. nov.*
25. *Zanclosporiella* W.P. Wu & Y.Z. Diao gen. nov.
1. *Arcuatosporea ellisii* W.P. Wu & Y.Z. Diao
2. *Arcuatosporea hughesii* W.P. Wu & Y.Z. Diao
3. *Arcuatosporea lunata* W.P. Wu & Y.Z. Diao
4. *Arcuatosporea septata* W.P. Wu & Y.Z. Diao
5. *Arcuatosporea sinensis* W.P. Wu & Y.Z. Diao
6. *Arcuatosporea suttonii* W.P. Wu & Y.Z. Diao
7. *Arcuatosporea yunnanensis* W.P. Wu & Y.Z. Diao
8. *Brachydictyochaeta bulliformis* W.P. Wu & Y.Z. Diao
9. *Brunneodinemasporium sinense* W.P. Wu & Y.Z. Diao
10. *Calceisporiella sinensis* W.P. Wu & Y.Z. Diao
11. *Catenularia elegans* W.P. Wu & Y.Z. Diao
12. *Chloridium crousii* W.P. Wu & Y.Z. Diao
13. *Chloridium culmicola* W.P. Wu & Y.Z. Diao
14. *Chloridium cylindrosporellum* W.P. Wu & Y.Z. Diao
15. *Chloridium jilinense* W.P. Wu & Y.Z. Diao
16. *Chloridium kirkii* W.P. Wu & Y.Z. Diao
17. *Chloridium proliferatum* W.P. Wu & Y.Z. Diao
18. *Chloridium setosum* W.P. Wu & Y.Z. Diao
19. *Chloridium shangsiense* W.P. Wu & Y.Z. Diao
20. *Chloridium sinense* W.P. Wu & Y.Z. Diao
21. *Chloridium tropicale* W.P. Wu & Y.Z. Diao
22. *Chloridium xishuangbanaense* W.P. Wu & Y.Z. Diao
23. *Codinaea clavatospora* W.P. Wu & Y.Z. Diao
24. *Codinaea dinghushanensis* W.P. Wu & Y.Z. Diao
25. *Codinaea fanglanii* W.P. Wu & Y.Z. Diao
26. *Codinaea kendrickii* W.P. Wu & Y.Z. Diao
27. *Codinaea latispora* W.P. Wu & Y.Z. Diao
28. *Codinaea minima* W.P. Wu & Y.Z. Diao
29. *Codinaea oxenbolliae* W.P. Wu & Y.Z. Diao
30. *Codinaea puerensis* W.P. Wu & Y.Z. Diao
31. *Codinaea pyriformis* W.P. Wu & Y.Z. Diao
32. *Codinaea simaoensis* W.P. Wu & Y.Z. Diao
33. *Codinaea tengii* W.P. Wu & Y.Z. Diao
34. *Codinaea trisetula* W.P. Wu & Y.Z. Diao
35. *Codinaeella brevissima* W.P. Wu & Y.Z. Diao
36. *Codinaeella cannonii* W.P. Wu & Y.Z. Diao
37. *Codinaeella cinnamomi* W.P. Wu & Y.Z. Diao

A list of new fungal species

(*not member of Chaetosphaeriaceae)

38. *Codinaeella kuthubutheenii* W.P. Wu & Y.Z. Diao
39. *Codinaeella latispora* W.P. Wu & Y.Z. Diao
40. *Codinaeella menispora* W.P. Wu & Y.Z. Diao
41. *Codinaeella multispuruloca* W.P. Wu & Y.Z. Diao
42. *Codinaeella paralambertiae* W.P. Wu & Y.Z. Diao
43. *Dinemasporium beijingense* W.P. Wu & Y.Z. Diao
44. *Dinemasporium fanglanii* W.P. Wu & Y.Z. Diao
45. *Dinemasporium longisporum* W.P. Wu & Y.Z. Diao
46. *Dinemasporium multisetulum* W.P. Wu & Y.Z. Diao
47. *Dinemasporium suttonii* W.P. Wu & Y.Z. Diao
48. *Dinemasporium tubakii* W.P. Wu & Y.Z. Diao
49. *Dinemasporium yongnianii* W.P. Wu & Y.Z. Diao
50. *Ellisembia reblovae* W.P. Wu & Y.Z. Diao
51. *Eucalyptostroma hongluosiensis* W.P. Wu & Y.Z. Diao
52. *Eucalyptostroma oxenbolliae* W.P. Wu & Y.Z. Diao
53. *Eucalyptostromiella beijingensis* W.P. Wu & Y.Z. Diao
54. *Fuscocatenula bumbisicola* W.P. Wu & Y.Z. Diao
55. *Hoehneliella triseptata* W.P. Wu & Y.Z. Diao
56. *Kionochaeta beijingensis* W.P. Wu & Y.Z. Diao
57. *Linkosia gelatinosa* W.P. Wu & Y.Z. Diao
58. *Linkosia filiformis* W.P. Wu & Y.Z. Diao
59. *Linkosia rostrata* W.P. Wu & Y.Z. Diao
60. *Lunatochaeta shenzhenensis* W.P. Wu & Y.Z. Diao
61. *Menispora paraciliata* W.P. Wu & Y.Z. Diao
62. *Menispora paratortuosa* W.P. Wu & Y.Z. Diao
63. *Menisporopsis biformis* W.P. Wu & Y.Z. Diao
64. *Menisporopsis dinemasporioides* W.P. Wu & Y.Z. Diao
65. *Menisporopsis elegans* W.P. Wu & Y.Z. Diao
66. *Menisporopsis macrospora* W.P. Wu & Y.Z. Diao
67. *Minimidochium dictyochaetum* W.P. Wu & Y.Z. Diao
68. *Minimidochium triseptata* W.P. Wu & Y.Z. Diao
69. *Morrisiella reblovae* W.P. Wu & Y.Z. Diao
70. *Monosporoschisma elegans* W.P. Wu & Y.Z. Diao
71. *Multiguttulispora paratriseptata* W.P. Wu & Y.Z. Diao
72. *Neopseudolachnea microsperma* W.P. Wu & Y.Z. Diao
73. *Neopseudolachnea moganshanensis* W.P. Wu & Y.Z. Diao
74. *Neotainosphaeria microsperma* W.P. Wu & Y.Z. Diao
75. *Nimesporella aunstrupii* W.P. Wu & Y.Z. Diao
76. *Nimesporella riisgaardii* W.P. Wu & Y.Z. Diao
77. *Oxenbolliella lunatosporea* W.P. Wu & Y.Z. Diao
78. *Parabahasutrabeeja minima* W.P. Wu & Y.Z. Diao
79. *Paracodinaea japonica* W.P. Wu & Y.Z. Diao
80. *Paragaeumannomyces asetulus* W.P. Wu & Y.Z. Diao
81. *Paragaeumannomyces nawawii* W.P. Wu & Y.Z. Diao
82. *Phaeochloridium gamsii* W.P. Wu & Y.Z. Diao sp. nov.*
83. *Phaeostalagmus minimus* W.P. Wu & Y.Z. Diao
84. *Pseudodinemasporium elegans* W.P. Wu & Y.Z. Diao
85. *Pseudodinemasporium minimum* W.P. Wu & Y.Z. Diao
86. *Pseudolachnea macrospora* W.P. Wu & Y.Z. Diao
87. *Pseudolachnella minima* W.P. Wu & Y.Z. Diao
88. *Pseudolachnella tengii* W.P. Wu & Y.Z. Diao
89. *Pseudolachnella yunnanensis* W.P. Wu & Y.Z. Diao
90. *Pseudothozetella lunata* W.P. Wu & Y.Z. Diao
91. *Rhopalophora minima* W.P. Wu & Y.Z. Diao*
92. *Rattania falcata* W.P. Wu & Y.Z. Diao
93. *Rattania intermedia* W.P. Wu & Y.Z. Diao
94. *Riisgaardia longispora* W.P. Wu & Y.Z. Diao
95. *Stilbochaeta ejneri* W.P. Wu & Y.Z. Diao
96. *Stilbochaeta lingnanensis* W.P. Wu & Y.Z. Diao
97. *Stilbochaeta lunata* W.P. Wu & Y.Z. Diao
98. *Stilbochaeta minteri* W.P. Wu & Y.Z. Diao
99. *Stilbochaeta sinensis* W.P. Wu & Y.Z. Diao
100. *Sinochloridium bambusicola* W.P. Wu & Y.Z. Diao sp. nov.*
101. *Sporendocladia beijingensis* W.P. Wu & Y.Z. Diao
102. *Stephemburiera microsperma* W.P. Wu & Y.Z. Diao
103. *Tainosphaeria cupulata* W.P. Wu & Y.Z. Diao
104. *Tainosphaeria microsperma* W.P. Wu & Y.Z. Diao
105. *Tainosphaeria phialogeniculata* W.P. Wu & Y.Z. Diao
106. *Tainosphaeria sivanesanii* W.P. Wu & Y.Z. Diao
107. *Tainosphaeria verrucophora* W.P. Wu & Y.Z. Diao
108. *Thozetella asetula* W.P. Wu & Y.Z. Diao
109. *Thozetella aunstrupii* W.P. Wu & Y.Z. Diao
110. *Thozetella fanglanii* W.P. Wu & Y.Z. Diao
111. *Thozetella guozhongii* W.P. Wu & Y.Z. Diao
112. *Thozetella hunanensis* W.P. Wu & Y.Z. Diao
113. *Thozetella japonica* W.P. Wu & Y.Z. Diao
114. *Thozetella longispora* W.P. Wu & Y.Z. Diao
115. *Thozetella lunata* W.P. Wu & Y.Z. Diao
116. *Thozetella minima* W.P. Wu & Y.Z. Diao
117. *Thozetella moganshanensis* W.P. Wu & Y.Z. Diao
118. *Thozetella palmicola* W.P. Wu & Y.Z. Diao
119. *Thozetella paragiganitea* W.P. Wu & Y.Z. Diao
120. *Thozetella pseudotoklaiensis* W.P. Wu & Y.Z. Diao
121. *Thozetella septata* W.P. Wu & Y.Z. Diao
122. *Thozetella suttonii* W.P. Wu & Y.Z. Diao
123. *Thozetella vermiformis* W.P. Wu & Y.Z. Diao
124. *Thozetella wenyingiae* W.P. Wu & Y.Z. Diao
125. *Xylolentia palmicola* W.P. Wu & Y.Z. Diao, sp. nov.*
126. *Verhulstia biformis* W.P. Wu & Y.Z. Diao
127. *Verhulstia elegans* W.P. Wu & Y.Z. Diao
128. *Verhulstia minima* W.P. Wu & Y.Z. Diao

129. *Xyladelphia parapulchriseta* W.P. Wu & Y.Z. Diao

130. *Xyladelphia sinensis* W.P. Wu & Y.Z. Diao

A list of new combinations and new name

(*excluded or new species not in Chaetosphaeriaceae)

1. *Aciculadictyochaeta aciculata* (S.S. Silva & Gusmão) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta aciculata* S.S. Silva & Gusmão)
2. *Aciculadictyochaeta luquillensis* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao comb. nov. (= *Chaetosphaeria luquillensis* F.A. Fernández & Huhndorf)
3. *Aunstrupia nodipes* (Penz. & Sacc.) W.P. Wu & Y.Z. Diao, comb. nov. (= *Helminthosporium nodipes* Penz. & Sacc.)
4. *Brachydictyochaeta antillana* (R.F. Castañeda) W.P. Wu & Y.Z. Diao (= *Dictyochaeta antillana* R.F. Castañeda)
5. *Cacumisporium acutata* (Réblová & W. Gams) W.P. Wu & Y.Z. Diao comb. nov. (= *Chaetosphaeria acutata* Réblová & W. Gams)
6. *Chloridium humicola* (S.C. Jong & E.E. Davis) W.P. Wu & Y.Z. Diao comb. nov. (= *Phialocephala humicola* S.C. Jong & E.E. Davis, = *Phialocephala gabalongii* Sivasith.)
7. *Chloridium mirabile* (Hol.-Jech.) W.P. Wu & Y.Z. Diao comb. nov. (= *Gonytrichum mirabile* Hol.-Jech.)
8. *Codinaea brachysetula* (Y.L. Jiang & T.Y. Zhang) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta brachysetula* Y.L. Jiang & T.Y. Zhang).
9. *Codinaea lithocarpi* (R.H. Perera, E.B.G. Jones & K.D. Hyde) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta lithocarpi* R.H. Perera, E.B.G. Jones & K.D. Hyde)
10. *Codinaea plovercovensis* (Goh and K.D. Hyde) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta plovercovensis* Goh and K.D. Hyde)
11. *Codinaea tilikfrei* (Bhat & B. Sutton) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta tilikfrei* Bhat & B. Sutton)
12. *Codinaea zhangii* W.P. Wu & Y.Z. Diao nom. nov. (= *Dictyochaeta chinensis* Y.L. Jiang & T.Y. Zhang)
13. *Codinaella sinensis* (D.W. Li, W.B. Kendr. & Jiangyuan Chen) W.P. Wu & Y.Z. Diao comb. nov. (= *Codinaea sinensis* D.W. Li, W.B. Kendr. & Jiangyuan Chen)
14. *Craspedodidymum carpaticum* (Hol.-Jech. & Révay) W.P. Wu & Y.Z. Diao comb. nov. (= *Chloridium carpaticum* Hol.-Jech. & Révay)
15. *Curvichaeta curvispora* (Réblová) W.P. Wu & Y.Z. Diao, comb. nov. (= *Chaetosphaeria curvispora* Réblová)
16. *Ejnerjensenia myriocarpa* (Fr.) W.P. Wu & Y.Z. Diao, comb. nov. (= *Sphaeria myriocarpa* Fr.)
17. *Ejnerjensenia pygmaea* (P. Karst.) W.P. Wu & Y.Z. Diao, comb. nov. (= *Chaetosphaeria pygmaea* (P. Karst.) Constant.
18. *Ellisembia aurantiaca* (D. Magyar & R. Shoemaker) W.P. Wu & Y.Z. Diao comb. nov. (= *Pyrigemmula aurantiaca* D. Magyar & R. Shoemaker)
19. *Exserticlava exserticlavoides* (Réblová & Seifert) W.P. Wu & Y.Z. Diao comb. nov. (= *Chaetosphaeria exserticlavoides* Réblová & Seifert)
20. *Falholtia kaohsiungensis* (S.Y. Hsieh, Goh & C.H. Kuo) W.P. Wu & Y.Z. Diao, comb. nov. (= *Stanjehughesia kaohsiungensis* S.Y. Hsieh, Goh & C.H. Kuo)
21. *Fusichloridium fusiformis* (W. Gams & Hol.-Jech.) W.P. Wu & Y.Z. Diao (= *Chaetosphaeria fusiformis* W. Gams & Hol.-Jech.)
22. *Kionochaetiella ivoriensis* (Rambelli & Lunghini) W.P. Wu & Y.Z. Diao, comb. nov., (= *Chaetopsina ivoriensis* Rambelli & Lunghini, *Giornale Botanico Italiano* 110: 253, 1976; = *Kionochaeta ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton, *Trans. Br. Mycol. Soc.* 85 (4): 713, 1986)
23. *Kylindrochaeta lignomollis* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao, comb. nov. (= *Chaetosphaeria lignomollis* F.A. Fernández & Huhndorf)
24. *Lareunionomyces foliicola* (P.M. Kirk) W.P. Wu & Y.Z. Diao comb. nov. (= *Phialocephala foliicola* P.M. Kirk, = *Sporendocladia foliicola* (P.M. Kirk) M.J. Wingf.)*
25. *Lareunionomyces kionochaetoides* (B. Sutton) W.P. Wu & Y.Z. Diao comb. nov. (= *Sporendocladia kionochaetoides* B. Sutton)*
26. *Nimesporella aliformis* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov. (= *Dictyochaeta aliformis* Kuthub. & Nawawi)
27. *Nimesporella aquatica* (R.F. Castañeda, M.S. Oliveira & Malosso) W.P. Wu & Y.Z. Diao, comb. nov. (= *Codinaea aquatica* R.F. Castañeda, M.S. Oliveira & Malosso)
28. *Nimesporella daphnioides* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao comb. nov. (= *Dictyochaeta daphnioides* Kuthub. & Nawawi)
29. *Nimesporella leomaiae* (M.A. Barbosa, Malosso & R.F. Castañeda) W.P. Wu & Y.Z. Diao, comb. nov. (= *Codinaea leomaiae* M.A. Barbosa, Malosso & R.F. Castañeda)
30. *Nimesporella pulchriseta* (Curr.) W.P. Wu & Y.Z. Diao comb. nov. (= *Chaetosphaeria pulchriseta* Curr.)
31. *Nimesporella queenslandica* (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov. (= *Hyphodiscosia queenslandica* Matsush.)
32. *Nimesporella tumidospora* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao, comb. nov. (= *Dictyochaeta tumidospora* Kuthub. & Nawawi)
33. *Paraceratocladia polysetosum* (R.F. Castañeda) W.P. Wu & Y.Z. Diao comb. nov. (= *Ceratocladium polysetosum* (R.F. Castañeda)
34. *Paragaemannomyces basispirus* (Nawawi & Kuthub) W.P. Wu & Y.Z. Diao comb. nov. (= *Obeliospora basispira* Nawawi & Kuthub.)

