Plants used for grilling fish in two ethnic groups in Guizhou, Southwest China

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Abstract

Background

Dong and Miao, two major ethnic groups in Qiandongnan Prefecture of Guizhou Province, China, have practiced an ancient cooking technique, grilling fish or fish barbecue, to boost their spirits and enrich their spiritual life as well. Using a variety of edible plants and fish from the famous rice-fish agricultural ecosystem, they made the grilled fish as sacrificial objects and food for the festivities. The knowledge of plants used for grilling fish has not been studied.

Methods

Data were collected using direct observation, semi-structured interviews, individual discussions, key informant interviews and focus group discussions administered to 279 informants living in ethnic villages of Congjiang County between September 2017 and March 2019. The fish-grilling plant voucher specimens were collected in the field excursions. The data were analyzed using ethnobotanical descriptive statistics, fidelity level (*FL*), and the cultural important plants index (*CPI*). In addition, a cultural important plants matrix design was used for comparative analysis of the plant cultural importance among two major ethnic groups.

Results

A total of 52 plant species in 21 families and 43 genera were recorded as edible plants for fish-grilling. The families Lamiaceae, Apiaceae and Lauraceae were more important sources among all plant groups. Herbaceous plants were the most species for fish-grilling, and leaves were the main part used. Wild edible plants were mainly collected for fish-grilling and a small number of species were from kitchen gardens, such as *Coriandrum sativum*, *Luffa aegyptiaca* and *Lagenaria siceraria*. Both Dong and Miao people had a high-fidelity level towards fish-grilling plants, which some given species received higher cultural important plants index in two groups. The integration of formal education and traditional culture in the local communities is conducive to the transmission of local knowledge. The traditional culture of the Dong and Miao's fish-grilling was very commonly related. The cultural preference is not particularly strong. Only a few species represent the characteristics of each group. In addition, this traditional barbecue ceremony was related to the ancestor worship of local people.

Conclusion

The present study is the first systematic ethnobotanical survey of traditional fish grilling knowledge in Congjiang County, Guizhou Province, China, which shows close relationship between local residents and

local plant resources. Results from this study will be helpful to protect agricultural cultural heritage of fish-grilling plants in southeast Guizhou, and provide a basis for the development of new food types.

Background

People, together other organisms, depends on the local ecosystem for survival. The local ecosystem is the source of food supplying which provides people with nutrients, as well as all other essential matters, including clothing, shelter and transportation, and cultural supporting. The local agricultural ecosystem is inextricably linked with the surrounding environment through local activities at various cultural levels. The local ecological environmental system, consisting of natural landscape characters and human-shaped parts, including crops, poultry, aquatic products, animals, and wild species, shows great diversity. One example is the subsistence culture of ethnic minorities such as the Miao and Dong in the rice-fish agricultural ecosystem of Congjiang County in southeastern Guizhou, China. It is a traditional agroecosystem where people have grown rice and cultured fish in the paddy fields for many generations [1].

Miao and Dong in Congjiang County, Guizhou Province, are two main ethnic groups, accounted for more than 90% of the population in the county. They live as neighbors. The Miao ethnic people settle mainly on the slopes with a higher altitude, while the Dong live close to rivers or streams at lower altitude. Both of them live in the environment with rich biodiversity, and manage and maintain the traditional rice-duckweed-fish-duck agricultural ecosystem [2]. This traditional artificial ecosystem was authorized as a globally important agricultural heritage systems (GIAHS) site, designated by the United Nations Food and Agriculture Organisation (FAO) in 2011 (<http://www.fao.org/giahs/giahsaroundtheworld/en/>). It is recognized as the indigenous community important knowledge resource, safeguard food security and poverty reduction. This ecosystem deeply influences their culture and customs. The rich edible biological resources produced by the rice-fish ecosystem have been integrated into the social culture and spiritual activities of the local Miao and Dong peoples, who are the important guardians of this traditional knowledge. Local people manage forests around the paddy rice fields in support of ecological and biodiversity conservation. When they harvest rice, people collect fish, green fodder and so on, and process them into other products for future uses. For example [1–3], fish would be preserved with various edible plants for food and cultural demands (for large events such as weddings, funerals, and religious ceremonies), fish-grilling (for harvest celebrations), and so on. Among them, fish-grilling or fish barbecue is one of the most impressive activities. These activities retain their unique culture and the relationship with the environment, showing the way of interaction and evolution, reflecting the phenomenon of cultural development and evolvement.

