

# Momordica Janarthanamii (Cucurbitaceae); A Remarkable New Species From Northern Western Ghats, India

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## Short Report

**Keywords:** Cucurbitaceae, Dioecious species, India, Momordica, Spine gourd, Taxonomy, Vegetable

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# Abstract

*Momordica janarthanamii*, a new species L., is described and illustrated from northern Western Ghats, India. The new species is closely related to *Momordica dioica* Roxb. ex Willd. Colored photographs, economical value, ecological note and distribution of the new species are provided. A key for the dioecious species of *Momordica* from India has also been provided to facilitate identification.

## Introduction

*Momordica* L. is one of the largest genera of the Cucurbitaceae and distributed throughout tropics of the old world (Mabberley 2017). Schaefer and Renner (2010) reported 59 species while Mabberley (2017) reported 45 species in the genus. In Asia, *Momordica* is represented by 12 taxa, among them 6 species, one subspecies and one variety are reported from India (Bharathi and Joseph 2013).

*Momordica* is diversified by having annual to tuberous perennial and monoecious to dioecious in habit. Phylogenetically monoecious group of the genus has evolved from dioecious species (Schaefer and Renner 2010). Recently karyomorphological and molecular work of Indian *Momordica* carried out by Ghosh et al. (2020). Many species of the genus are well known for their use as fruit vegetable; however, only *Momordicacharantia* L. is widely cultivated for its edible and medicinal properties. In India, along with wild occurrence almost all 8 taxa are locally cultivated.

During plant exploration of the northern Western Ghats of Maharashtra, authors had collected an interesting dioecious species of *Momordica*. The species is remarkable because of its orbicular conspicuous bracts of male flowers. After perusal of literature (Trimen 1894; Cook 1903; Gamble 1935; Chakravarty 1982; de Wilde and Duyfjes 2002, Joseph and Antony 2007, 2010; Bharathi and Joseph 2013) it was found that, species is closely related to *Momordica dioica* Roxb. ex Willd., which is distributed in Bangladesh, India, Pakistan and Sri Lanka but differs in many remarkable characters (Table.1). After examination of a type specimen of *Momordicadioica* (660 597 housed in BR) and aforesaid literature including protologue of *M.dioica* (Willdenow 1805) it is confirmed that, it's an interesting undescribed species of the genus *Momordica*. Therefore, it is described and illustrated here as a *Momordicajanarthanamii* Gosavi, Gholave Madhav & Kambale.

## Materials And Methods

The specimens of *Momordica* were collected from Karanjali ghat (Kumbharbari), Nashik in July 2020. The morphological characters were studied under Leica EZ4 Stereo Zoom microscope. Diagnostic characters of the unknown species were compared with protologue and type specimens of its closely related species *i.e.* *M. dioica*. Photographs in the field and different parts of the plants were taken by using M50 Canon camera. The Type specimens have been deposited at BSI, CAL and SUK herbaria.

## Results

## Taxonomy

*Momordicajanarthanamii* Gosavi, Gholave, Madhav & Kambale, *sp. nov.* Type: INDIA, Maharashtra, Nashik District, Karanjali Ghat (Kumbharbari), 20°15'37.04"N, 73°36'58.28"E, 646 m, 07 July 2020, K.V.C. Gosavi & A.R. Gholave 5141 (holotype CAL!, isotypes BSI!, SUK!) (Figs. 1, 2, 3, 4).

## Diagnosis

*Momordicajanarthanamii* is closely related to *M. dioica* but differs in buds of male flowers not subtended in bract (vs. subtended in bract), bracts of male flowers orbicular, 0.4–0.5 cm long, not covers pedicel and glandular along margins (vs. reniform, cucullate, up to 1 cm long, covers pedicel and eglandular along margins), bracts of female flowers ovate and glandular along margins (vs. cucullate and eglandular), sepals of female flowers 10–12 mm long, linear elliptic to ensiform, glandular along margins and acute at apex (vs. 3–6 mm long, elliptic to oblong, eglandular along margins and mucronulate at apex), seeds hexagonal in shape and 7–9 mm long (vs. round to slightly ovoid in shape and 2–3 mm across).