35. *Paragaeumannomyces microappendiculatus* (Cantillo & Gusmão) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Obeliospora microappendiculata* Cantillo & Gusmão)
36. *Paragaeumannomyces minimus* (W.P. Wu & McKenzie) W.P. Wu & Y.Z. Diao comb. nov. ≡ *Obeliospora minima* W.P. Wu & McKenzie)
37. *Paragaeumannomyces nitidus* (Kuthub., G.M. Liew & Nawawi) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Obeliospora nitida* (Kuthub., G.M. Liew & Nawawi) Cantillo & Gusmão)
38. *Paragaeumannomyces triappendiculatus* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Obeliospora triappendiculata* Kuthub. & Nawawi)
39. *Parasporendocladia bactrospora* (W.B. Kendr.) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Phialocephala bactrospora* W.B. Kendr., ≡ *Sporendocladia bactrospora* (W.B. Kendr.) M.J. Wingf.)*
40. *Phaeochloridium geniculata* (Emden) W.P. Wu & Y.Z. Diao comb. nov. (= *Phialophora geniculata* Emden)*
41. *Phaeochloridium phaeosporum* (W. Gams & Hol.-Jech) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Chloridium phaeosporum* W. Gams & Hol.-Jech.)*
42. *Phaeodischloridium inaequiseptatum* (Matsush.) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Dischloridium inaequiseptum* (Matsush.) Hol.-Jech.)
43. *Phialogeniculata obclavata* (Matsush.) W.P. Wu & Y.Z. Diao (≡ *Chloridium obclavata* Matsush.)
44. *Phialoturbella apiculata* (Matsush.) W.P. Wu & Y.Z. Diao, comb. nov. (≡ *Codinaea apiculata* Matsush.)
45. *Riisgaardia obclavata* (W.P. Wu) W.P. Wu & Y.Z. Diao (≡ *Linkosia obclavata* W.P. Wu)
46. *Riisgaardia vermiculata* (W.P. Wu) W.P. Wu & Y.Z. Diao (≡ *Clasterosporium vermiculatum* Cooke)
47. *Stilbochaeta jianfenglingensis* (J.W. Xia & X.G. Zhang) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Codinaea jianfenglingensis* J.W. Xia & X.G. Zhang)
48. *Stratiphoromyces multifimbriata* (R. Kirschner & C.J. Chen) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Dictyochaeta multifimbriata* R. Kirschner & C.J. Chen, Mycol. Progress 1(3): 287, 2002)*
49. *Thozetella rivularis* (Réblová & J. Fourn.) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Chaetosphaeria rivularis* Réblová & J. Fourn.)
50. *Xyladelphia intermedia* (Gusmão & S.M. Leão) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Dictyochaeta intermedia* Gusmão & S.M. Leão)
51. *Xyladelphia plutiguttulata* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Dictyochaeta plutiguttulata* Kuthub. & Nawawi)
52. *Xyladelphia vittata* (Kuthub. & Nawawi) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Dictyochaeta vittata* Kuthub. & Nawawi)
53. *Xyladictyochaeta eucalypti* (B. Sutton & Hodges) W.P. Wu & Y.Z. Diao comb. nov. (≡ *Codinaea eucalypti* B. Sutton & Hodges)*
54. *Xylolentia matsushimae* W.P. Wu & Y.Z. Diao nom. nov. (= *Chloridium reniforme* Matsush.)*
55. *Zanclosporiella minuta* (F.A. Fernández & Huhndorf) W.P. Wu & Y.Z. Diao, comb. nov. (≡ *Chaetosphaeria minuta* F.A. Fernández & Huhndorf)

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Statements & Declarations

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Data Availability: The datasets generated during and/or analysed during the current study are available in the MycoBank repository (included in the manuscript), GenBank (included in Table 1 and Table 2) and TreeBASE (submission number: 29086). And also The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Figure Captions:

Table 1 New taxa, isolate information and GenBank accession numbers for new sequences determined for this study

Table 2 A list of all accepted genera in the family Chaetosphaeriaceae

Supplementary Table 1 Taxa, isolate information and GenBank accession numbers for new sequences determined for this study.

Supplementary Table 2 Taxa, isolate information and GenBank accession numbers for sequences retrieved from GenBank

Fig. 1 In nature the anamorphic chaetosphaeriaceous fungi can be found on decaying leaves, branches, bark and rotten wood of various plants in different geographic areas, though more diversity can be found from subtropical and tropical areas. Submerged wood in streams usually provide interesting diversity of chaetosphaeriaceous fungi. Here plant litter samples were collected from Moganshan, Zhejiang (a), Haituoshan, Hebei (c), and Northeast China (c), many new or interesting species were discovered from them

Fig. 2 The anamorphic chaetosphaeriaceous fungi can be discovered on various plant litters, including decaying leaves, branches, bark, wood, fruit and seeds of various plants.

Fig. 3 Maximum likelihood (ML) tree based on ITS and 28S rDNA sequence data for the *Chaetosphaeriaceae*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.92 are shown at the nodes. *Tracylla eucalypti* CPC 31777 and *Tracylla aristata* CPC 25500 was chosen as the outgroup

Fig. 4 Conidiomata, conidiophores and conidiogenous cells of non-phialidic chaetosphaeriaceous fungi. a Synnemata of *Falholtia kaohsiungensis*. b Synnemata of *Morrisiella indica*. c Conidiogenous cells of *Stanjehughesia hormiscioides*. d Conidiogenous cells of *Riisgaardia longispora*. e Conidiophores and conidiogenous cells of *Ellisembia reblovae*. f Conidiogenous cells of *Linkosia gelatinosa*. g Conidiophores and conidiogenous cells of *Aunstrupia nodipes*. h Conidiogenous cells of *Morrisiella fusiformis*. i Conidiophores and conidiogenous cell of *Lomaanthia pooga*. j Conidiophores and conidiogenous cells of *Falholtia kaohsiungensis*. k Conidiogenous cells of *Morrisiella indica*. Scale bar: a, b 40 μm , c-g, i-k 10 μm , h 5 μm

Fig. 5 Conidia of non-phialidic chaetosphaeriaceous fungi. A. *Linkosia longispora*; B. *Linkosia multiseptum*; C. *Stanjehughesia larvata*; D. *Stanjehughesia polypora*; E. *Stanjehughesia hormiscioides*; F. *Falholtia kaohsiungensis*; G. *Linkosia fusiformis*; H. *Linkosia gelatinosa*; I. *Stanjehughesia curviapicis*; J. *Ellisembia reblovae*; K. *Aunstrupia nodipes*; L. *Ellisembia brachypus*. Scale bar: 10 μm for all

Fig. 6 Conidiomata of *Dinemasporium*, *Pseudolachnea* and *Pseudolachnella*. a *Dinemasporium fusiformia*. b *Pseudolachnella tengii*. c *Dinemasporium longisporum*. d *Pseudolachnea macrospora*. e *D. ligongense*. f *D. sinensis*. Scale bar: 20 μm

Fig. 7 Conidiomata of phialidic chaetosphaeriaceous fungi. a-c Sporodochial conidiomata in *Thozetella asetulata* (Wu12089, a), *Menisporopsis dinemasporium* (Wu12102, b) and *Adautomilanezia caesalpiniae* (Crous et al., 2016, c). d-f Synnemata of *Arcuatosporea sinensis* (Wu12237, d), *Menisporopsis elegans* (Wu12183, e) *Phialosporostilbe setosa* (Wu12420, f)

Fig. 8 Conidiomata of phialidic chaetosphaeriaceous fungi. a Conidiophores formed in cluster from basal stroma in *Catenularia elegans* (Wu6078). b Conidiophores and capitate setae with mucilaginous apex from basal stroma in *Sporoschisma phaeocentrum* (Luo et al., 2016). c conidiophores and setae in clusters from basal stroma in *Stilbochaeta lunata*. d Single conidiophores with percurrent proliferation in *Catenularia cubensis*. e Conidiophores adhering and twining around the setae in *Paraceratocladium silvestre*. f Setiform conidiophores with dichotomously branched towards the apex and generally above the fertile region, consisting of two rows of phialides one on each side of the conidiophore with each cell narrowly ellipsoid, covered by sterile shield cells in *Cryptophiale udagawae*. g Setiform conidiophores with fertile region restricted to middle part and conidiogenous cells addressed to the fertile region, formed just below the distal septa of cells, and arranged in verticils in *Zanclospora brevispora*

Fig. 9 Conidiomata of anamorphic chaetosphaeriaceous fungi. a. Setiform conidiophores with sterile apex and fertile region in *Kionochaeta beijingensis*. b. Setiform conidiophores with secondary branches bearing conidiogenous cells in *Gonytrichum macrocladum*. c. Setiform conidiophores with lateral branches bearing conidiogenous cells in *Menispora* sp. d. Conidiophores with branches and conidiophores at the apex in *Sporendocladia beijingensis*. e. Capitate hyphae in *Monosporoschisma elegans*. f. Capitate hyphae and conidiophores in *Sporoschisma mirabile*. g. Sterile setae in *Xyladelphia parapulchriseta*

Fig. 10 Morphology of microawns in *Thozetella* species. a *T. acerosa*. b *T. hunanensis*. c. *T. fabacearum*. d *T. asetula*. e-f *T. fanglanii*. g *T. guozhongii*. h, j *T. japonica*. i *T. longispora*. Scale bar: 5 μm

Fig. 11 Conidiogenous cells and conidiogenesis of anamorphic chaetosphaeriaceous fungi. a *Sporoschisma nigroseptatum*. b *Catenularia elegans*. c *Cacumisporium capitulatum* (public domain) d *Catenularia cubensis*. e *Craspedodidymum cubense*. f *Phialogeniculata guadalcanalensis* (Luo et al., 2019). g *Tainosphaeria cupulata*. h

Tainosphaeria phialogeniculata. i *Stephemberneria elegans*. j *Catenularia* sp. k *Xyladelphia sinensis*. l *Chloridium jinghongense*. m *Chloridium culmicola*. n *Parabahusutrabeeja minima*

Fig. 12 Conidiogenous cells and conidiogenesis of anamorphic chaetosphaeriaceous fungi. a *Arcuatospora sinensis*. b *Multiguttulispora dimorphia*. c *Adautomilanezia caesalpiniae* (Crous et al., 2016). d-e *Obeliospora minima*. f *Cryptophialoidea fasciculata*. g *Zanclospora iberica* (Hernandez-Restrepo et al. 2017). h *Cryptophiale fruticetum*. i *Gonytrichum mirabile*. j *Menispora paraciliata*. k. *Paraceratocladium silvestre*. l *Phaeostagmus minimus*. m *Sprendocladia beijingensis*

Fig. 13 Conidial morphology of phialidic chaetosphaeriaceous fungi with hyaline spores. a *Kionochaeta ramifera*. b *Zanclospora brevispora*. c *Chloridium culmicola*. d *Fuscocatenula variegata*. e *Parabahusutrabeeja minima*. f *Nawawia oviformis* (Peng et al., 2016). g *Cryptophiale guadalcanalensis*. h *Cryptophiale fruticetum*. i *Ejnerjensonia parapulchriseta*. j *Cryptophiale udagawae*. k *Codinaea leomaiae* (Barbosa et al., 2016). l *Phialogeniculata guadalcanalensis* (Luo et al., 2019). m *Brachydictyochaeta bulliformis*. n *Zanclospora novae-zelandiae*. o *Dinemasporium americana*. p *Arcuatospora ellisii*. q *Menisporopsis pirozynskii*. r. *Paragaumannomyces nawawii*

Fig. 14 Conidial morphology of phialidic chaetosphaeriaceous fungi with pigmented spores. a *Chloridium proliferatum*. b *Chloridium gonytrichii*. c *Hoehneliella perplexa*. d *Catenularia catenulata*. e *Catenularia cubensis*; f *Catenularia elegans*. g *Craspedodidymum elatum*. h *Phaeodischloridium inaequiseptatum*. i *Adautomilanezia caesalpiniae* (Crous et al., 2016). j *Exserticlava vasiformis*; k *Monosporoschisma elegans*. l *Sporoschisma hemipsilum*. m *Sporoschisma mirabile*. n *Sporoschisma parvicuneatum*. o *Stephemberneria elegans*

Fig. 15 Maximum likelihood (ML) tree based on ITS sequence data for the non-phialidic *Chaetosphaeriaceae*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Tracylla eucalypti* CPC31777 was chosen as the outgroup

Fig. 16 Colony of non-phialidic anamorphs of chaetosphaeriaceous fungi on PDA after 20 days at 25°C. a, b *Aunstrupia nodipes* (a for 43149, b for 44694). c *Ellisembia brachypus* (50658). d *Ellisembia reblovae* (ex-type strain 44776). e, f *L. multiseptum* (e ex-type strain 42961, e 43190); g *L. rostrata* (ex-type strain NN47479). h-i *Lomaantha pooga* (h 42977, i 43946). j, k *Morrisiella indica* (j 42908, k 44710). l *Falholtia kaohsiungensis* (50711). m *Stanjehughesia polypora* (47796). n, o *Riisgaardia longispora* (n ex-type strain 50731, o 50687). p *R. vermiculata* (42952)