Under the influence of modern agricultural intensification and biotechnology, more and more people take a few food crops as staple food (such as rice, wheat, potato, or corn)[4, 5]. One billion people worldwide still collect wild edible plants for diets. In many communities, such as in southern Ethiopia [6, 7], southwestern China [8] and rural Cyprus [9], indigenous people gather and consume WEPs and semi-domesticated plants to supplement their diets. In addition to collecting wild plants directly, some wild

species deemed valuable have been purposefully domesticated in major production areas. For example, the native tuber crop *Dioscorea dumetorum* in Benin (West Africa) has been gained by local farmers as an important understanding of the species [10]. However, it is obvious that these traditional artificial ecosystems and their diversity of species utilization, as well as their impact on local culture, have been well documented, but are still far from enough, as the traditional knowledge existed in southeast Guizhou to be recorded in the present paper.

In our ethnobotanical surveys, we investigated the species diversity and associated traditional knowledge of fish-grilling plants. They are edible plants related to fish-grilling activities, used primarily for flavoring or increasing the availability of fish from the famous rice-fish agroecosystem in southeast Guizhou. Although the collection and consumption of edible plants are widespread locally, their diversity and relevant indigenous knowledge have not been adequately investigated. The purpose of this ethnobotanical study is to provide an inventory of these plants, and to assess the significance of these plants in local cultural functions, and the differences among different ethnic groups and their causes. We calculated the fidelity (FL) and cultivated important plant index (CII) for each plant species and its application. The visual method was used to design the cultural important plant matrix, and the differences between the two cultural important plant species were compared and analyzed. The information provided here describes an ancient tradition of using edible plants associated with fish-grilling, with potential social and environmental impacts that will contribute to local rural development and biodiversity conservation.

Materials And Methods

Study area

This ethnobotanical survey aimed to investigate the wild edible plant species used for traditional fish-grilling by the Miao and Dong ethnic groups living in Northeast Congjiang County, Qiandongnan Miao and Dong Autonomous Prefecture in Guizhou Province, China. These particular practices are being used since eternity descended from the traditional knowledge of locals. This area covers about 3,244 km² and in a mid-subtropical warmth and humid monsoon climate area with the average annual temperature of 18.4 °C, receiving 1,193 mm mean annual rain fall [11, 12]. The area is composed of low mountains and hills occupied over approximately 90% of its total territory.

Dong and Miao are two main ethnic groups in this area, with 90% of ca. 300 thousand people mainly living in rural areas. Agriculture is their main occupation. Most of the people, living in the villages along the hills, from the valley to the mid-mountain, sometimes to the top, make living from the environment appropriate age-old rice-fish agriculture. It has been recognized as an ecosystem with more levels of nutrition, longer food chain, and more complex food web [12]. Xiaohuang (a village dominated by Dong people) and Basha (dominated by Miao) are typical ethnic villages. The former resides in low altitude, near the hill foot, and close to the river. The later one resides to the middle of the hills. In Xiaohuang, the rice-fish agriculture practiced by Dong people has a long history. Nowadays, the glutinous rice and fish

co-culture is still the main type of rice planting pattern in the local Dong communities in low altitude areas, while corn and many other crops are the main sources of income for Miao people living in the hill and mountains in Basha village. The fish is widely raised in the terraced fields, and the grilled fish is considered being one of important traditional food in Congjiang.

Based on the accessibility and availability of local informants, we visited several villages dominated by two ethnic groups, Dong and Miao, at the beginning of this study. Finally, two villages, Xiaohuang and Basha, were selected for intensive data-collecting during September 2017 and March 2020 (Figure 1).

Data collection

For collecting data, informed consent was obtained from local people orally while explaining the scope of the investigation prior to the interviews. All the informants were interviewed through direct observation, semi-structured interviews, individual discussions, key informant interviews, and focus group discussions through snowball methodology [13] in two villages, Xiaohuang and Basha. We revisited the informants in order to verify the consistency of the information collected in the previous visit. Some inconsistent were occurred and was directly discussed with informants to clarify the reasons. So all the data presented in this paper are thorough and complete based on our surveys.