Perennial, dioecious, tuberous, tendrillar climbers, up to 10 m high. Tubers elongated or irregularly bulged at maturity. Stems pentangular, inter-nodes 5–15 cm long, minutely hirsute, nodes pilose to villous at either side of leaf base or base of branches. Tendrils simple, 5–17 cm long, basal 2–5 cm long part uncoiled, upper 3–12 cm long part coiled. Petioles 2–9 cm × 1.5–4 mm, villous at the apical region, channeled, channel ribs sparsely scaberulous to glabrous. Lamina ovate to broadly triangular in outline, rarely hastate, entire or 3–5 lobed, 6–13 × 5–15 cm, base cordate, apex acute or acuminate, margin undulate or crenulate to coarsely denticulate, scabrous, lateral veins 3 paired; lower vein pair inconspicuous, short, running near to basal margin, upper 2 pairs fused at base, secondary and tertiary veinlets form denticulate or mucronulate at the end of margin, bulbous based short hairs scattered on upper surface, cystoliths on lower surface, veins of lower surface sparsely hirsute to pilose. Male flower solitary to 5–8 in scorpioid cymes; male flowers 5–9 × 4–6 cm, axillary; solitary flower pedicel 4.5–8 cm × 1.5–2 mm long, thick, angled, articulated above the bract, hirsute to pilose. Nodal bracts on cyme, lower 0–3 sterile, margins glandular to eglandular, acute to acuminate at apex. Bracts at the tip of pedicel, orbicular, 4–5 × 5–6 mm, persistent, margins covered with glands, pilose at apical margin, apex dark green, thick, acute, ca. 10 nerved, lower surface pilose hairy. Receptacle tube funnel shape, 0.8–1 × 0.4–0.5 cm, purplish black, echinate to pilose or mixed. Sepals 5, free, 0.8–1 × 0.2–0.4 cm, elliptic-oblong, yellowish purple at base, greenish yellow at apex, margins ciliate to short pilose, sparsely 5-nerved, acute at apex, both surfaces sparsely hairy. Petals 5, free, obovate, 3–4 × 2.3–3 cm, bright yellow, veins prominent, villous to pubescent on outer surface. Stamens 3, two with a pair of anthers, one with a single anther; filaments whitish yellow 3–4 mm long, glabrous or sparsely hairy; anthers 2–3 × 1.5–2 mm, extrorse, thecae dull black, S-shaped. Female flowers 5–10 × 4–7.5 cm, solitary, in the leaf axils; pedicel 3.5–8 cm × 1.5–2 mm, angled, hirsute to pilose. Bracts at middle of pedicel, 1.0–2.0 × 0.8–1.5 mm, persistent, ovate, greenish white, few glands at margins, sparsely hairy, apex acute, dark green. Sepals 5, free, 10–12 × 1.5–2 mm, linear elliptic to ensiform, green, margins sparsely hairy, few glands on margins, sparsely 5-nerved, acute at apex, with dark green tip. Petals 5, free, ovate, 3–5 × 2.2–4 cm, bright yellow,

veins prominent, villous to pubescent on outer surface. Ovary ovoid, 1–1.5 × 0.4–0.6 cm, densely covered with ca. 1 mm long soft papillae. styles 3–5 mm long, whitish green, stigma 4 × 8 mm, 3 lobed, each lobe bifid. Fruits broadly ellipsoid to ovoid, or with round base and rostrate apex, 3.5–6 × 2–3 cm, dark green to whitish green, turning bright orange on ripening, densely covered with spines; spines soft, 2–3 mm long, terete or slightly compressed. Pulp sweet when ripe, carmine red. Seeds black, shining, losing its lustre on drying, hexagonal shaped, sculptured on faces with irregular blotches of furrows and ridges, 7–9 × 5–6.5 mm, seed coat hard, brittle; endosperm oily, aromatic.

**Phenology:** Flowering and fruiting— July to August.

**Distribution:** India: Maharashtra: Nashik district.

**Local name:** Kartule (Marathi).

**Specimens examined:** INDIA, Maharashtra, Nashik Districts, Karanjali Ghat (Kumbharbari), 20°15'37.04"N, 73°36'58.28"E, 646 m, 07 July 2020, *K.V.C. Gosavi & A.R. Gholave* 5141(male) (holotype CAL!, isotypes BSI!, SUK!).