Fig. 17 *Aunstrupia nodipes* (Wu1311a). a-f Conidiophores and conidiogenous cells. g Superficial mycelium from which the conidiophores are produced. Scale bar: 20 μ m

Fig. 18 *Aunstrupia nodipes* (Wu1311a). a Conidiophore and conidiogenous cell bearing conidia. b-i Conidia. Scale bar: 20 μ m

Fig. 19 *Ellisembia aurea* (Wu1786a). a, b, d, e, g-k Ascospores. c Paraphyses. f Apical structure of asci. Scale bar: a, b, d-e 20 μ m, c, f-k 10 μ m

Fig. 20 *Ellisembia brachypus* (Wu8080b). a, e, h-i Conidiophores and conidiogenous cells. b-g, j Conidia. Scale bar: 20 μ m

Fig. 21 *Ellisembia reblovae* (Wu1913b, holotype). a-l, r, r-z Conidia. m-q, s. Conidiophores and conidiogenous cells. Scale bar: 10 μ m

Fig. 22 *Linkosia filiformis* (Wu8277, holotype). a-i Conidia. j-k Conidiogenous cells. Scale bar: 20 μ m

Fig. 23 *Linkosia filiformis* (Wu8169). a Mass of conidia and setae. b, c Setae and conidia. d-r Conidia. Scale bar: 40 μ m

Fig. 24 *Linkosia fusiformis* (Wu1326a, holotype). a-o Conidia. p-t Conidiogenous cells. Scale bar: 20 μ m

Fig. 25 *Linkosia gelatinosa* (Wu8118a). a-d, f-n Conidia. e Superficial mycelium and conidiogenous cell. Scale bar: 20 μ m

Fig. 26 *Linkosia gelatinosa* (Wu8228c, holotype). a-e Conidia. f-i Conidiogenous cells. Scale bar: 10 μ m

Fig. 27 *Linkosia multiseptum* (Wu1374b, holotype). a-e Conidiogenous cells bearing mature conidia. f-j Conidia. Scale bar: 20 μ m

Fig. 28 *Linkosia rostrata* (Wu6030b, holotype). a-o Conidia. p-w Conidiogenous cells formed from superficial mycelium. Scale bar: a-t, w 20 μ m, u, v 10 μ m

Fig. 29 *Linkosia rostrata* (Wu6030b, holotype). a-e Conidia. f-j Conidiogenous cells formed from superficial mycelium. k Conidiogenous cell and developing conidia. Scale bar: 10 μ m

Fig. 30 *Lomaantha pooga* (Wu1518a). a-c, h Conidiophores and conidiogenous cells. d-g Conidia. Scale bar: 20 μ m

Fig. 31 Colony of non-phialidic anamorphs of chaetosphaeriaceous fungi on PDA after 20 days at 25°C. a-b *Ellisembia reblovae* (ex-type strain 44776). c-d *Linkosia filiformis* (ex-type strain 50606). e-f *L. gelatinosa* (ex-type strain NN50607). g-h *L. rostrata* (ex-type strain NN47479). i-r *Riisgaardia longispora* (ex-type strain 50731). k-l *R. obclavata* (ex-type strain 43163)

Fig. 32 *Morrisiella indica* (Wu1913a). a-f Synnemata. Scale bar: a-e 50 μ m, f 20 μ m

Fig. 33 *Morrisiella indica* (Wu1913a). a-d Conidiogenous cells on synnemata. e-n Conidia. Scale bar: 20 μ m

Fig. 34 *Morrisiella reblovae* (Wu9002, holotype). a-c Part of the synnemata bearing conidiophores and conidiogenous cells. d-f Part of the synnemata, showing the central setae, surrounding hyphae, intercalary conidiogenous cell. Scale bar: 10 μ m

Fig. 35 *Morrisiella reblovae* (Wu9002, holotype). a-d Part of the synnemata bearing conidiophores and conidiogenous cells. e-j Conidia. Scale bar: 10 μ m

Fig. 36 *Stanjehughesia hormiscioides* (Wu8263). a-j Conidia. k-o Developing conidia. p-z Conidiogenous cells. Scale bar: a-o 20 μ m, p-z 10 μ m

Fig. 37 *Falholtia kaohsiungensis* (Wu8321). a-d, f, g Synnemata with conidiophores and conidiogenous cells. e Conidiogenous cells on part of synnemata. h-i Conidia. Scale bar: a-d 100 μ m, e-i 50 μ m

Fig. 38 *Falholtia kaohsiungensis* (Wu8321). a-c Conidiophores and conidiogenous cells. d-l Conidia. m Conidiophores and conidiogenous cells on part of synnemata. Scale bar: a-l 20 μ m, m 50 μ m

Fig. 39 *Riisgaardia longispora* (Wu8333, holotype). a-h Conidia. Scale bar: 20 μ m

Fig. 40 *Riisgaardia longispora* (Wu8333, holotype). a-f Conidia with rough wall. g-i Conidiogenous cells. Scale bar: 10 μ m

Fig. 41 *Riisgaardia obclavata* (Wu1266a, holotype). a Conidiogenous cell bearing a conidium. b-l Conidia. m-q Conidiogenous cells. Scale bar: 20 μ m

Fig. 42 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Dictyochaeta* and related genera with aseptate conidia. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Nawawia filiformis* MH758196 was chosen as the outgroup.

Fig. 43 Colony of *Dictyochaeta*, *Bahusutrabeeja* and related genera on PDA after 20 days at 25°C. a, b *Brachydictyochaeta bulliformis* (ex-type strain 78320). c, d *Bahusutrabeeja trisetula* (ex-type strain 44720). e, *Paracodinaea japonica* (ex-type strain 77392). g, h *Parabahusutrabeeja minima* (ex-type strain 43967). i *Lunatochaeta shenzhenensis* (ex-type strain 78259). j *Paracodinaea japonica* (76395). k *Calceisporiella sinensis* (ex-type strain 44686). l *Parabahusutrabeeja minima* (55337). m *Oxenbollia lunatosporea* (ex-type strain 47501). n *Bahusutrabeeja dwaya* (44655). o *Dictyochaeta fuegiana* (43191). p *Phialogeniculata guadalcanalensis* (44662).

Fig. 44 *Brachydictyochaeta antillana* (Wu13318). a-f Setiform conidiophores with lateral phialides. Scale bar: 5 μ m.

Fig. 45 *Brachydictyochaeta antillana* (Wu13318). a-e, k-p. Conidia. f-j Conidiogenous cells with funnel-shaped collarettes. Scale bar: 5 μ m.

Fig. 46 *Brachydictyochaeta bulliformis* (Wu16818). a, b. e-h. Setiform conidiophores with lateral phialides and swollen apex. c, d Conidiogenous cells. i-p Conidia. Scale bar: 5 μ m

Fig. 47 *Brachydictyochaeta bulliformis* (a-l Wu17533 holotype, m-s Wu16818). Wu 17533: a, b, i Setae with swollen apex. c-f Conidia. g-k Conidiogenous cells. Wu16818: n Setae. p-r Conidiogenous cells. s. Conidia. Scale bar: 5 μ m

Fig. 48 *Lunatochaeta shenzhenensis* (Wu17504, holotype). a-d Setae and conidiophores in cluster. e, f Conidiophores and terminal phialidic conidiogenous cells. g-o conidia. p Apical part of setae. Scale bar: a-d 20 μ m, e-p 5 μ m

Fig. 49 *Phialoturbella apiculata* (Wu8115c). a, b Conidiophores and conidiogenous cells with funnel-shaped collarettes. c-e Conidia. Scale bar: a 10 μ m, b-e 5 μ m

Fig. 50 *Calceisporiella sinensis* (Wu1900a, holotype). a Conidiophores. b Upper part of conidiophores and conidiogenous cells bearing inconspicuous collarettes. c Conidia. Scale bar: a 40 μ m, b-c 20 μ m

Fig. 51 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Codinaea*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Paracodinaea japonica* 16859 77205 was chosen as the outgroup.

Fig. 52 Colony of *Codinaea*, *Xyladelfia*, *Nimesporella* and *Multiguttulispora* species on PDA after 20 days at 25°C. a, b *Codinaea clavatophora* (ex-type strain 47943). c, d *C. oxenbolliae* (ex-type strain 77595). e, f *C. dinghushanensis* (ex-type strain 54218). g, h *C. puerensis* (ex-type strain 75986). i, j *C. kendrickii* (ex-type strain 57551). k, l *C. pyriformis* (ex-type strain 45929). m, n *C. latispora* (ex-type strain 77341). o, p *Xyladelfia parapulchriseta* (ex-type strain 77767). q, r *Codinaea simaoensis* (ex-type strain 76046). o *C. fanglanii* (ex-type strain 58983). p *Xyladelfia sinensis* (ex-type strain 78332). s, t *Xyladelfia parapulchriseta* (ex-type strain 77767).

Fig. 53 *Codinaea clavatophora* (Wu8015, holotype). a-d Setae and conidiophores in clusters. e-j Conidiophores and conidiogenous cells. k-l Conidia. Scale bar: a-c 20 μ m, d 10 μ m, e-l 5 μ m

Fig. 54 *Codinaea dinghushanensis* (Wu17442). a-b Setae. c-e Conidiophores clustered together with setae. f-m Conidiophores and conidiogenous cells with funnel-shaped collarettes. n-t Conidia. Scale bar: a, b. d-h 10 μ m, c 20 μ m, i-t 5 μ m

Fig. 55 *Codinaea dinghushanensis* (Wu12155, holotype). a-i Setae and conidiophores in clusters from basal stroma. f Fertile setae with terminal polyphialidic conidiogenous cell. j Developing setae and conidiophores from basal stroma. Scale bar: a-c 20 μ m, d-j 10 μ m

Fig. 56 *Codinaea dinghushanensis* (Wu12155, holotype). a Sterile setae. b-g, l Conidiophores and conidiogenous cells with funnel-shaped collarettes. h, i, k conidiogenous cells with funnel-shaped collarette and spore mass. j Conidia. Scale bar: a-k 5 μ m, l 10 μ m

Fig. 57 *Codinaea fanglanii* (Wu13345, holotype). a, b Setae and conidiophores in cluster. c-f Conidiophores and conidiogenous cells with funnel-shaped collarettes. g-l Conidia. Scale bar: a, b 10 μ m, c-l 5 μ m

Fig. 58 *Codinaea fanglanii* (Wu13368). a, b Setae and conidiophores in cluster. c, d Apical part of the setae bearing a phialidic conidiogenous cells with funnel-shaped collarettes. e-h Conidiophores and conidiogenous cells with funnel-shaped collarettes. i-k Conidia. Scale bar: a, b 20 μ m, c-i 5 μ m

Fig. 59 *Codinaea kendrickii* (Wu13208, holotype). a Conidiophores and setae in cluster. b, c Conidiophores and conidiogenous cells with funnel-shaped collarettes. d-f Fertile setae and conidiophores. Scale bar: 10 μ m

Fig. 60 Conidia of *Codinaea kendrickii* (a-o Wu13208 holotype, p-s Wu13253). Scale bar: 5 μ m

Fig. 61 *Codinaea latispora* (Wu17038, holotype). a-h Fertile setae, conidiophores and conidiogenous cells. i-k Upper part of conidiophores with terminal conidiogenous cells. l Conidia. Scale bar: a-g 10 μ m, h-l 5 μ m

Fig. 62 *Codinaea latispora* (a-k Wu17038, holotype; l-q 17037). a-c Fertile setae, conidiophores and conidiogenous cells. d-e. Conidiophores and conidiogenous cells bearing funnel-shaped collarettes; f-u Conidia. Scale bar: a-c 10 μ m, d-u 5 μ m

Fig. 63 *Codinaea minima* (Wu1942b, holotype) a Setae. b Setae and conidiophores in cluster. c Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. d Conidia. Scale bar: a, b 40 μ m, c, d 20 μ m.

Fig. 64 *Codinaea oxenbollii* (Wu17179, holotype). a, b Setae and conidiophores in clusters. c, d Setae. e-i Conidiophores and conidiogenous cells. j-q Conidia. Scale bar: a-d 10 μ m, e-q 5 μ m

Fig. 65 *Codinaea puerensis* (Wu15148). a-c Conidiophores. d-g Apical part of setae with conidiogenous cells bearing funnel-shaped collarettes. h-p Conidia. Scale bar: a, b 20 μ m, c 10 μ m, d-p 5 μ m

Fig. 66 *Codinaea pyriformia* (Wu2746b1, holotype). a Conidia. b Conidiophores and conidia with setulae. Scale bar: 20 μ m

Fig. 67 *Codinaea siamensis* (Wu12670). a, b Setae and conidiophores in clusters. c, d Fertile setae with terminal polyphialidic conidiogenous cells. e-g Conidiophores and conidiogenous cells with funnel-shaped collarettes. h-q Conidia. Scale bar: a-d 10 μ m, e-q 5 μ m

Fig. 68 *Codinaea simaoensis* (Wu15241, holotype). a, b Setae and conidiophores in cluster from basal stroma. c Apical part of conidiogenous cell. d-f Setae, conidiophores and conidiogenous cells from basal stroma. g-j Conidia. Scale bar: a-b 20 μ m, c-j 5 μ m

Fig. 69 *Codinaea simaoensis* (Wu15214, holotype). a Conidiophores and conidiogenous cell. b-j Conidia. Scale bar: 5 μ m

Fig. 70 *Codinaea tengii* (Wu1645c, holotype). a Conidiophores and setae in clusters. b Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. c Conidia. Scale bar: a 40 μ m, b, c 20 μ m

Fig. 71 *Codinaea trisetula* (Wu1930c, holotype). a Conidiophores, conidiogenous cells and conidia. b Upper part of conidiophores and conidiogenous cells bearing funnel-shaped collarettes. c Conidia. Scale bar: a 40 μ m, b-c 20 μ m

Fig. 72 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Codinaeella*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Paragaemannomyces garthjonesii* 1019 was chosen as the outgroup

Fig. 73 Colony of *Codinaea*, *Codinaeella* and *Nimesporella* species on PDA after 20 days at 25°C. a-d *Codinaea lithocarp*i (44671). e-j *C. siamensis* (e-h 44644, i-j 44718). k-l *C. terminalis* (47726). m-p *Codinaeella kuthubutheenii* (M 44891, n 43775, o 42898, p 44410). p *Ca. geniculata* (47771). r *Ca. yunnanensis* (44495). s, t *Ca. multisporuloca* (ex-type strain 78175). u *Nimesporella aunstrupii* (ex-type strain 54329). v *N. riisgaardii* (ex-type strain 59021). w *Multiguttulispora paratriseptata* (ex-type strain 55338). x *Codinaea clavatophora* (ex-type strain 47943)

Fig. 74 Colony of *Codinaeella* species on PDA after 20 days at 25°C. a, b *Ca. brevissima* (ex-type strain 77622). c, d *Ca. paralambertiae* (ex-type strain 76781). e, f *Ca. cinnamomi* (ex-type strain 57549). a, h *Ca. cannonii* (ex-type strain 76040). I, j *Ca. kuthubutheenii* (ex-type strain 78279). k, l *Ca. minuta* (ex-type strain 58997). m, n *Ca. menispora* (ex-type strain 77422). o, p *Ca. latispora* (ex-type strain 47478)