A total of 279 informants were randomly selected for the present study. These respondents include 161 Dong people (57.71%) in Xiaohuang and 118 Miao people (42.29%) in Basha (Table 1). All individuals were interviewed on commonly gathering and using wild species of plant origin (fruits, roots/tubers, leafy vegetables, spices, and others), their availability, preparation forms and conservation status for their traditional fish-grilling. All the plants mentioned by the respondents were collected and identified in the field. The documented plant species were validated for identification based on "*Flora of China*" [14] and taxonomy updated according to "The Plant List" [15]. The specimens matched with the herbarium lodged and assigned voucher numbers in the Herbaria of Jishou University, Hunan Province, China.

Data analysis

The information of plant resources used for fish-grilling were recorded including the local names of species, habit, their uses in different forms, mode of administration, part(s) used and information concerning the edible value or relevance to local communities. The information forms are from at least three respondents for quantitative analysis [16]. To determine the influence of socioeconomic factors, two different indicators of knowledge were used: (1) fidelity level [17], the fidelity level of each plant used was examined and based on combined use citation totals from all informants; (2) cultural important plants index [18], cultural important plants index for one species by all informants.

Fidelity level

The categories calculated for uses of the fidelity level (*FL*) percentage measure analysis are detailed in Table 2. Each plant use was added to the appropriate category prior to analysis calculated following formula:

$$FL = N_p/N \times 100\%$$

Where N_p is the total number of informants that independently cited a specific plant use and N is the total number of informants (N) that cited the plant for any use.

Cultural important plants index

For the purposes to evaluate the cultural importance of each species based on its cited uses of two ethnic groups. The cultural important plants index (CII) was calculated for each plant and in each group. Briefly, it is calculated as follows:

$$CII_s = \sum_{u=u_1}^{u_{NC}} \sum_{i=i_1}^{i_N} \frac{UR_{ui}}{N}$$

Where NC is the total number of different use-categories, and UR is the total number of all the informants (from i_1 to i_N) that summing the same data, but grouping them in a different manner (Dong ethnic group and Miao ethnic group). As an additive index, CII takes into account both spread of the use (number of informants) for each species in different groups (CII_D and CII_M) and its versatility.

Cultural important plants matrix design

The cultural important plants matrix design, a visual approach created by Cassandra *et al.* [19] and Kunwar *et al.* [20], was designed for the comparative analysis of how cultural important plants differ in two groups, Dong and Miao. The CII data for each group were plotted with a standard scatterplot, with Dong cultural important plants index data corresponding to the x-axis and Miao cultural important plants index data to the y-axis.

Results

Socio-economic characteristics of informants

A total of 118 Miao and 161 Dong informants were interviewed in the present study (Table 1). All informants practiced fish-grilling and also kept this traditional fish processing method due to the emotional connection with local farmers and the age-old rice-fish agriculture system. Informants interviewed were mostly male and there were more percentage of male among Miao informants than that of Dong informants (respectively 61.0% and 56.5%), the sex ratio of Miao was higher than Dong (1.3 vs. 1.6). Farmers (83.1% of Miao, 77.0% of Dong) are the most important occupations, in addition to migrant workers, students and local officials. More fish-grilling plants were reports by middle-age and old people (age > 40) than those by younger ones (20–40). Respectively 82.2% and 73.9 % of Miao and Dong informants were illiterate (someone even attended the school but cannot read).

Edible plants used for fish-grilling reported

The edible plants used for fish-grilling consisted of 52 species, in 43 genera and 21 families were documented and collected (Table 2). The most commonly mentioned plant family was Lamiaceae (7 species, 13.5%), followed by Apiaceae (6 species, 11.5%), Lauraceae (5 species, 9.6%), Amaryllidaceae, Gramineae and Zingiberaceae (4 species each), Rutaceae (3 species), and Acoraceae, Compositae, Cucurbitaceae, Euphorbiaceae and Solanaceae (2 species each). Plants from these 12 families contributed 82.69% of all species. The remaining nine families were represented by only 1 species each (Fig. 2). The richest genera were *Allium* and *Litsea* with 4 species each (Table 2).