**Additional specimens examined:** INDIA, Maharashtra, Nashik Districts, Karanjali Ghat, 07 July 2020, *K.V.C. Gosavi & A.R. Gholave* 5142 (female); 20 July 2020, *K.V.C. Gosavi & N.A. Madhav* 5151(male); 20 July 2020, *K.V.C. Gosavi & N.A. Madhav* 5152 (female); Tryambakeshwar, Vatvad, 19 July 2020, *S.S. Kambale & A.R. Gholave* ARG-1001 (male) (housed in BSI).

**Economic value:** Fruits of the species are used as vegetable by localites. The unripe fruits are also sold in local markets.

**Ecological note:** *Momordicajanarthanamii* is commonly grows from foothills to almost top of Karanjali ghat and also at hills of Tryambakeshwar in Nashik districts. Thus, there is need to explore the species to estimate its IUCN status. At present it is considered here as Data Deficient (DD, IUCN, 2019). The species is commonly found on shrubby species and bushes like *Carissacarandas* L., *Strobilanthescallosa* (Nees) Bremek, *Capparissepriaria* L., *Lantanacamara* L. and *Tectonagrandis* L.f.

**Etymology:** The specific epithet is in honor of Prof. Malapati Kuppuswamy Janarthanam, Department of Botany, Goa University for his valuable voluminous contribution in the field of angiosperm taxonomy and conservation of the rare and endemic species of Western Ghats, India.

## Discussion And Conclusion

Presently, *Momordica* is represented by seven species, one subspecies and one variety in India. The new species described herein can also be utilized as a new crop. After screening for its nutritious properties and food value it will be useful in the breeding programmes to improve the cultivated species of *Momordica*.

## Key to the dioecious species of Indian *Momordica*

- 1a. Inner 3 petals with black purple blotch 2
- 1b. Petals of flower without any black purple blotch 3
- 2a. Leaf margins dentate; petioles eglandular *M.*  
*subangulata*
- subsp. *renigera*
- 2b. Leaf margins undulate; petioles gland dotted *M.*  
*cochinchinensis*
- 3a. Buds of male flower subtended in bract; bracts of male flowers  
reniform, cucullate; swollen, covers pedicel 4
- 3b. Buds of male flowers not subtended in bract; bracts of male  
flowers orbicular; not covers pedicel *M. janarthanamii*
- 4a. Sepals in male flowers blackish purple, broad,  
round or scarious at apex *M. sahyadrica*
- 4b. Sepals in male flowers whitish yellow, mucronulate at apex *M. dioica*

## Declarations

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**Availability of data and material:** Type of the new species will be submitted in the mentioned herbaria after published manuscript.

**Code availability** NA

**Authors' contributions** KVCG: Collected type and extra specimens, identified and taken photographs of new species, wrote manuscript and prepared type specimens. ARG: Collected type and extra specimens,

identified and taken photographs of new species, reviewed the manuscript. NAM: Drawn illustration, collected and prepared extra specimens. SSK: Identified, analysed characters with protologue and type specimens of allied species, reviewed the manuscript.

**Ethics approval:** NA

**Consent to participate:** NA

**Consent for publication:** NA

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## Tables

**Table 1.** Comparison of diagnostic characters between *Momordica dioica* Roxb. ex Willd. and *M. janarthanamii* sp. nov.

Sr. no.	Characters	<i>M. dioica</i>	<i>M. janarthanamii</i>
1	Inflorescence of male  Flowers	Solitary or a loose fascicle with 5–7 (15) flowers	Solitary and scorpioid cyme with 5–8 flowers
2	Buds of male flowers	Subtended in bract	Not subtended in bract
3	Bracts of male flowers	Reniform, cucullate; up to 1 cm long; covers pedicel; eglandular along margins	Orbicular; 0.4–0.5 cm long; not covers pedicel; glandular along margins
4	Bracts of female flowers	Cucullate; eglandular	Ovate; glandular along margins
5	Sepals of female flowers	3–6 mm long; elliptic to oblong; eglandular along margins; mucronulate at apex	10–12 mm long; linear elliptic to ensiform; glandular along margins; acute at apex
6	Seeds	round to slightly ovoid in shape; 2–3 mm across	Hexagonal in shape; 7–9 × 5–6.5 mm