Fig. 75 *Codinaeella brevissima* (Wu17241, holotype). a-f Conidiophores and conidiogenous cells with funnel-shaped collarettes. g-r Conidia. Scale bar: 5 μ m

Fig. 76 *Codinaeella cannonii* (Wu15206, holotype). a-e Conidiophores and conidiogenous cells. f-s Conidia. Scale bar: 5 μ m

Fig. 77 *Codinaeella cinnamomi* (Wu13202, holotype). a-e Conidiophores and conidiogenous cells. f-t Conidia. Scale bar: 5 μ m

Fig. 78 *Codinaeella filamentosa* (WuBJ142). a-f Setae. g-i, k, m Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. j Apical part of setae. l Basal part of setae. Scale bar: a, b 20 μ m, c-f 10 μ m, g-m 5 μ m

Fig. 79 Conidia of *Codinaeella filamentosa* (WuBJ141). Scale bar: 5 μ m

Fig. 80 *Codinaeella kuthubutheenii* (Wu17529, holotype). a-h. Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. i-r Conidia. Scale bar: 5 μ m

Fig. 81 *Codinaeella latispota* (Wu6015, holotype). a-i Conidiophores and conidiogenous cells. j-z Conidia. Scale bar: a-d, x 10 μ m, e-v, y, z 5 μ m

Fig. 82 *Codinaeella minuta* (Wu12743). a-i Conidiophores and conidiogenous cells. j-s Conidia. Scale bar: a-c. o-p 10 μ m, d-n, q-s 5 μ m

Fig. 83 *Codinaeella multisporuloca* (Wu17413, holotype). a Conidiophores. b-h, j Conidiophores and conidiogenous cells. i Conidia. Scale bar: a 40 μ m, i 10 μ m, b-h, j 5 μ m

Fig. 84 *Codinaeella multisporuloca* (Wu17413, holotype). a-k Conidia. l Conidiophores. Scale bar: a-k 5 μ m, l 40 μ m

Fig. 85 *Codinaeella paralambertiae* (Wu16511, holotype). a Conidiophores. b Superficial mycelium. c-j Conidiophores and conidiogenous cells. k-r Conidia. Scale bar: a 20 μ m, b-r 5 μ m

Fig. 86 *Codinaeella sinensis* (Wu17690). a Basal part of setiform conidiophores. b, e-i Part of setiform conidiophores with lateral phialides. c, d Apex of the setiform conidiophores. j-t Conidia. Scale bar: 5 μ m

Fig. 87 *Codinaeella sinensis* (Wu16915). a-d Setiform conidiophores. e-k Part of setiform conidiophores with lateral phialides. l-o Conidia. Scale bar: a, b 20 μ m, c, d 10 μ m, e-o 5 μ m

Figs. 88 *Codinaeella yunnanensis* (Wu17204). a-m Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. n-w Conidia. Scale bar: a-f 10 μ m, g-w 5 μ m

Fig. 89 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Menispora*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Podospora didyma* AY999127 was chosen as the outgroup

Fig. 90 Colony of *Menispora* species on PDA after 20 days at 25°C. a, b *Menispora gamsii* (77475). c, d *Menispora paraciliata* (ex-type strain 77478). e, f *M. paratortuosa* (ex-type strain 77625)

Fig. 91 *Menispora manitobaensis* (Wu17408). a, b Setae with branches and sterile apex. c-i Part of main stipe of setae and branches bearing conidiogenous cells with narrow collarettes. Scale bar: a 20 μ m, b 10 μ m, c-i 5 μ m

Fig. 92 *Menispora manitobaensis* (Wu17408). a, l-o Part of main stipe of setae and branches bearing conidiogenous cells with narrow collarettes. b-k Conidia. Scale bar: 5 μ m

Fig. 93 *Menispora paraciliata* (Wu17033). a, b Setiform conidiophores with secondary branches and lateral branches of conidiophores and conidiogenous cells. c, d Part of setiform conidiophores with branches, showing the base of branches. e, f Fertile regions of the setiform conidiophores, showing the lateral branches and curved collarette. Scale bar: a, b 40 μ m, c-f 20 μ m

Fig. 94 *Menispora paraciliata* (Wu17033). a Part of setiform conidiophores, showing the base of branch and rounded apex. b Lower part of the setiform conidiophores. c-f Lateral branches bearing conidiogenous cells with curved collarettes. g-i Conidia. Scale bar: 5 μ m

Fig. 95 *Menispora paratortuosa* (Wu17005). a, b Setae and setiform conidiophores. c Upper part of setiform conidiophores. d-f Setiform conidiophores bearing lateral conidiogenous cells or conidiogenous cells. Scale bar: a 40 μ m, b 20 μ m, c, d-f 5 μ m

Fig. 96 *Menispora paratortuosa* (Wu17005). a-c Setiform conidiophores with lateral branches of conidiophores and conidiogenous cells. d-l Conidia. Scale bar: 5 μ m

Fig. 97 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Multiguttulispora*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Dictyoachaeta cangshanensis* GZCC190525 was chosen as the outgroup.

Fig. 98 *Multiguttulispora paratriseptata* (Wu2812a, holotype). a Conidiophores. b Upper part of conidiophores with polyphialidic conidiogenous cells. c Conidia. Scale bar: a 40 μ m, c-b 20 μ m

Fig. 99 *Neotainosphaeria microsperma* (Wu1928a, holotype). a Conidiophores. b Upper part of conidiophores with percurrent proliferation. c Conidia. Scale bar: a 40 μ m, b-c 20 μ m

Fig. 100 *Nimesporella aunstrupii* (Wu12202, holotype). a, e Conidia. b-d, f-g Conidiophores and conidiogenous cells. Scale bar: b 10 μ m, a, c-g 5 μ m

Fig. 101 *Nimesporella daphnioides* (Wu12150). a-d Conidiophores and conidiogenous cells. e-i Upper part of conidiophores with terminal conidiogenous cells. j-z Conidia. Scale bar: a-d 10 μ m, e-z 5 μ m

Fig. 102 *Nimesporella riisgaardii* (Wu13349a, holotype). a-h Conidiophores. i Conidiogenous cells with developing conidium. j Conidia. Scale bar: a-h 10 μ m, i-j 5 μ m

Fig. 103 *Nimesporella riisgaardii* (Wu13349a, holotype). a-f Conidia. g-k Conidiophores and conidiogenous cells. Scale bar: 5 μ m

Fig. 104 *Oxenbollia lunatospota* (Wu6065, holotype). a-i Conidiophores and conidiogenous cells with funnel-shaped collarettes. j-t Conidia. Scale bar: a 10 μ m, b-t 5 μ m

Fig. 105 *Parabahusutrabeeja minima* (a-n Wu12460, o-t Wu12456). a-g Conidiophores with percurrent proliferations and terminal phialidic conidiogenous cells. h-t Conidia. Scale bar: a-c 10 μ m, d-t 5 μ m

Fig. 106 *Paracodinaea japonica* (Wu16901, holotype). a-c Conidiophores and conidiogenous cells with funnel-shaped collarettes. d-k Conidia. Scale bar: 5 μ m

Fig. 107 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Stilbochaeta*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Codinaea paniculata* CBS145098 was chosen as the outgroup

Fig. 108 Colony of *Stilbochaeta* species on PDA after 20 days at 25°C. a, b *S. ejnerii* (ex-type strain 57536). c-f *S. lingnanensis* (d, d ex-type strain 76748, e, f 76617). g, h *S. lunata* (ex-type 78288). i, j *S. minteri* (ex-type strain 76642). k, l *S. sinensis* (ex-type strain 54257)

Fig. 109 *Stilbochaeta ejneri* (Wu13244, holotype). a, b Conidiophores. c-h, m Upper part of conidiophores and conidiogenous cells bearing funnel-shaped collarettes. i-l, n Conidia. Scale bar: a-d 20 μm , e-n 5 μm

Fig. 110 *Stilbochaeta lingnanensis* (Wu16288). a-d Setae and conidiophores in cluster. e, f Setae with sterile apex. g, h Conidiophores, conidiogenous cells bearing funnel-shaped collarettes. i Conidia. Scale bar: a-d 20 μm , e-i 10 μm

Fig. 111 *Stilbochaeta lingnanensis* (Wu16288). a-d Conidiophores, conidiogenous cells bearing funnel-shaped collarette. e-l Conidia. Scale bar: a-c, e-l 10 μm , d 20 μm

Fig. 112 *Stilbochaeta lunata* (Wu17536, holotype). a-c Sterile setae clustered with conidiophores, which have terminal phialidic conidiogenous cells with funnel-shaped collarettes. d-e Setae with sterile and swollen apex, conidiophores with terminal conidiogenous cell. Scale bar: a, b 10 μm , f, g, c-e 5 μm

Fig. 113 *Stilbochaeta lunata* (Wu17536, holotype). a, b, h-j Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. c-g, k Conidia. Scale bar: 5 μm

Fig. 114 *Stilbochaeta minteri* (Wu16270, holotype). a-e, j. Setae and conidiophores in clusters. f, i Conidiophores and conidiogenous cells. g, h Setae with sterile and rounded apex. Scale bar: a-e, j 20 μm , f-i 10 μm

Fig. 115 *Stilbochaeta minteri* (Wu16270, holotype). a-d Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. e-k Conidia. Scale bar: 10 μm

Fig. 116 *Stilbochaeta sinensis* (Wu16101). a, b Setae and conidiophores in clusters. c, d Setae with sterile and swollen apex. e-h Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. i-n Conidia. Scale bar: 5 μm

Fig. 117 *Stilbochaeta sinensis* (a-d, j, k Wu16101, e-i, l-o Wu16909). a-I, l-o Conidia. j, k Setae with sterile and swollen apex. i Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. Scale bar: 5 μm

Fig. 118 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Tainosphaeria*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Striatosphaeria codinaeophora* MR1230 was chosen as the outgroup

Fig. 119 Colony of *Tainosphaeria* species on PDA after 20 days at 25°C. a, b *T. cupulata* (ex-type strain 78378). c, d *T. microsperma* (ex-type strain 76340). e, f *T. phialogeniculata* (ex-type strain 76036). g, h *T. verrucophora* (ex-type strain 78530). i, j *T. sivanesanii* (ex-type strain 78406). k-t *T. jonesii* (a-l 44886, m, n 43723, o, p 44639, q, r 44886, s, t 44639)

Fig. 120 *Tainosphaeria cupulata* (Wu17579, holotype, holotype). a-l Conidiophores and conidiogenous cells with funnel-shaped collarettes. m Conidia. n Low part of conidiophores in groups. Scale bar: a-c 10 μm , d-n 5 μm

Fig. 121 Conidia of *Tainosphaeria cupulata* (Wu17579, holotype). Scale bar: 5 μm

Fig. 122 *Tainosphaeria jonesii* (Wu17259). a-g Conidiophores and conidiogenous cells with funnel-shaped collarettes. h-n Conidia. Scale bar: a-b 10 μm , c-n 5 μm

Fig. 123 *Tainosphaeria microsperma* (Wu16152, holotype). a-f Conidiophores and conidiogenous cells with funnel-shaped collarettes. g-y Conidia. Scale bar: a, b 10 μm , c-y 5 μm

Fig. 124 *Tainosphaeria phialogeniculata* (Wu15202, holotype). a-c Conidiophores and conidiogenous cells with funnel-shaped collarettes. d-u Conidia with setulae. Scale bar: 5 μm

Fig. 125 *Tainosphaeria sivanesanii* (Wu17575, holotype). a-f, j-l Conidiophores and conidiogenous cells with funnel-shaped conidia. g-i Conidia. Scale bar: a 10 μm , b-l 5 μm

Fig. 126 *Tainosphaeria verrucophora* (Wu17647b1, holotype). a-l Conidiophores and conidiogenous cells with funnel-shaped conidia. Scale bar: a, b 20 μm c-l 5 μm

Fig. 127 *Tainosphaeria verrucophora* (Wu17647b1, holotype). a-r Conidia. s-t Conidiophores and conidiogenous cells with funnel-shaped conidia. Scale bar: 5 μm

Fig. 128 *Xyladelfia parapulchriseta* (Wu17090, holotype). a-i Setae with dark cell. Scale bar: a 40 μm , b, c 20 μm , d-i 10 μm

Fig. 129 *Xyladelfia parapulchriseta* (Wu17090, holotype). a-h Conidia. i-r Conidiophores and conidiogenous cells with narrow sporulating loci. Scale bar: 5 μm

Fig. 130 *Xyladelfia sinensis* (Wu17453, holotype). a-e Setae with dark cell. f-j Conidiophores and conidiogenous cells bearing funnel-shaped collarettes. k-r Conidia. Scale bar: a 20 μm , b-d 10 μm , e-s 5 μm

Fig. 131 *Dictyochaeta lunulospora* (Wu3524b). a Conidiophores and conidiogenous cells. b Conidia. Scale bar: 20 μm

Fig. 132 Maximum likelihood (ML) tree based on ITS sequence data for the *Chloridium* narrow concept. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Striatosphaeria castaneae* CBS145352 and *Striatosphaeria codinaeophora* MR1230 were chosen as the outgroup

Fig. 133 Colony of *Chloridium* species on PDA after 20 days at 25°C. a, b *Chloridium crousii* (ex-type strain 42830). c, d *C. kirkii* (ex-type strain 43888). e, f *C. culmicola* (ex-type strain 45714). g, h, k, l *C. proliferatum* (g, h ex-type strain 78531. k, l 78518). i, j *C. cylindrosporellum* (ex-type strain 47981). m, n *C. jilinense* (ex-type strain 46507). o, p *C. setosum* (53381)

Fig. 134 Colony of *Chloridium* species on PDA after 20 days at 25°C. a, b *Chloridium shangsiense* (ex-type strain 43199). c, d *C. tropicale* (ex-type strain 76009). e, f *C. sinensis* (ex-type strain 77481). g, h *C. xishuangbanaense* (ex-type strain 75978). i, j *C. virescens* (I-J 85152, k, l 85145). m *C. setosum* (53381). n, *C. virescens* var. *chlamydosporum* (12033). o *C. virescens* var. *caudigerum* (12125). p *C. chloroconium* (12049). q *C. gonytrichii* (12066)

Fig. 135 *Chloridium crousii* (ex-type strain 42830 on PDA). a-i Conidiophores and conidiogenous cells. j-m Conidia. Scale bar: a-e 20 µm, f-m 5 µm.