Habits of fish-grilling plants

The plants for fish-grilling are from four habits, namely herbs (36 species), trees (12 species), climbers (2 species) and shrubs (2 species) in Congjiang County, Guizhou. Among them, herbs are the most important group for local fish-grilling, accounting for 69%, trees accounted for 23%, and climbers and shrubs each accounted for 4% (Fig. 3).

Status of fish-grilling plants

The Venn's diagram (Fig. 4) showed that most plant species for fish-grilling in Congjiang County are wild, with 37 species, accounting for 71.2% of all species. The local Miao and Dong people usually collect wild edible plants on the hillsides and farming fields in time when they start to grill the fish. They believe that freshness of the raw material is particularly important. Eight species including *Colocasia gigantea*, *Canna indica*, *Cunninghamia lanceolata*, *Phyllostachys edulis*, *Perilla frutescens*, *Tetradium ruticarpum*, *Zanthoxylum bungeanum* and *Illicium verum*, have been semi-domesticated and domesticated by the local people, providing economic income and other supplements to them. This survey also showed that there are 17 species of semi-domesticated plants in the area, and 7 of them have been artificially cultivated: *Allium macrostemon*, *Allium fistulosum*, *Allium sativum*, *Allium hookeri*, *Capsicum annuum*, *Zingiber officinale* and *Zingiber striolatum*. These cultivated plants are almost the main spice plants and vegetables in local. Generally, these plants are cultivated in the vicinity of the local people's residence, and are not far from the rice fields where the fish are raised.

Parts of plants used in fish-grilling

Leaves were the most popularly used part for fish-grilling and accounted for 17 species (33%), followed by seeds 9 (18%), whole plant 7 (14%), aerial part 6 (12%), fruits 5 (10%), branches 2 (4%) and bark, petals, roots, stem and tubers 1 each (2%).

Fidelity level analysis of the fish-grilling plants used

The analysis of fish-grilling plants listed in Table 2 showed that both Miao and Dong people had a high fidelity level of these plants in the study area. A total of 62% (n = 32) fish-grilling plants had high Fidelity

Level ($\geq 50\%$). Particularly, 5 edible plants, *Mentha spicata*, *Clinopodium chinense*, *Agastache rugose*, *Oenanthe javanica* and *Apium graveolens* had the highest Fidelity Level ($\geq 90\%$). Species with low fidelity level were mostly used broader.

Cultural important plants matrix analysis

The majority of fish-grilling plants had an intermediate (quadrants II, III, VI, and VII) cultural important plant index score (Fig. 5). No species emerged in quadrant I and VIII, indicating that neither ethnic group has strict exclusivity species for the traditional fish-grilling.

Lagenaria siceraria emerged in quadrant V, was specifically cultural important to Dong people, but not to Miao people. *Allium macrostemon* and *Allium fistulosum* received higher cultural important plants index in Miao group scores emerged in quadrant II. Likewise, two species received higher cultural important plants index scores emerged in quadrant VII in Dong group: *Allium hookeri* and *Coriandrum sativum*.

Out of the 52 taxa documented in this study, only *Capsicum annuum* emerged in quadrant IV, indicating high value to both Miao and Dong people for fish-grilling. Both two ethnic groups like to bake or grill peppers (*Capsicum annuum*) as dressing, tearing off the burnt skin, then use some leaves of other spice plants mixed with water, named *Zhanshui*, similar to sauce with sliced chilli peppers. As the locals claimed, the grilled fish will become insipid without such special traditional condiment.

Discussion

Knowledge and use of edible plants for fish-grilling in Congjiang

Using wild food plants (WFPs) is an important part of livelihood strategies in many primitive human communities throughout the world. Wild plants may be the main livelihood food source for people or maybe just a supplement (nutrition source, medicine, special event). In Congjiang County, Miao and Dong also use a variety of wild plants in their fish-grilling activities during the harvest season. Among the 52 species of local's traditional baking-fish plants recorded in this study, the vast majority were WFPs. Miao and Dong appear to be the most populous ethnic groups, and they had the traditional customs of fish-grilling when harvesting rice. These fish-grilling plants were important supplement foods, not just favoring local food security, but mainly important in their harvesting activities.