## Figures



**Figure 1**

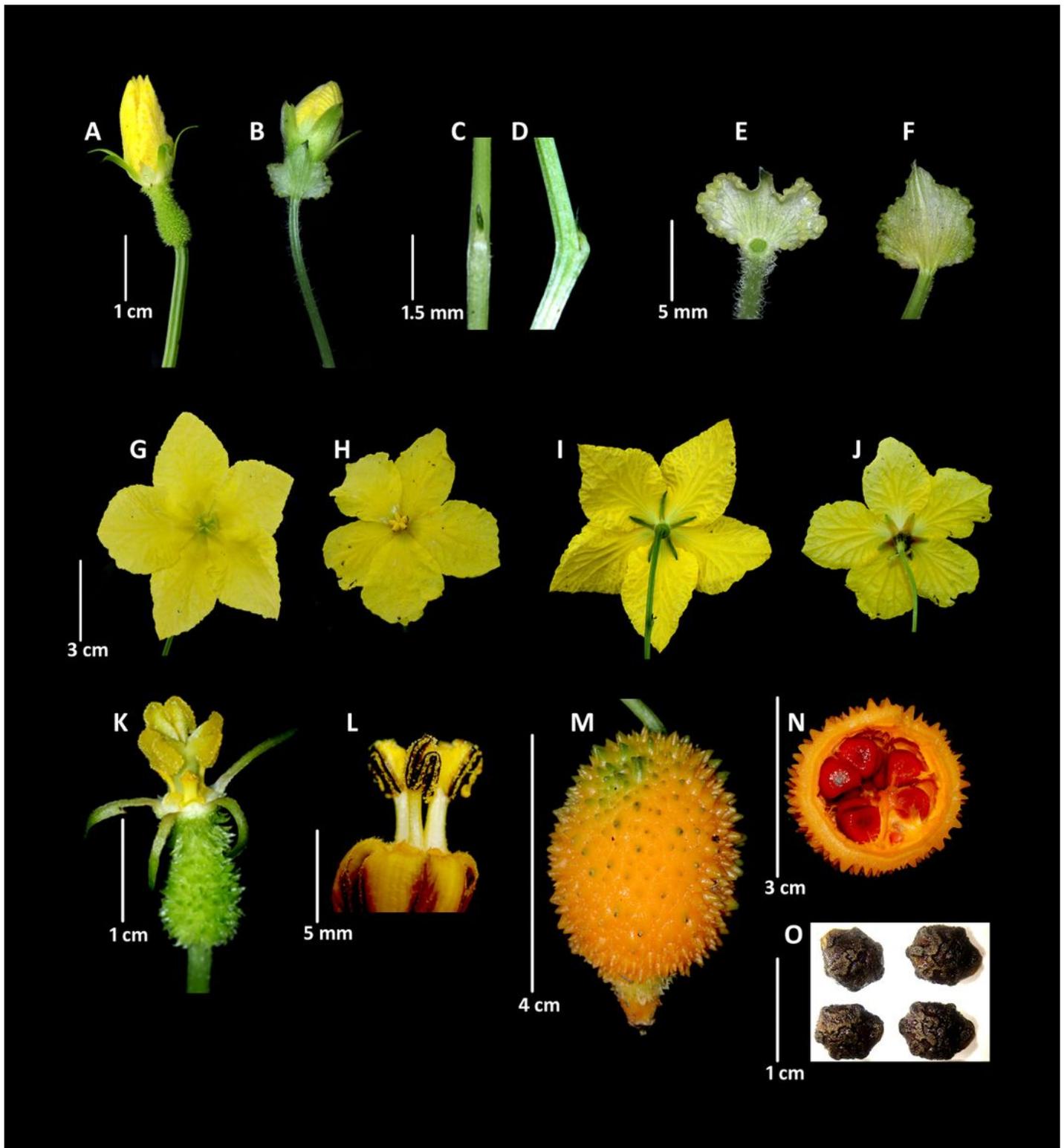
*Momordica janarthanamii* sp. nov.: A. habitat, B. male plant. Photographs by K.V.C. Gosavi and A.R. Gholave