Fig. 136 *Chloridium culmicola* (ex-type strain 45714) a-f Conidiophores and conidiogenous cells with developing conidia. g-k Conidia. Scale bar: 5 µm

Fig. 137 *Chloridium cylindrosporellum* (Wu13210, holotype). a-f Conidia. g-o Conidiophores and conidiogenous cells with developing conidia. Scale bar: a-f, i-o 5 µm, g-h 20 µm

Fig. 138 *Chloridium gonytrichii* (Wu17008). a-f Setiform conidiophores with branches. g-i Lateral branches and conidiogenous cells. j-m Conidia. Scale bar: a-c 20 µm, e-f 10 µm, g-m 5 µm

Fig. 139 *Chloridium jilinense* (Wu5039, holotype). a-i Conidiophores bearing terminal conidiogenous cells. j, k Conidia. Scale bar: a-d, g-k 10 µm, e, f 20 µm

Fig. 140 *Chloridium jilinense* (ex-type strain 46507 on PDA). a-i Conidiophores and conidiogenous cells. j, k Chlamydospore. l-p Conidia. Scale bar: a 20 µm, b-p 10 µm

Fig. 141 *Chloridium kirkii* (ex-type strain 43888 on PDA). a-c, i-n Conidiophores and conidiogenous cells, chlamydospores also found. d-g Conidia. h Superficial hyphae bearing chlamydospore. Scale bar: a-c, g, i-n 10 µm, d-f 5 µm, h 20 µm

Fig. 142 *Chloridium mirabile* (WuBJ01). a Branched setiform conidiophores. b-c Part of conidiophores showing branches. d-f Conidiogenous cells and collar hyphae; g, h Apex of the setiform setae with rounded apex. Scale bar: a 20 µm, b-c 10 µm, d-h 5 µm.

Fig. 143 *Chloridium mirabile* (WuBJ01). a-j Part of conidiophores showing branches, collar hyphae and conidiogenous cells. k-p Conidia. Scale bar: 5 µm.

Fig. 144 *Chloridium proliferatum* (Wu17053, holotype). a-h Conidiophore and conidiogenous cells. i-o Conidia. Scale bar: 5 µm.

Fig. 145 *Chloridium proliferatum* (from the living strain of Wu17684 on PDA). a-f conidia. g-n, p-s Conidiophores and conidiogenous cells bearing inconspicuous collarettes and percurrent proliferation. o hyphae. Scale bar: n-o 10 µm, a-l, p-s 5 µm

Fig. 146 *Chloridium setosum* (Wu17032, holotype). a-g Setae, conidiophores and conidia. Scale bar: 20 µm

Fig. 147 *Chloridium setosum* (Wu17032, holotype). a-e, h Conidiophores, conidiogenous cells and conidia. f Basal part of setae. g Upper part of setae. i, j, k-o Conidia. Scale bar: 5 µm

Fig. 148 *Chloridium shangsiense* (Wu1385b, holotype). a-d Conidiophores, conidiogenous cells bearing broad sporulating loci, conidia. e-i Part of the conidiophores bearing conidiogenous cells and conidia. Scale bar: a-d 10 µm, e-i 5 µm

Fig. 149 *Chloridium shangsiense* (ex-type strain 43199 on PDA). a-f Conidiophores, conidiogenous cells bearing broad sporulating loci, conidia. g-i Lateral chlamydospore. j-l Conidia. Scale bar: 5 µm

Fig. 150 *Chloridium sinensis* (Wu17056, holotype). a, b, d-g Conidiophores and conidiogenous cells. c Basal part of conidiophores in clusters. h-o Conidia. Scale bar: 5 µm

Fig. 151 *Chloridium tropicale* (YN004, holotype). a-g Conidiophores and conidiogenous cells. h-m Conidia. Scale bar: a, b 10 µm, c-m 5 µm

Fig. 152 *Chloridium virescens* var. *caudigerum* (a-i Wu12125, j-l 15218). a-g, i Conidiophores and conidiogenous cells bearing developing conidia. h, i Basal part of conidiophores. k, l conidia. Scale bar: 10 µm

Fig. 153 *Chloridium xishuangbanaense* (YN013). a-h Conidiophores and conidiogenous cells. i-l Conidia. Scale bar: 5 µm

Fig. 153 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Paragaeumannomyces* and related genera. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Nawawia filiformis* MH758196 was chosen as the outgroup

Fig. 155 Colony of *Chaetosphaeria* and related genera on PDA after 20 days at 25°C. a, b *Ejnerjensenia myriocarpa* (44603). c-f *Chaetosphaeria innumera* (c, d 43746, e, f 43874). g, h *Paragaeumannomyces minimus* (78408). i, j *Fuscocatenua* sp. (43776). l *Fuscocatenua variegata* (55332). m, n *Craspedodidymum elatum* (42874). o, p *Chaetosphaeria* sp. (43137)

Fig. 156 *Catenularia elegans* (Wu6078, holotype). a Conidiophores in clusters. b-d Conidiophores, conidiogenous cells and conidia. Scale bar: a 30 µm, b-d 20 µm

Fig. 157 *Catenularia elegans* (Wu6078, holotype). a-c Conidiogenous cells with collarettes and developing conidia. d-e Conidia. Scale bar: 5 μ m

Fig. 158 *Craspedodidymum carpaticum* (Wu8296). a-c, h, i, m-s Conidiophores and conidiogenous cells. d-l Conidia. Scale bar: m-s 20 μ m, a-l 5 μ m

Fig. 159 *Craspedodidymum elatum* (Wu1270b). a, b Conidiophores. c-f Conidiogenous cells with collarettes and developing conidia. g-j Conidia. Scale bar: a 20 μ m, b 10 μ m, c-j 5 μ m

Fig. 160 *Ejnerjensenia myriocarpa* (= *Chloridium clavaeforme*, Wu15226). a, f, g, j Conidiophores and conidiogenous cells with funnel-shaped collarette. b-e, h, i Conidia. Scale bar: 5 μ m

Fig. 161 *Fuscocatenula bambusicola* (holotype). a Conidiophores and conidiogenous cells. b Conidia. Scale bar: 10 μ m

Fig. 162 *Fuscocatenula variegata* (Wu12520). a-e Conidiophores, conidiogenous cells and developing conidia. f-j Part of conidiophores, conidiogenous cells and developing conidia. k-s Conidia. Scale bar: a-e 20 μ m, f-s 5 μ m

Fig. 163 *Paragaeumannomyces asetulus* (Wu12131, holotype). a-g Conidiogenous cells with developing conidia. h, i. conidia. Scale bar: 5 μ m

Fig. 164 *Paragaeumannomyces asetulus* (Wu12131, holotype). a-o Conidia. p-u Conidiogenous cells with developing conidia. Scale bar: 5 μ m

Fig. 165 *Paragaeumannomyces minimus* (Wu17577). A, b, d-e Setae. f-h, l-p Conidia. c, i-k Conidiogenous cells directly formed from mycelium. on natural substrate. Scale bar: a 40 μ m, c-j 20 μ m, 10 μ m, i-p 5 μ m

Fig. 166 *Paragaeumannomyces minimus* (living strain 78408 from Wu17577 on PDA). a-c Setae. d-k Conidiogenous cells directly formed from mycelium. l-z, aa-ab Conidia. on PDA. Scale bar: a, d 20 μ m, b, c, e-h 10 μ m, i-ac 5 μ m

Fig. 167 *Paragaeumannomyces nawawii* (Wu12655, holotype). a-d Setae. e-n Conidiophores and conidiogenous cells. o-q Conidia. Scale bar: a-d 10 μ m, e-q 5 μ m

Fig. 168 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Cryptophiale* and other related genera with branched conidiophores or lateral phialides. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Stephanophorella stellata* CBS101301 was chosen as the outgroup

Fig. 169 Colony of *Cryptophiale*, *Paracryptophiale*, *Paraceratocladium* and related fungi on PDA after 20 days at 25°C. a, b *Cryptophiale fruticetum* (44516). c-f *C. udagawae* (43732 and 43015). g, h *Paraceratocladium silvestre* (44059). i, j *Paraceratocladia polysetosum* (44119). k, l *Paracryptophiale pirozynskii* (ex-type strain 44888).

Fig. 170 *Cryptophiale fruticetum* (Wu17591). a, b Sterile setae with branches. c Sterile setae and setiform conidiophores. d-f Setiform conidiophores with fertile regions and branched apex. g Fertile region with conidiogenous cells. h-n Conidia. Scale bar: a, b 40 μ m, c-e 20 μ m, f 10 μ m, g-q 5 μ m

Fig. 171 *Paracryptophiale pirozynskii*. a-i Setiform conidiophores with fertile region, conidiogenous cells and developing conidia. Scale bar: 20 μ m.

Fig. 172 *Paracryptophiale pirozynskii*. a-g Conidia. h-i Fertile region with conidiogenous cells and developing conidia. Scale bar: 10 μ m.

Fig. 173 *Cryptophialoidea fasciculata* (Wu17489). a-c Conidiophores with fertile region. d-g Fertile region with conidiogenous cells in groups. h-m Conidia. Scale bar: a-c 20 μ m, d, e 10 μ m, f-q 5 μ m

Fig. 174 *Paraceratocladium silvestre* (Wu17503). a-d Setae with conidiophores. e-l Part of setae and conidiophores bearing intercalary conidiogenous cells with funnel-shaped collarettes. m-q Conidia. Scale bar: a-c 20 μ m, d-e 10 μ m, f-q 5 μ m

Fig. 175 *Paraceratocladia polysetosa* (Wu1523a). a Conidia. b Setae and conidiophores bearing intercalary conidiogenous cells. c Conidiophores and intercalary conidiogenous cells with funnel-shaped collarettes. Scale bar: b 40 μ m, a, c 20 μ m

Fig. 176 *Zanclospora brevispora* (Wu17551). a-e Setiform conidiophores with fertile region. f-h Fertile regions with conidiogenous cells directly formed from main stipe of setae. i-t Conidia. Scale bar: a-c 20 μ m, d-e 10 μ m, f-t 5 μ m

Fig. 177 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Kionochaeta*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Chaetosphaeria abietis* CBS42783 was chosen as the outgroup

Fig. 178 Colony of *Kionochaeta*, *Kionochaetiella* and *Sporendocladia* species on PDA after 20 days at 25°C. a, b *Kionochaeta beijingensis* (ex-type strain 77954). c, d, *K. castaneae* (53349). e, f *K. ramifera* (e for 43657, f for ex-type strain CBS102618). g, *K. spissa* (43916). h *Kionochaetiella ivoriensis* (ex-type strain CBS374.76). i-j *Sporendocladia beijingensis* (ex-type strain 77249). k-l *Sporendocladia fumosa* (CBS518.93)

Fig. 179 *Kionochaeta beijingensis* (Wu17305, holotype). a-f Setiform conidiophores with fertile region in the middle. g Fertile region of the setiform conidiophores with secondary setae. h Lower part of the setiform conidiophores, with hyphae at the base. Scale bar: a, b 40 μ m, c-e 20 μ m, f-h 10 μ m

Fig. 180 *Kionochaeta beijingensis* (Wu17305). a Fertile region of the setiform conidiophores with secondary setae. b Secondary setae among the conidiophores in the fertile region. c, d Apex of setiform conidiophores. e-i Conidiophores and conidiogenous cells with narrow sporulating loci. j-n Conidia. Scale bar: 5 μ m

Fig. 181 *Phaeostalagmus minimus* (Wu12260, holotype). a-n Conidiophores, conidiogenous cells and developing conidia. o-z Conidia. Scale bar: a, b 40 μ m, c-h 10 μ m, h-z 5 μ m

Fig. 182 *Sporendocladia beijingensis* (Wu17341, holotype). a-e Conidiophores with branched sporulating apex. f-h Sporulating structure with secondary branches and conidiogenous cells. Scale bar: a-d 20 μ m, f-h 5 μ m

Fig. 183 *Sporendocladia beijingensis* (Wu17341, holotype). a-d Conidiophores with branched sporulating apex with secondary branches and conidiogenous cells. e-h. Conidia. Scale bar: 5 μ m

Fig. 184 *Cacumisporium capitulatum* (Wu7047). a-c, g-j Conidiogenous cells with percurrent proliferation and broad collarettes. d-f Conidiophores. k-m Conidia. Scale bar: a-c, g-m 10 μ m, d-f 20 μ m

Fig. 185 *Monosporoschisma elegans* (Wu5520, holotype). a, b, g, i, j Capitulate hyphae. c-f, h Capitulate hyphae, conidiophores and conidiogenous cells. Scale bar: a-g 10 μ m, h 100 μ m, k 5 μ m

Fig. 186 *Monosporoschisma elegans* (Wu5520, holotype). a-b Upper part of capitulate hyphae with percurrent proliferations. c-e Upper part of conidiophores bearing developing conidia. e-k Conidia. Scale bar: 5 μ m

Fig. 187 *Phaeodischloridium inaequiseptatum* (Wu5523). a-k Conidiophores and conidiogenous cells. i-t Conidia. Scale bar: a-h 10 μ m, i-t 5 μ m

Fig. 188 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Sporoschisma*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Chloridium terricola* HGUP4519 was chosen as the outgroup

Fig. 189 *Sporoschisma longicatenatum* (Wu12064). a-d, f-h Capitulate hyphae, conidiophores, conidiogenous cells and conidia. e Conidia. Scale bar: a-d 20 μ m, e-h 10 μ m

Fig. 190 *Stephembruneria microsperma* (Wu1318a, holotype). a-e Conidia. f, g Conidiophores. h-m Part of conidiophores and terminal conidiogenous cells. Scale bar: a, b 20 μ m, c-g, h-m 10 μ m

Fig. 191 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Arcuatospora*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Chaetosphaeria ciliate* CBS122131 was chosen as the outgroup

Fig. 192 Colony of *Arcuatospora* species on PDA after 20 days at 25°C. a, b *Arcuatospora ellisii* (ex-type strain 77541). c, d *A. hughesii* (ex-type strain 54242). e, f *A. lunata* (ex-type strain 77700). g-j *A. septata* (g-h ex-type strain 47512. i-j 50638). k, l *A. sinensis* (ex-type strain 57331).

Fig. 193 Colony of *Arcuatospora* species on PDA after 20 days at 25°C. a, b *A. suttonii* (ex-type strain 78459). c, d *A. yunnanensis* (ex-type strain 47742). f, f *Arcuatospora* sp. (43974).