Our survey found that the plant species used for fish baking by local people are mainly herbs, with fewer woody plants, vines and shrubs. The area is mainly forest land, but the trees do not occupy the quantitative advantage of the raw materials of the grilled fish. The forest tree species in and around the area is mainly Chinese fir (*Cunninghamia lanceolata*). In the case of fish-grilling, the bark can only be used as a fuelwood. The edible plants are mainly herbaceous plants under the forest and rice fields, which is in line with some similar cases of the optimal foraging principle [21–23]. Those plants available nearby or plentiful locally are most possibly used, when fish-grilling activities occurred, which is in line

with the resource availability hypothesis [24, 25]. Usually leaves (including young shoots) are used more, and the roots and stems are used less. Using leaves make the least damage to plants when collecting, see Figs. 3 and 6.

In addition, a small number of these wild plant species are purposefully domestically planted for domestication and cultivation (Fig. 4), and that are really showed that the artificial cultivation with economic value, such as *Coriandrum sativum*, *Luffa aegyptiaca* and *Lagenaria siceraria*. The local people's traditional practice with these fish-grilling related plant species is conducive to the maintenance of local biodiversity, reflecting the concept of harmony between the local people and the nature.

Both Miao and Dong people had a high-fidelity level towards fish-grilling plants in the study area. Most of these plants had an intermediate cultural important plant index score by Dong and Miao people.

Capsicum annuum was of high value to locals for fish-grilling. There were some given species received higher cultural important plants index in two groups: *Allium macrostemon* and *Allium fistulosum* to Miao people, and *Allium hookeri* and *Coriandrum sativum* to Dong people, respectively.

Allium macrostemon, *Allium fistulosum*, *Allium hookeri* and *Coriandrum sativum* are four spices commonly used locally to enhance the flavor of fish in the roasting process. *Allium macrostemon* grew mainly on the slopes, *Allium fistulosum* was drought-tolerant and water logging tolerant, and the Miao who lived on the slopes at slightly higher altitudes were more likely to use the plants and to have a higher survival score on plant selection preferences. *Allium hookeri* grows in moist forests and around rice fields. *Coriandrum sativum* is a widely cultivated spice crop, which requires fertile soil and good water conservation. These two species are used more by Dong people, who lives at the foot of lower mountains, compared to Miao people. Therefore, the preference of Miao and Dong to fish-grilling plants may be related to their living environment.

Relationship between formal education and traditional culture

In this ethnic area where traditional rice-fish farming is used for agricultural livelihoods, most people do not have access to the high-quality education in the past, but they maintain lots of traditional knowledge. Some residents believe traditional ecological knowledge was highly eroded by formal education, so the local experts (teachers and traditional knowledge experts) call for the formal education must to be integrated with local cultural backgrounds and traditional practices [26]. If the local knowledge and cultural diversity does not fully take into account, the traditional ecological knowledge and linguistic diversity of local communities was resulting in rapid losing.

In fact, the traditional knowledge like fish-grilling plant uses, as a localized education entity (book preparation and teaching) was unlikely to be widely applicable in China with 55 ethnic groups. However, fish-grilling is a typical symbol of traditional culture of Congjiang. There is no doubt that its traditional knowledge deserves protection and inheritance. Therefore, we advocate the ethnobiologists, education

reformists and practitioners of cultural conservation can actively called for the inclusion of traditional culture in the formal education system.

Cultural importance and biodiversity of fish-grilling plants

The famous rice-fish agriculture ecosystem is characterized by a structural complexity and multifunctionality which enables the provision of different benefits to locals. From the analysis of the cultural importance matrix of fish-grilling plants, the traditional culture of fish-grilling was very commonly in Miao and Dong ethnic groups in Congjiang. Most of the species fall in the sixth quadrant. The group's preference is not particularly strong, only a few species represent the characteristics of each group. The local people in Congjiang accepted exotic plants and developed their new usages. For example, *Lagenaria siceraria* is used as a vessel by the Dong people to hold glutinous rice. *Zea mays* is an important staple food for the Miao people. Based on the elder informants, in the past, the fresh pepper leaves were used as an ingredient of sauce. Nowadays, these exotic species, such as peppers, have a unique flavor and are easily accessible, so they are favored by locals. The inclusion of these exotic plants in traditional diets enriches culture rather than a sign of cultural erosion or environmental degradation, which is consistent with the diversity hypothesis of plant resources. As a matter of fact, Miao and Dong live together in small communities and keep intermarriage. They learn from each other in the production management and food culture of rice and fish agricultural system.