**Figure 2**

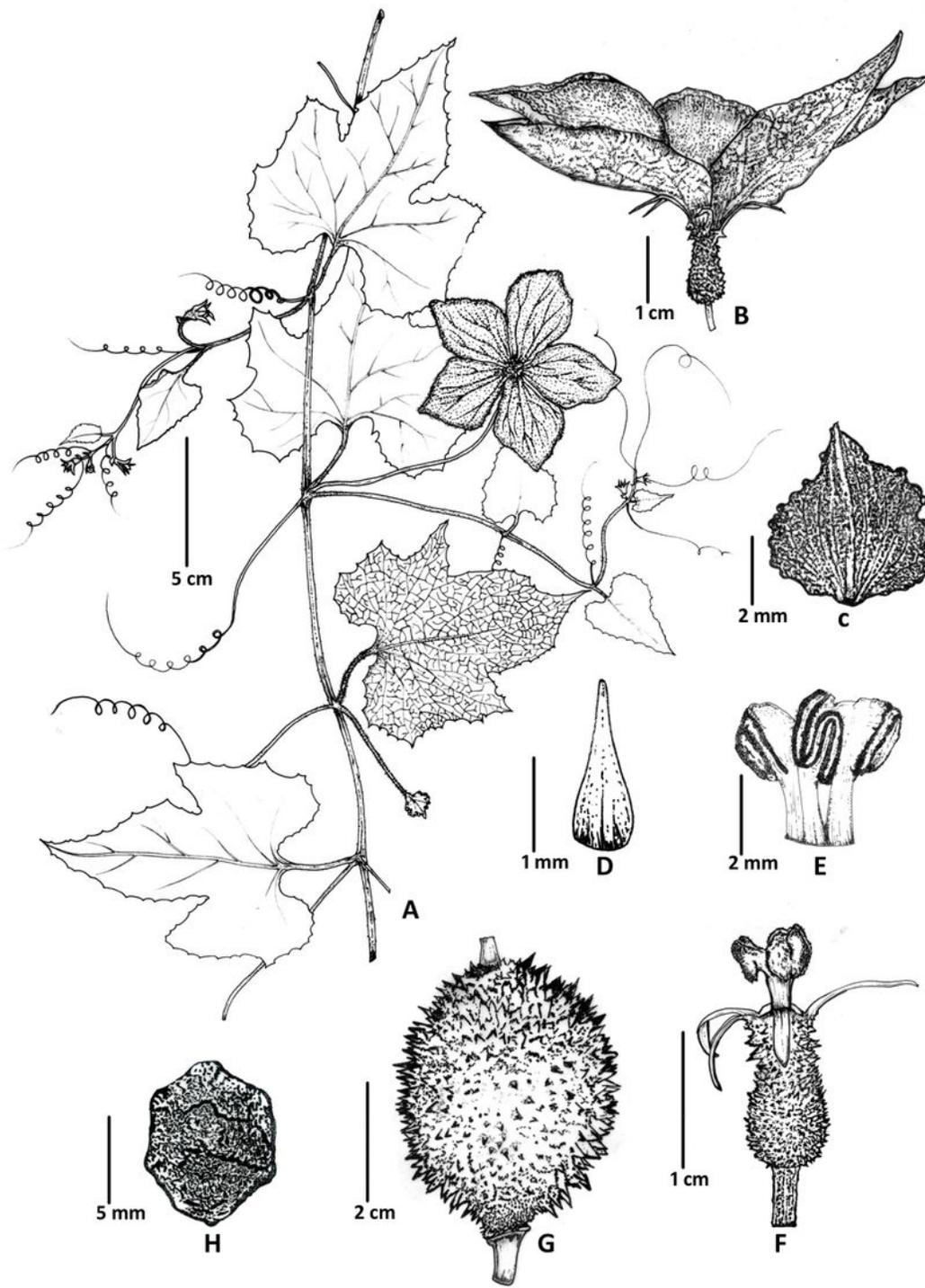
*Momordica janarthanamii* sp. nov.: A. flowering twig of female plant, B. flowering twig of male plant, C. solitary flower in female plant, D. solitary flower in male plant, E. scorpioid cyme in male plant.

Photographs by K.V.C. Gosavi



**Figure 3**

*Momordica janarthanamii* sp. nov.: Female plant: A. flower bud, C & D. bract, G. top view of flower, I. lower view of flower showing calyx, K. gynoecium showing stigma, style and ovary, M. fruit, N. TS of fruit, O. seeds. Male plant: B. bud, E & F. bracts, H. top view of flower, J. lower view of flower showing calyx, L. stamens. Photographs by K.V.C. Gosavi



**Figure 4**

*Momordica janarthanamii* sp. nov.: A. flowering twig of male plant, B. flower of female plant, C. bract of male flower, D. bract of female flower, E. stamens, F. gynoecium, G. fruit, H. Seed. Drawn from K.V.C. Gosavi & A.R. Gholave 5141 and 5142 by N.A. Madhav