Fig. 194 *Arcuatospora ellisii* (Wu17244). a-c Conidiomata with setae and synnemata. d Synnemata, conidiophores and conidiogenous cells with funnel-shaped collarette. e-l Conidia. Scale bar: a-c 20 μ m, d 10 μ m, e-l 5 μ m

Fig. 195 *Arcuatospora ellisii* (Wu17147, holotype). a, b, d Synnematous conidiomata with setae. c, e-h Upper part of the synnemata with conidiophores and conidiogenous cells. i-k Conidia. Scale bar: a, b, d 20 μ m, c, e-k 10 μ m

Fig. 196 *Arcuatospora hughesii* (Wu12237, holotype). a-c Synnematous conidiomata with setae. d Upper part of the synnemata with conidiogenous cells. e-i Conidiophores and conidiogenous cells. j-s Conidia. Scale bar: a-c 40 μ m, d 20 μ m, e-s 10 μ m

Fig. 197 *Arcuatospora lunata* (Wu17248, holotype). a-c Synnematous conidiomata with setae. d-i Conidia. j-l Upper part of the synnemata with conidiophores and conidiogenous cells. Scale bar: a-c 20 μ m, d-l 10 μ m

Fig. 198 *Arcuatospora septata* (Wu6039c, holotype). a Synnematous conidiomata with setae, b-f Synnemata, conidiophores and conidiogenous cells with inconspicuous collarette. g-p Conidia. Scale bar: a 20 μ m, b-f 10 μ m, g-p 5 μ m

Fig. 199 *Arcuatospora sinensis* (Wu12528). a-d Synnemata with setae. e Basal part of synnemata with stroma and conidiophores. f Basal part of synnemata showing basal stroma and hyphae. g-l Conidiophores and conidiogenous cells. m-t Conidia. Scale bar: a-d 40 μ m, e 20 μ m, f-t 5 μ m

Fig. 200 *Arcuatospora sinensis* (Wu13025, holotype). a, b, d, e Synnemata with setae. c Apex of setae. Scale bar: a, b, d 20 μ m, c, e 5 μ m

Fig. 201 *Arcuatospora sinensis* (Wu13025, holotype). b, d, f Synnemata with setae and phialidic conidiogenous cells. a, c Conidiogenous cells with collarettes. e-j Conidia. Scale bar: 5 μ m

Fig. 202 *Arcuatospora suttonii* (Wu17630, holotype). a-d Synnematous conidiomata with setae. e Apex of setae. f-h Upper part of the synnemata with conidiophores and conidiogenous cells. Scale bar: a-d 20 μ m, e-h 10 μ m

Fig. 203 *Arcuatospora suttonii* (Wu17630, holotype). a-f, h-j Conidia. g, k Upper part of the synnemata with conidiophores and conidiogenous cells. Scale bar: 10 μ m

Fig. 204 *Arcuatospora yunnanensis* (Wu7255a, holotype). a-e Synnematous conidiomata with setae. f Synnemata with basal stroma. g Conidiophores in the synnemata. h Upper part of the synnemata with conidiogenous cells. i-r Conidia. Scale bar: a-d 40 μ m, e-g 20 μ m, h-q 10 μ m

Fig. 205 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Menisporopsis*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Nawawia filiformis* MFLU18 1500 was chosen as the outgroup

Fig. 206 Colony of *Menisporopsis*, *Eucalyptostroma*, *Eucalyptostromiella* and *Pseudothozetella* species on PDA after 20 days at 25°C. a, b *Menisporopsis biformis* (ex-type strain 78233). c, d *M. dinemasporioides* (ex-type strain 54208). e, f *M. elegans* (ex-type strain 54228). g, h *M. macrospora* (ex-type strain 77554). i-j *Eucalyptostroma hongluosiense* (A-B ex-type strain 77220; C-D 77221). k *Eucalyptostroma oxenbolliae* (ex-type strain 76600). l *Eucalyptostromiella beijingensis* (ex-type strain 78012). m *Pseudothozetella lunata* (ex-type strain 76055).

Fig. 207 *Menisporopsis biformis* (Wu17473, holotype). a-c Synnemata with setae. d Upper part of the synnemata with conidiophores and conidiogenous cells. e Apical part of setae with mucilaginous cap. f, g Microconidia. h-l Conidia. Scale bar: a 50 μm . b, c 20 μm , d-l 5 μm

Fig. 208 *Menisporopsis dinemasporium* (Wu12102, holotype). a-c Synnematos conidiomata with setae. d-f, i-m, o, p Conidia. G, h, n Excipulum and conidiophores. Scale bar: a-c 50 μm , g, h, I, n 10 μm , d-f, j-m, o, p 5 μm

Fig. 209 *Menisporopsis elegans* (Wu12183, holotype). a, b Synnematos conidiomata with single setae. c, d Fertile regions of synnemata with phialidic conidiogenous cells. e, f Phialidic conidiogenous cells with inconspicuous collarettes. g-k Conidia.

Fig. 210 *Menisporopsis macrospora* (Wu17184, holotype). a Synnemata with setae. b, c Upper part of the synnemata with conidiophores and conidiogenous cells. d-j Conidia. All from the holotype specimen. Scale bar: a, 40 μm , h 20 μm , b-g, i, j 5 μm ,

Fig. 211 *Phialosporostilbe gregariclava* (Wu2259). a Conidia. b Synnemata with setae. c Conidiophores and conidiogenous cells. d Fertile setae. Scale bar: a, c, d 20 μm , b 40 μm

Fig. 212 Maximum likelihood (ML) tree based on ITS sequence data for the *Eucalyptostroma* and related fungi with stromatic conidiomata. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Thozetella pinicola* 76212 was chosen as the outgroup

Fig. 213 *Eucalyptostroma hongluosiensis* (a-c Wu16890, holotype; c-e Wu17318). a, f-i Conidiophores and conidiogenous cells. b-e Conidia. f Sporodochial conidiomata. Scale bar: a-e, g-i 5 μm , f 10 μm

Fig. 214 *Eucalyptostroma oxenbolliae* (a Wu16273, b-h Wu16283). a Part of sporodochial conidiomata with conidiophores and conidiogenous cells. b-h Conidia. Scale bar: 5 μm

Fig. 215 *Eucalyptostromiella beijingensis*. a, b Sporodochial conidiomata. c Part of conidiomata with conidiophores and conidiogenous cells. d-i Conidiogenous cells. j Conidia. All from the holotype specimen Wu17319. Scale bar: a, b 10 μm , c-i 5 μm

Fig. 216 *Minimidochium dictyochaetum* (Wu18158, holotype). a Sporodochial conidiomata with setae and wet spore mass. b-k Conidia. l-m Setae. n Conidiogenous cell. Scale bar: a 20 μm , l-m 10 μm , b-k, n 5 μm

Fig. 217 *Minimidochium triseptata* (Wu2083p, holotype). a Sporodochial conidiomata with setae and wet spore mass. b Setae. c Conidiophores and conidiogenous cells. d Conidia. Scale bar: a 100 μm , b-d 20 μm

Fig. 218 *Pseudothozetella lunata* (Wu15207, holotype). a, b Sporodochial conidiomata. c Conidiophores and conidiogenous cells with collarette. d-j Conidia. Scale bar: a 40 μm , b 10 μm , c-j 5 μm

Fig. 219 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Rattania*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Dictyochaeta curvispora* CBS114070 was chosen as the outgroup

Fig. 220 Colony of *Minimidochium* and *Rattania* species on PDA after 20 days at 25°C. a, b *Minimidochium dictyochaetum* (ex-type strain 75992). c, d *Rattania falcata* (ex-type strain 76627). e, f *R. intermedia* (ex-type strain 44906)

Fig. 221 *Rattania falcata* (Wu16324, holotype). a Sporodochial conidiomata with setae. b Short setae. c-m Conidia. Scale bar: a 10 μm , b-m 5 μm

Fig. 222 *Rattania falcata* (Wu16364). a Conidiophores and conidiogenous cells with inconspicuous collarettes. b Short setae arising from the hyphae. c-g Conidia. Scale bar: 5 μm

Fig. 223 *Rattania intermedia* (Wu1998d, holotype). a Setae. b Conidia. c Conidiophores and conidiogenous cells. Scale bar: 20 μm

Fig. 224 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Thozetella*. Bootstrap support values $\geq 60\%$, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Chaetosphaeria myriocarpa* CBS24175B was chosen as the outgroup

Fig. 225 Colony of *Thozetella* species on PDA after 20 days at 25°C. a, b *Thozetella asetula* (ex-type strain 54235). c, d *T. aunstrupii* (ex-type strain 77539). e, f *T. fanglanii* (ex-type strain 76092). g, h *T. guozhongii* (ex-type strain 76969). i, j *T. hunanensis* (ex-type strain 53378). k, l *T. palmicola* (ex-type strain 76448). m, n *T. paragiganitea* (ex-type strain 76039). o, p *T. pseudotocklaiensis* (ex-type strain 78410). q, r *T. septata* (ex-type strain 78221). s, t *T. suttonii* (ex-type strain 44785). u *T. japonica* (ex-type strain 77262). v *T. lunata* (ex-type strain 57647). w *T. minima* (ex-type strain 76016). x, y *T. moganshanensis* (ex-type strain 77338)

Fig. 226 *Thozetella asetula* (F Wu1916, all others Wu12089 holotype). a, d, e Conidiophores and conidiogenous cells. b, c Sporodochial conidiomata with wet spore mass. f-r Microawns. s-u Conidia. Scale bar: a, f-u 5 μ m, b, c 50 μ m

Fig. 227 *Thozetella aunstrupii* (Wu17144, holotype). a, b Microawns. c-e Conidiophores and conidiogenous cells from basal stroma. f Conidia. Scale bar: 5 μ m

Fig. 228 *Thozetella fanglanii* (Wu17587, holotype). a, b Conidiophores and conidiogenous cells. c-m Microawns. n-t Conidia. Scale bar: 5 μ m

Fig. 229 *Thozetella fanglanii* (Wu15230). a Conidiophores and conidiogenous cells. b-l, k Microawns and conidia. j, l-p Conidia. Scale bar: 5 μ m

Fig. 230 *Thozetella guozhongii* (Wu16763). a, b Conidiophores and conidiogenous cells from basal stroma. c-n Microawns. o-u Conidia. Scale bar: 5 μ m.

Fig. 231 *Thozetella guozhongii* Wu16696 (holotype). a Conidiophores and conidiogenous cells from basal stroma. b-i, l-n Microawns. j, k, o, p Conidia. Scale bar: 5 μ m

Fig. 232 *Thozetella hunanensis* (Wu11044c). a-o Microawns. p-r, u-y conidia. s, t Conidiophores and conidiogenous cells. Scale bar: 5 μ m.

Fig. 233 *Thozetella japonica* (Wu16900, holotype). a Sporodochial conidiomata. b, c Conidiophores and conidiogenous cells with inconspicuous collarettes. d-j Microawns. Scale bar: a 20 μ m, b-j 5 μ m

Fig. 234 *Thozetella japonica* (Wu16900, holotype). a-e Microawns. f-k Conidia. Scale bar: 5 μ m

Fig. 235 *Thozetella longispora* (Wu16313, holotype). a, b Conidiophores and conidiogenous cells. c-m Microawns. Scale bar: 10 μ m

Fig. 236 *Thozetella longispora* (Wu16313, holotype). a-m Conidia. Scale bar: 10 μ m

Fig. 237 *Thozetella lunata* (Wu12702, holotype). a, b Conidiophores and conidiogenous cells. c-s Microawns. t-z, aa-ab Conidia. Scale bar: 5 μ m.

Fig. 238 *Thozetella minima* (Wu15211, holotype). a Sporodochial conidiomata. b, d-h Microawns. c Basal stroma and conidiophores. i-l Conidia. Scale bar: a 40 μ m, b-l 10 μ m

Fig. 239 *Thozetella moganshanensis* (Wu17016, holotype). a Basal stroma and conidiophores. b-f Conidia. Scale bar: 10 μ m.

Fig. 240 *Thozetella moganshanensis* (Wu17016, holotype). a-i Microawns. Scale bar: 10 μ m

Fig. 241 *Thozetella palmicola* (Wu17612, holotype). a, b Conidiomata. c-f Conidiophores and conidiogenous cells. Scale bar: a 20 μ m, b 10 μ m, c-f 5 μ m

Fig. 242 *Thozetella palmicola* (Wu17612, holotype). a-m Microawns. n Conidiophores and conidiogenous cells. Scale bar: 5 μ m

Fig. 243 *Thozetella palmicola* (Wu17612, holotype). a, b Conidiophores and conidiogenous cells. c-e Microawns. f-m Conidia. Scale bar: 5 μ m.

Fig. 244 *Thozetella paragigantea* (Wu15205, holotype). a Sporodochial conidiomata. b Basal stroma and conidiophores. c-l Conidia. m, n Microawns. Scale bar: a 40 μ m, b, m, n 20 μ m, c-l 10 μ m

Fig. 245 *Thozetella paragigantea* (Wu15205, holotype). a-h Microawns. Scale bar: a 20 μ m, b-h 5 μ m

Fig. 246 *Thozetella pseudotocklaiensis* (Wu17596, holotype). a, b Sporodochial conidiomata with microawns and spore mass. c Conidiophores and conidiogenous cells. d-h Microawns. i-p Conidia. Scale bar: a 20 μ m, b, d 10 μ m, c, i-p 5 μ m

Fig. 247 *Thozetella pseudotocklaiensis* (Wu17596, holotype). a Conidiophores and conidiogenous cells. b-i Microawns. Scale bar: 5 μ m

Fig. 248 *Thozetella pseudotocklaiensis* (Wu17596, holotype). a, b Conidiophores and conidiogenous cells. c-g Microawns. h-l Conidia. Scale bar: 5 μ m

Fig. 249 *Thozetella septata* (Wu17454, holotype). a Sporodochial conidiomata with basal stroma and wet spore mass. b Sporodochia. c-e Conidiophores and conidiogenous cells. f-r, ab Microawns. s-aa Conidia. Scale bar: a 50 μ m, b, f-g 10 μ m, c-e, h-ab 5 μ m

Fig. 250 *Thozetella suttonii* (Wu1940b, holotype). a-c Part of basal stroma and lateral wall of sporodochia. d-n Conidia. o-p Part of conidia bearing setulae. Scale bar: a 20 μ m, b-p 5 μ m

Fig. 251 *Thozetella tocklaiensis* (Wu17254). a-d Conidiophores and conidiogenous cells. e-n, p-z Microawns. o, aa-aj Conidia. Scale bar: 5 μ m.

Fig. 252 *Thozetella vermiformis* (Wu15201, holotype). a-c Conidiophores and conidiogenous cells. d-k Microawns. l-p Conidia. Scale bar: 5 μ m

Fig. 253 *Thozetella vermiformis* (Wu15201, holotype). a-c Microawns. d, e Microconidia. Scale bar: a, d, e 5 μ m, b, c 20 μ m

Fig. 254 *Thozetella wenyingiae* (Wu15209, holotype). a-f, u-w Conidia. g-t Microawns. Scale bar: 5 μ m

Fig. 255 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Verhulstia*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Chaetosphaeria lentomita* MR1265 was chosen as the outgroup

Fig. 256 Colony of *Thozetella* and *Verhulstia* species on PDA after 20 days at 25°C. a, b *Thozetella vermiformis* (ex-type strain 77561). c, d *T. wenylingae* (ex-type strain 76043). e, f *Verhulstia bififormis* (ex-type strain 77657). g, h *V. elegans* (ex-type strain 77590). i-l *V. minima* (i-j ex-type strain 77723, k-l 77720)

Fig. 257 *Verhulstia bififormis* (Wu17174, holotype). a-c Sporodochia with setae and basal stroma. d Conidiophores and conidiogenous cells. e-z, aa-ac Conidia. ad-ah Fusiform conidia. Scale bar: a-c 20 µm, d-z, aa-ah 5 µm

Fig. 258 *Verhulstia elegans* (Wu17163 holotype). a, b Sporodochial conidiomata with setae. c-g Conidia. Scale bar: a, b 20 µm, c-g 5 µm

Fig. 259 *Verhulstia minima* (a-f Wu17227 holotype, g, h ex-type strain on PDA). a, b Sporodochial conidiomata with setae. c Conidiophores and conidiogenous cells. d-g Conidia. h Chlamydo-spore. Scale bar: a, b 20 µm, c-h 5 µm

Fig. 260 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Dinemasporium*. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Dendrophoma cytosporoides* JQ889273 223.95 was chosen as the outgroup

Fig. 261 Maximum likelihood (ML) tree based on ITS sequence data for the genus *Pseudolachnea* and related fungi. Bootstrap support values ≥ 60 %, Bayesian posterior probability values ≥ 0.95 are shown at the nodes. *Dinemasporium morbidum* CBS12966 was chosen as the outgroup

Fig. 262 Colony of *Dinemasporium* species on PDA after 20 days at 25°C. a, b *Dinemasporium. beijingsensis* (ex-type strain 54964). c-f *D. fanglanii* (c, d ex-type strain 54975; e, f 76979). g, h *D. multisetulum* (ex-type strain 77298). i, j *D. suttonii* (ex-type strain 77032). k-n *D. yongnianii* (k, l ex-type strain 76866; m, n 57357). o, p *D. iriomotense* (43900). p, q *D. japonicum* (44100); r, s *D. morbidum* (43618).