Food rituals of rice-fish production

Many ethnic rituals are presented through language of creating, giving and eating food [27]. While grilling fish from the Dong area in Congjiang County, it will also grills other foods such as chicken, pork, and shrimp, and eat steamed glutinous rice which is usually packed in a container made of *Lagenaria siceraria* (Fig. 6c). The food ritual participants are generally community elders or prestigious people who create and maintain each other's variant identities and relationships through rituals. The information reporter reflected that the traditional barbecue ceremony was related to the ancestor worship of Dong people. In this way, they told their ancestors to “the warehouse is full of rice, and the jar is filled with kipper” to celebrate the harvest of rice and fish. To a certain extent, rituals can reflect the positive consciousness of human beings for the protection of biodiversity, contain the ecological culture concept of respecting nature, and can be regarded as a cultural example to reconstruct the harmonious and mutually beneficial relationship between human and nature.

The sustainable consumption and production patterns

As we all know, land is a fixed resource, and with the acceleration of China's urbanization process and the extensive development of the rural revitalization strategy in rural areas, the land use change in Qiandongnan Prefecture will affect the services provided by the rice-fish-duck agro-ecosystem. This study shows that the two major ethnic groups in the region maintain a sustainable consumption and production patterns by using rice fish and wild edible plant resources within the system with limited external production input, this reliance on the ecosystem services provided by indigenous biological

resources for the basic necessities of life can facilitate the transfer of rich ethnobotanical knowledge to the local population and maintain a high level of local biodiversity.

Due to the needs of traditional fish-grilling ingredients, locals are free to use local wild plant resources without any restrictions, so this may increase the chance of extinction of certain plants. Worldwide, because of over-acquisition and over-harvest of resources, there are 15,000 plant species may be facing extinction [28]. Fortunately, the wild species collected for fish-grilling in Congjiang are commonly distributed in local ecosystems, as shown in Table 2.

Conclusions

This study investigates and documents the traditional knowledge of fish-grilling plants in Congjiang County. Peoples in two ethnic groups, Dong and Miao, have a high degree of overlap when choosing fish-grilling plants, and there is also a small amount of dietary culture preference. The traditional barbecue ceremony was related to the ancestor worship of local people, which maintains a sustainable consumption and production patterns by using rice fish and wild edible plant resources. Obviously, this information confirms the harmonious relationship between the local people's traditional knowledge and natural resources. Results can serve as baseline data for preservation of the agricultural cultural heritage in a form of traditional fish-grilling plant knowledge in Southeast Guizhou of China.

Declarations

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Availability of data and materials

The data for this study may be availed upon request.

Authors' contributions

CLL conceived and designed the study. JWH collected the data and performed the statistical analysis; JWH, YB and DYI participated in discussions; CLL finalized the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

We followed ethical guidelines adopted by the International Society of Ethnobiology (2008). Permissions were verbally informed by all participants in this study. All people appeared in the Figure 6 agreed to publish the photos.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Figures

Figure 1

Geographic location of the study area: Caption: Xiaohuang, Basha in Congjiang, Southeast Guizhou, China. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.

Figure 2

Number of fish-grilling plant species document of families in Congjiang County, Southeast Guizhou of China

Figure 3

Percentage of habitats of fish-grilling plants in Congjiang County, Southeast Guizhou of China

Figure 4

Venn's diagram representing the status of plants in the traditional fish-grilling in Congjiang County, Southeast Guizhou of China

Figure 5

Cultural important matrix comparison of two ethnic groups with the fish-grilling plants.

Figure 6

The fish-grilling process. Caption: (a) Edible plants and fish collection. (b) Insert the fish (*Cyprinus carpio*) with bamboo sticks and grill it directly on the fire. (c) When local people eat grilled fish, they take staple food. It is the steamed glutinous rice packed in a container made of *Lagenaria siceraria*. (d) The cleaned edible plants are torn off by hand and packed into a container. (e) The torn edible plants (called Zhanshui in local name) are packed in small plates made of bamboo stems. (f) The locals eat grilled fish at a lawn in the wild.