Fig. 263 Colony of *Dinemasporium* species on PDA after 20 days at 25°C. a, b *D. cruciferum* (54977, 54978). c, d *D. japonicum* (44100, 53377). e *D. ligongense* (54665). f, g *D. multisetulum* (54971, 54980). h *D. pseudodecipens* (46487). i, j *D. sinensis* (154678, 54677). k *D. beijingsensis* (ex-type strain 54864). l-p *D. yongnianii* (47605, 54969, 54968, 54970, 54981 respectively).

Fig. 264 Colony of *Brunneodinemasporium*, *Neopseudolachnella* and *Pseudodinemasporium* species on PDA after 20 days at 25°C. a-d *Brunneodinemasporium sinensis* (a, b ex-type strain 58989. c, d 58990). e, f *Neopseudolachnella microsperma* (ex-type strain 54767). g, h *N. moganshanensis* (ex-type strain 77756). i, j *Pseudodinemasporium elegans* (ex-type strain 43192). K-l *P. minimum* (ex-type strain 55372)

Fig. 265 *Dinemasporium beijingsensis* (Wu15095, holotype). a Part of the conidiomata with excipulum and setae. b, c Part of excipulum. d Basal stroma and conidiophores. e Conidiophores and conidiogenous cells from the inner layer of excipulum. f Upper part of the excipulum with rounded or slightly pointed apical cell. Scale bar: a 50 µm, b-d 20 µm, e-f 10 µm

Fig. 266 *Dinemasporium beijingsensis* (Wu15095, holotype). a, b Conidiophores and conidiogenous cells. c-n. Conidia. Scale bar: 10 µm

Fig. 267 *Dinemasporium fanglanii* (Wu17630, holotype). a, b Conidiomata with setae and wet spore mass. c-f poorly developed excipulum with setae and acute apical cells. g-n Conidia. Scale bar: a 50 µm, b 20 µm, c-n 10 µm

Fig. 268 *Dinemasporium fanglanii* (a-q Wu16713, r-w Wu17630). a-l, n-w Conidia. m Conidiophores and conidiogenous cells. Scale bar: 10 µm

Fig. 269 *Dinemasporium ligongense* (Wu15050). a Setae. b Part of excipulum with short setae in out layer. c-d Short setae. Scale bar: a 20 µm, b-d 10 µm

Fig. 270 *Dinemasporium ligongense* (Wu15050). a-d Basal stroma, conidiophores and conidiogenous cells. e-o Conidia. Scale bar: 10 µm

Fig. 271 *Dinemasporium longispora* (IMI238583, holotype). a Vertical section of a conidioma. b Basal stroma. c Lateral wall. d Conidiophores and conidiogenous cells. e Conidia.. Scale bar: a 50 µm, b-e 10 µm

Fig. 272 *Dinemasporium multisetulum* (Wu15100, holotype). a Conidiomata. b-c Excipulum, setae and superficial hyphae. d Conidia. Scale bar: a 50 µm, b 20 µm, d 5 µm

Fig. 273 Conidia of *Dinemasporium multisetulum* (a-n Wu15105, o-t Wu15098). Scale bar: 5 µm

Fig. 274 *Dinemasporium parastrigosum* (Wu16519). a Conidiomata. b Excipulum and setae. c, d Conidiophores and conidiogenous cells. e-o Conidia. Scale bar: a 100 µm, b 20 µm, c-o 5 µm

Fig. 275 *Dinemasporium sinense* (Wu15058). a, b Part of conidiomata with setae and excipulum. c-e Setae and excipulum. f Out layer of excipulum showing end ends with rounded apex. g Excipulum with conidiophores. Scale bar: a 100 µm, b-e, g 20 µm, f 10 µm

Fig. 276 *Dinemasporium sinense* (Wu15058). a Part of conidiomata with setae and excipulum. b Out layer of excipulum showing end with rounded apex. c Conidiophores and conidiogenous cells. d-z Conidia. Scale bar: a 20 µm, d-aa 5 µm

Fig. 277 *Dinemasporium suttonii* (Wu16992, holotype). a Conidiomata. b, c Excipulum. d Setae. e-h, j-m Conidia. i Conidiophores and conidiogenous cells. Scale bar: a 100 µm, b, d 20 µm, c, e-m 10 µm

Fig. 278 *Dinemasporium tubakii* (Wu13446, holotype). a Conidiomata. b, c Setae. d-f Conidia. Scale bar: a 50 μ m, b, c 10 μ m, d-f 5 μ m

Fig. 279 *Dinemasporium yongnianii* (Wu16535, holotype). a Conidiomata with setae. b Part of excipulum. c, d Part of excipulum with conidiophores and conidiogenous cells. e Conidiophores and conidiogenous cells bearing developing conidia. f-j Conidia. Scale bar: a 50 μ m, b-d 20 μ m, e-j 10 μ m

Fig. 280 *Brunneodinemasporium sinense* (Wu13294). a-c Conidiomata with setae. d Excipulum and setae. Scale bar: b-d 100 μ m, a 10 μ m

Fig. 281 *Brunneodinemasporium sinense* (Wu13294). a-d Conidiophores and conidiogenous cells. e-n Conidia. Scale bar: 5 μ m.

Fig. 282 *Pseudodinemasporium elegans* (Wu12464, holotype). a Conidiomata with setae. b, c Not well-developed excipulum with setae. d, e Conidiophores and conidiogenous cells. f-n Conidia. Scale bar: a 50 μ m, b-n 5 μ m

Fig. 283 *Pseudodinemasporium minimum* (Wu1382i, holotype). a, b Part of excipulum. c-g Conidia. Scale bar: 5 μ m

Fig. 284 *Neopseudolachnella microsperma* (Wu15057, holotype). a Conidiomata. b Setae. c-f Conidiophores and conidiogenous cells. g Part of conidiomata showing origin of setae and conidiophores. h Basal stroma from which setae and conidiophores are formed. i-r Conidia. Scale bar: a 40 μ m, b 20 μ m, g 10 μ m, c-f, h-r 5 μ m

Fig. 285 *Neopseudolachnella moganshanensis* (Wu16980, holotype). a Conidiomata. b-d Setae. e-g Apical part of setae with rough wall. h Conidiophores and basal part of setae. i-j Basal stroma and basal part of setae. Scale bar: a 40 μ m, b-d 10 μ m, e-j 5 μ m

Fig. 286 *Neopseudolachnella moganshanensis* (Wu16980, holotype). a Basal stroma with setae and conidiophores. b-f Conidiophores and conidiogenous cells. g-q Conidia. Scale bar: 5 μ m

Fig. 287 Colony of *Pseudolachnella* species on PDA after 20 days at 25°C. a, b *Pseudolachnella minima* (ex-type strain 55219). c, d *P. tengii* (ex-type strain 47882). e-g. *P. yunnanensis* (e, f ex-type strain 58842. g 45671). h *P. scolecospora* (54233)

Fig. 288 *Pseudolachnea macrospora* (IMI34705, holotype). a Vertical section of a conidioma. b Conidiophores and conidiogenous cells. c Conidia. a 50 μ m, b-c 10 μ m

Fig. 289 *Pseudolachnella minima* (Wu12374). a-d Conidiophores and conidiogenous cells with developing conidia. e-q Conidia. Scale bar: 5 μ m

Fig. 290 *Pseudolachnella minima* (Wu12378, holotype). a, b Part of conidiomata. c Basal stroma. d-f Conidiophores and conidiogenous cells with developing conidia. g-j Conidia. Scale bar: a, b 20 μ m, c-j 5 μ m

Fig. 291 *Pseudolachnella scolecospora* (Wu12227). a Part of conidiomata. b Conidiophores and conidiogenous cells with developing conidia. c Setae. d-i Conidia. Scale bar: a 20 μ m, c 10 μ m, b, d-i 5 μ m

Fig. 292 *Pseudolachnea tengii* (Wu7544, holotype). a Vertical section of a conidioma. b Setae. c Basal stroma and conidiophores. d Conidiophores and conidiogenous cells. e Conidia. Scale bar: a 50 μ m, b-e 10 μ m

Fig. 293 *Pseudolachnella yunnanensis* (Wu12930). a Part of conidiomata. b-l Conidia. Scale bar: a 20 μ m, b-l 5 μ m

Fig. 294 *Pseudolachnella yunnanensis* (12902, holotype) a Conidiophores and conidiogenous cells with developing conidia. b-k Conidia. Scale bar: 5 μ m

Fig. 295 *Hoehneliella perplexa* (Wu13238). a Synnematos conidiomata with cupulate fertile region and setae. b Setae. c Low part of conidiomata with filamentous hyphae. d Subhyaline hyphae surrounding the fertile region in the upper part of conidiomata. e Conidiophores and conidiogenous cells. f-q Conidia. Scale bar: a, b 20 μ m, c 10 μ m, d-q 5 μ m

Fig. 296 *Hoehneliella triseptata* (Wu2252). a Synnematos conidiomata with setae and wet spore mass. b Basal part of setae. c-h Conidia. Scale bar: a 50 μ m, b-h 5 μ m

Fig. 297 Colony of non chaetosphaeriaceous fungal species on PDA after 20 days at 25°C. a, b *Phaeochloridium gamsii* (ex-type strain 78202). c, d *Sinochloridium bambusicola* (ex-type strain 76961). e, f *Xyladictyochaeta eucalypti* (43979). f, h *Xylolentia matsushimae* (43170). i, j *Tubulicolla cylindrospora* (43188). k, l *Rhopalophora hainanensis* (ex-type strain 78512)

Fig. 298 *Phaeochloridium gamsii* (Wu17434, holotype). a-g Conidiophores and conidiogenous cells. h-r Conidia. Scale bar: 5 μ m

Fig. 299 *Phaeochloridium geniculata* (Wu2735b). a-g. Conidiophores, conidiogenous cells and conidia. h, i Conidia. Scale bar: 5 μ m

Fig. 300 *Phaeochloridium phaeosporum* (Wu12504). a-d Conidia. e-h Conidiophores, conidiogenous cells and conidia. Scale bar: h 20 μ m, a-g 5 μ m

Fig. 301 *Sinochloridium bambusicola* (Wu16678, holotype). a-f Conidiophores and conidiogenous cells. g-j Conidia. Scale bar: 5 μ m

Fig. 302 *Xylolentia palmicola* (Wu12519, holotype). a-o Conidiophores, conidiogenous cells and conidia. p-q Conidia. . Scale bar: 10 μ m for A-C. Scale bar: 5 μ m for D-Q.

Fig. 303 *Xyladictyochaeta eucalypti*. a Conidiophores, conidiogenous cells and attached conidia. b. Conidia. Scale bar: 10 μ m

Table 1. New taxa, isolate information and GenBank accession numbers for new sequences determined for this study

Species	Substrate	Geographical location	Specimen	Strain	Type Status	GenBank accession number	
						ITS	LSU
<i>Arcuatosporea ellisii</i>	<i>Cinnamomum</i> sp., dead leaf	China, Guangdong	17147a	CGMCC3.20745	T	OL628394	
<i>Arcuatosporea hughesii</i>	leaf litter	China, Guangdong	12237	CGMCC3.20646	T	OL627740	OL655098
<i>Arcuatosporea lunata</i>	leaf litter	China, Guangdong	17248	CGMCC3.2075	T	OL628450	
<i>Arcuatosporea septata</i>	leaf litter	China, Hunan	6039c	CGMCC3.20644	T	OL627664	
<i>Arcuatosporea sinensis</i>	<i>Cinnamomum</i> sp., dead leaf	China, Zhejiang	13025	CGMCC3.20653	T	OL627845	
<i>Arcuatosporea suttonii</i>	leaf litter	China, Hainan	17630	CGMCC3.20674	T	OL628653	
<i>Arcuatosporea yunnanensis</i>	<i>Quercus</i> sp., decaying fruit	China, Yunnan	7244B	NN047742	T	OL627671	OL655067
<i>Brachydictyochaeta bulliformis</i>	leaf litter	China, Guangdong	17533a	CGMCC3.20759	T	OL628591	
<i>Brunneodinemasporium sinense</i>	<i>Quercus serrata</i> , leaf litter	China, Zhejiang	13294a	CGMCC3.20659	T	OL627952	
<i>Calceisporiella sinensis</i>	dead branch	China, Guangdong	1900a	CGMCC3.20635	T	OL627627	OL655035
<i>Catenularia elegans</i>	dead branches	China, Hunan	6078		T		
<i>Chloridium crousii</i>	dead branch	China, Guangxi	1328b	CGMCC3.20701	T	OL627543	OL655003
<i>Chloridium culmicola</i>	bamboo, decaying culm	China, Yunnan	2606b	CGMCC3.20639	T	OL627650	OL655054
<i>Chloridium cylindrosporellum</i>	bamboo, rotten leaf	China, Sichuan	13210	CGMCC3.20719	T	OL627899	
<i>Chloridium jilinense</i>	rotten wood	China, Jilin	5039	CGMCC3.2064	T	OL627659	OL655058
<i>Chloridium kirkii</i>	rotten wood	China, Guangxi	1459b	CGMCC3.20703	T	OL627588	OL655020
<i>Chloridium proliferatum</i>	<i>Entada phaseoloides</i> , decaying fruit	China, Hainan	17684b	CGMCC3.20766	T	OL628678	
<i>Chloridium setosum</i>	<i>Pinus</i> sp., rotten cone	China, Zhejiang	17032a	CGMCC3.20741	T	OL628345	
<i>Chloridium shangsiense</i>	dead branch	China, Guangxi	1285b	CGMCC3.20632	T	OL627574	OL655016
<i>Chloridium sinense</i>	<i>Leguminosae</i> , rotten seed	China, Zhejiang	17056a	CGMCC3.20743	T	OL628375	
<i>Chloridium tropicale</i>	leaf litter	China, Yunnan	YN004	CGMCC3.20725	T	OL628018	OL655153
<i>Chloridium xishuangbanense</i>	leaf litter	China, Yunnan	YN13a	CGMCC3.20723	T	OL628006	OL655149
<i>Codinaea clavatophora</i>	leaf litter	China, Yunnan	8015	CGMCC3.20792	T	OL627680	
<i>Codinaea dinghushanensis</i>	<i>Smilax</i> sp., leaf litter	China, Guangdong	12155	CGMCC3.20647	T	OL627723	
<i>Codinaea fanglanii</i>	leaf litter	China, Zhejiang	13345	CGMCC3.20658	T	OL627950	OL655146
<i>Codinaea kendrickii</i>	bamboo, rotten leaf	China, Sichuan	13208	CGMCC3.20718	T	OL627885	
<i>Codinaea latisporea</i>	bamboo, rotten leaf	China, Zhejiang	17038	CGMCC3.20739	T	OL628329	
<i>Codinaea minima</i>	<i>Arundo donax</i> , dead culm	China, Guangdong	1942b		T		
<i>Codinaea oxenbolliae</i>	leaf litter	China, Sichuan	17179	CGMCC3.20747	T	OL628418	
<i>Codinaea puerensis</i>	leaf litter	China, Yunnan	15148	CGMCC3.20724	T	OL628008	
<i>Codinaea pyriformis</i>	leaf litter	China, Yunnan	2746b1	CGMCC3.20707	T	OL627653	OL655056
<i>Codinaea siamensis</i>	leaf litter	China, Yunnan	15214	CGMCC3.20800	T	OL628033	
<i>Codinaea tengii</i>	palm, dead stem	China, Nanning	1645c		T		

<i>Codinaea trisetula</i>	dead branch	China, Guangdong	1930c	CGMCC3.20636	T	OL627631	OL655039
<i>Codinaeella brevissima</i>	leaf litter	China, Sichuan	17241	CGMCC3.20804	T	OL628427	
<i>Codinaeella cannonii</i>	leaf litter	China, Yunnan	15206a	CGMCC3.20728	T	OL628027	
<i>Codinaeella cinnamomi</i>	<i>Cinnamomum</i> sp., dead leaf	China, Sichuan	13202	CGMCC3.20717	T	OL627883	
<i>Codinaeella kuthubutheenii</i>	dead branch	China, Guangdong	17529	CGMCC3.20758	T	OL628585	
<i>Codinaeella latispora</i>	leaf litter	China, Hunan	6015	CGMCC3.20789	T	OL627661	
<i>Codinaeella multispuruloca</i>	<i>Quercus dentata</i> , decaying fruit	China, Hebei	17413a	CGMCC3.20754	T	OL628541	
<i>Codinaeella paralambertiae</i>	<i>Rhododendron</i> sp., decaying leaf	UK, Scotland	16511	CGMCC3.20733	T	OL628174	OL655201
<i>Dinemasporium beijungense</i>	grass, decaying culm	China, Beijing	15095	CGMCC3.2065	T	OL627785	OL655115
<i>Dinemasporium fanglanii</i>	grass, decaying leaf	China, Guangdong	16730a	CGMCC3.20668	T	OL628233	
<i>Dinemasporium longisporum</i>	<i>Bothriochloa</i> sp., dead culm	USA, Texas	IMI1238583		T		
<i>Dinemasporium multisetulum</i>	grass, decaying culm	China, Beijing	15100	CGMCC3.20651	T	OL627790	OL655117
<i>Dinemasporium suttonii</i>	bamboo, dead leaf	China, Zhejiang	16993	CGMCC3.20802	T	OL628308	OL655220
<i>Dinemasporium tubakii</i>	grass, decaying leaf	China, Jiangsu	13446a	CGMCC3.20798	T	OL627994	
<i>Dinemasporium yongnianii</i>	grass, decaying culm	China, Shan'xi	16535	CGMCC3.20734	T	OL628210	
<i>Ellisembia reblovae</i>	bamboo, dead culm	China, Guangdong	1913b	CGMCC3.20705	T	OL627632	OL655040
<i>Eucalyptostroma hongluosiense</i>	<i>Cyclobalanopsis</i> sp., rotten fruit	China, Jiangsu	16890a	CGMCC3.20669	T	OL628282	
<i>Eucalyptostroma oxenbolliae</i>	leaf litter	China, Guangdong	16273	CGMCC3.20664	T	OL628120	OL655183
<i>Eucalyptostromiella beijingensis</i>	<i>Quercus</i> sp., decaying leaf	China, Beijing	17319b	CGMCC3.20753	T	OL628500	
<i>Fuscocatenula bambusicola</i>	bamboo, dead culm	China, Ningxia	1182b		T		
<i>Kionochaeta beijingensis</i>	<i>Quercus</i> sp., decaying fruit	China, Beijing	17342a	CGMCC3.20752	T	OL628478	OL655246
<i>Kionochaetiella ivoriensis</i>	leaf litter	Ivory Coast	JCM9876	CBS374.76	T		
<i>Linkosia filiformis</i>	rodeen wood	China, Hubei	8227	CGMCC3.20793	T	OL627687	OL655075
<i>Linkosia gelatinosa</i>	rotten wood	China, Hubei	8228c	CGMCC3.20709	T	OL627688	OL655076
<i>Linkosia multiseptum</i>	bamboo, dead culm	China, Guangxi	1374b	CGMCC3.20786	T	OL627557	OL655008
<i>Linkosia rostrata</i>	bamboo, dead culm	China, Hunan	6030b	CGMCC3.2079	T	OL627662	OL655059
<i>Lunatochaeta shenzhenensis</i>	leaf litter	China, Guangdong	17504a	CGMCC3.20757	T	OL628577	OL655258
<i>Menispora paraciliata</i>	<i>Pinus</i> sp., dead cone	China, Zhejiang	17033b	CGMCC3.20742	T	OL628367	
<i>Menispora paratortuosa</i>	<i>Platanus occidentalis</i> , decaying fruit	China, Zhejiang	17005a	CGMCC3.20748	T	OL628428	OL655236
<i>Menisporopsis biformis</i>	palm, decaying petiole	China, Guangdong	17473	CGMCC3.20805	T	OL628559	OL655255
<i>Menisporopsis dinemasporioides</i>	leaf litter	China, Guangdong	12102	CGMCC3.20711	T	OL627718	OL655089
<i>Menisporopsis elegans</i>	<i>Fagus</i> sp., dead leaf	China, Guangdong	12183	CGMCC3.20795	T	OL627730	OL655091
<i>Menisporopsis macrospora</i>	leaf litter	China, Sichuan	17184a	CGMCC3.20674	T	OL628398	OL655231
<i>Minimidochium dictyochoetum</i>	leaf litter	China, Yunnan	15158	CGMCC3.2066	T	OL628010	OL655150
<i>Minimidochium triseptata</i>	<i>Smilax</i> sp., leaf litter	China, Guangdong	2083p		T		
<i>Monosporoschisma elegans</i>	palm, dead petiole	China, Hainan	5520		T		
<i>Morrisiella reblovae</i>	dead branches	China, Yunnan	9002		T		
<i>Multiguttulispora paratriseptata</i>	dead branch	China, Guangdong	12457	CGMCC3.20796	T	OL627820	OL655127

<i>Neopseudolachnea minima</i>	grass, decaying culm	China, Hebei	15057	CGMCC3.20649	T	OL627783	OL655113
<i>Neopseudolachnella moganshanensis</i>	grass, decaying culm	China, Zhejiang	16980	CGMCC3.20675	T	OL628463	OL655244
<i>Neotainosphaeria microsperma</i>	dead branch	China, Guangdong	1928a	CGMCC3.20788	T	OL627633	OL655041
<i>Nimesporella aunstrupii</i>	leaf litter	China, Guangdong	12202	CGMCC3.20648	T	OL627752	OL655105
<i>Nimesporella riisgaardii</i>	palm, dead petiole	China, Zhejiang	13349a	CGMCC3.20797	T	OL627965	
<i>Oxenbollia lunatospora</i>	leaf litter	China, Hunan	6065	CGMCC3.20641	T	OL627663	OL655060
<i>Paracodinaea minima</i>	<i>Cinnamomum</i> sp., dead leaf	China, Guangxi	1559a	CGMCC3.20654	T	OL627597	
<i>Paracodinaea japonica</i>	dead fruit of tree	Japan, Tsu	16913	CGMCC3.20663	T	OL628342	
<i>Paracryptophiale pirozynskii</i>	dead branch	China, Guangdong	2008	NN044888	T	OL627641	OL655047
<i>Paragaeumannomyces asetulus</i>	dead bark	China, Guangdong	12131		T		
<i>Paragaeumannomyces nawawii</i>	plam, rotten material	China, Guangdong	12655		T		
<i>Phaeochloridium gamsii</i>	banana, leaf	China, Guangdong	17434a	CGMCC3.20755	T	OL628548	
<i>Phaeostalagmus minimus</i>	leaf litter	China, Guangdong	12182		T		
<i>Pseudodinemasporium elegans</i>	dead branches	China, Guangdong	12464	CGMCC3.20655	T	OL627829	OL655131
<i>Pseudodinemasporium minimum</i>	<i>Cinnamomum</i> sp., decaying leaf	China, Guangxi	1382i	CGMCC3.20702	T	OL627572	OL655015
<i>Pseudolachnea macrospora</i>	<i>Sarothaumus scoparius</i>	UK, Petit Port	IMI134705		T		
<i>Pseudolachnella minima</i>	bamboo, decaying culm	China, Guangdong	12378	CGMCC3.20714	T	OL627799	
<i>Pseudolachnella tengii</i>	bamboo, decaying culm	China, Yunnan	7544	CGMCC3.20791	T	OL627679	OL655070
<i>Pseudolachnella yunnanensis</i>	bamboo, decaying culm, big species	China, Yunnan	12902	CGMCC3.20720	T	OL627929	
<i>Pseudothozetella lunata</i>	leaf litter	China, Yunnan	15207	CGMCC3.20661	T	OL628034	OL655157
<i>Rattania falcata</i>	leaf litter	China, Guangdong	16324	CGMCC3.20731	T	OL628131	
<i>Rattania intermedia</i>	dead branches	China, Guangdong	1998d	CGMCC3.20638	T	OL627646	OL655050
<i>Rhopalophora hainanensis</i>	<i>Bauhinia purpurea</i> , seed pod	China, Hainan	17643	CGMCC3.20807	T	OL628666	
<i>Riisgaardia longispora</i>	rotten wood	China, Hubei	8333	CGMCC3.20794	T	OL627701	OL655085
<i>Riisgaardia obclavata</i>	bamboo, dead culm	China, Guangxi	1266a	CGMCC3.20787	T	OL627568	OL655013
<i>Sinochloridium bambusicola</i>	bamboo, dead culm	China, Guangdong	16678a	CGMCC3.20735	T	OL628215	
<i>Sporendocladia beijingsensis</i>	<i>Quercus</i> sp., decaying fruit	China, Beijing	BJ19-3	CGMCC3.20738	T	OL628290	OL655217
<i>Stephembruneria microsperma</i>	bamboo, dead culm	China, Guangxi	1318a	NN043126	T	OL627563	
<i>Stilbochaeta ejneri</i>	dead branch	China, Sichuan	13224A	CGMCC3.20716	T	OL627877	OL655138
<i>Stilbochaeta lingnanensis</i>	leaf litter	China, Guangdong	16279a	CGMCC3.20666	T	OL628162	OL655198
<i>Stilbochaeta lunata</i>	leaf litter	China, Guangdong	17536	CGMCC3.20806	T	OL628587	
<i>Stilbochaeta minteri</i>	leaf litter	China, Guangdong	16270	CGMCC3.20732	T	OL628135	OL655188
<i>Stilbochaeta sinensis</i>	leaf litter	China, Guangdong	12195	CGMCC3.20713	T	OL627747	
<i>Tainosphaeria cupulata</i>	<i>Acacia</i> sp., decaying seed pod	China, Guangdong	17579	CGMCC3.20761	T	OL628617	
<i>Tainosphaeria microsperma</i>	<i>Pinus</i> sp., rotten cone	China, Zhejiang	16152a	CGMCC3.20729	T	OL628074	OL655170
<i>Tainosphaeria phialogeniculata</i>	leaf litter	China, Yunnan	15202	CGMCC3.20799	T	OL628025	
<i>Tainosphaeria verrucophora</i>	leaf litter	China, Hainan	17647b1	CGMCC3.20765	T	OL628677	
<i>Tainosphaeriella sivanesanii</i>	<i>Acacia</i> sp., decaying fruit	China, Guangdong	17575	CGMCC3.20767	T	OL628636	
<i>Thozetella asetula</i>	dead seed	China, Guangdong	12089	CGMCC3.20645	T	OL627735	OL655094
<i>Thozetella aunstrupii</i>	leaf litter	China, Guangdong	17144a	CGMCC3.20744	T	OL628392	

<i>Thozetella fanglanii</i>	rotten wood	China, Beijing	15230	CGMCC3.20662	T	OL628043	OL655159
<i>Thozetella guozhongii</i>	palm, decaying leaf	China, Guangdong	16696a	CGMCC3.20667	T	OL628217	OL655204
<i>Thozetella hunanensis</i>	leaf litter	China, Hunan	11044c	CGMCC3.20671	T	OL627706	OL655087
<i>Thozetella japonica</i>	rotten fruit of unidentified tree	Japan, Tsu	16900a	CGMCC3.2067	T	OL628292	OL655218
<i>Thozetella longispora</i>	leaf litter	China, Guangdong	16313	NN076704	T	OL628158	
<i>Thozetella lunata</i>	palm, decaying leaf	China, Guangdong	12701a	CGMCC3.20657	T	OL627903	OL655141
<i>Thozetella minima</i>	leaf litter	China, Yunnan	15211	CGMCC3.20726	T	OL628020	
<i>Thozetella moganshanensis</i>	<i>Platanus occidentalis</i> , decaying bark	China, Zhejiang	17016a	CGMCC3.20671	T	OL628327	OL655223
<i>Thozetella palmicola</i>	palm, decaying seed	China, Hainan	17612	CGMCC3.20763	T	OL628651	
<i>Thozetella paragiganitea</i>	leaf litter	China, Yunnan	15205a	CGMCC3.20727	T	OL628026	
<i>Thozetella pseudotocklaiensis</i>	<i>Delonix regia</i> , decaying seed pod	China, Hainan	17596a	CGMCC3.20762	T	OL628638	
<i>Thozetella septata</i>	palm, decaying petiole	China, Guangdong	17454a	CGMCC3.20756	T	OL628553	
<i>Thozetella suttonii</i>	dead branches	China, Guangdong	1940b	CGMCC3.20637	T	OL627636	OL655043
<i>Thozetella vermiformis</i>	rotten seed	China, Sichuan	17201a	CGMCC3.20746	T	OL628402	
<i>Thozetella wenyingiae</i>	leaf litter	China, Yunnan	15209a	CGMCC3.20655	T	OL628030	OL655156
<i>Verhulstia biformis</i>	<i>Rubus</i> sp., dead leaf	China, Sichuan	17175b	CGMCC3.20749	T	OL628435	
<i>Verhulstia elegans</i>	leaf litter	China, Sichuan	17163a	CGMCC3.20803	T	OL628414	OL655233
<i>Verhulstia minima</i>	leaf litter	China, Sichuan	17227a	CGMCC3.20674	T	OL628454	
<i>Xyladelphia parapulchriseta</i>	dead branch	China, Guangdong	17090a	CGMCC3.20751	T	OL628464	OL655245
<i>Xyladelphia sinensis</i>	plam, dead petiole	China, Guangdong	17453b	CGMCC3.2076	T	OL628598	OL655261

colour figure

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