

## Diversity and indigenous utilization of bamboo in Xishuangbanna, Yunnan Province, Southwest China\*

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**Abstract**—There are more than 100 species of 17 genera of bamboos recorded from Xishuangbanna. The genera *Bambusa*, *Dendrocalamus* and *Gigantochloa* that contain the most species are also common in southeast Asia, hence indicating the similarity of species between these two regions. The other more common species are *Indossa*, *Melocalamus* and *Phyllostachys*. Bamboos of Xishuangbanna are a traditional source of raw materials in the daily life of the many ethnic communities living in the Xishuangbanna area. The various species used for building houses, food, medicine, agricultural tools, handicrafts, cultural and religious activities and horticulture are described briefly in this report.

*Key words:* Diversity; utilization; housing; food; products.

### INTRODUCTION

Bamboo is an important non-timber forest product (NTFP), and it has significant commercial value. However, the increasing demands on the world's bamboo resources has led to overexploitation and destruction of bamboo habitats, increasing the threat of erosion of bamboo genetic diversity.

In contrast, the indigenous communities in Yunnan, southwest China use methods and strategies for sustainable utilization and development of bamboo resources. It is therefore important to study the indigenous knowledge that relates to the classification, identification, utilization, management and conservation of these resources.

In this report, the different uses by the indigenous community were found to include the description and evaluation of the relationships between the environment

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and local people. This study not only examined the scientific and indigenous knowledge of the local people to identify and name the various species, but it provided an inventory for local utilization and management.

## STUDY AREA

The study was conducted in Xishuangbanna, Yunnan province in Southwest China. Xishuangbanna is located at the southeast end of the Hengduan Mountains — the eastern appendages of the Himalayas. It lies between 21°10' and 22°40' N, and 99°55' and 101°50' E with a total area of 1 922 300 hectares, of which 94% consists of mountains, and hilly terrain and river valleys make up the remaining area. The elevation is low — about 420 m in the South which rises to 2800 m in the North. The annual rainfall is 1138 to 2431 mm with mean annual temperatures of 15°C in winter and 22°C in summer. The mean annual relative humidity is 70–80%. The unique landforms and complex physiography make Xishuangbanna a diversified ecological environment with diverse and numerous ecosystems. Tropical forests account for 33.8% of the total cover. The biological resources are so plentiful that Xishuangbanna is known as 'the kingdom of wild flora and fauna'. It is home to the vast majority of plants and animal species found in China. A total of 4669 higher taxa of 282 families have been recorded in Xishuangbanna up to the end of 1995 [1]. Thus nearly one-sixth of the total species of China (30 000 species) are found in Xishuangbanna, although it constitutes only one five hundredth of the total land area of China.

Xishuangbanna is a multi-ethnic minority area that includes Dai, Hani (also called Aini), Lahu, Bulang, Yi, Jinuo, Yao, Wa, Hui, Bai, Zhuang, Miao, Buyi, and others (e.g. Kemo, Kemie, and Kongge). Each group has its own language and its indigenous knowledge based on its unique cultural diversity, especially in the utilization, management, and conservation of natural resources. Bamboo is the most useful plant in the province and it is widely cultivated and used by all the ethnic communities.

The overall objective of this study was to survey, describe and evaluate bamboo species conserved and used by indigenous communities in Xishuangbanna.

## METHODS

Study sites were selected based on three criteria: species, cultural, and economic diversity. A total of 40 sites were visited and more than 200 local people were interviewed about the distribution, ecological conditions, and regeneration of bamboos as well as for indigenous knowledge of folk classification, utilization, management and conservation.

Initially a search for information, specimens, and documentation, relating to taxonomy and indigenous knowledge systems on folk classification, identification and

conservation of bamboo resources was carried out. This involved: (1) compilation of all bamboo genera and species recorded from Xishuangbanna; (2) collection of protologues (original description) of all the taxa; (3) establishment of a preliminary nomenclatural framework in accordance with the International Code of Botanical Nomenclature (ICBN), and (4) compilation of folklore relating to bamboo.

The second stage involved visiting sites and interviewing local people. Interviews of local people were conducted in three phases. The first phase involved the local leaders and some experienced persons who were asked to recall important or memorable bamboo species in the study area. The interviewers had prepared questionnaires with simple and clear questions. Examples of such questions are: 'How many bamboo species are in your area? Which bamboos are used for edible shoots? Which bamboo do you like to cultivate? How do you propagate bamboo? How do you recognise the species?' For unknown bamboos, detailed questions were asked that related to the morphological characteristics. The second set of interviews concerned the species referred to in the first interview and a field survey was carried out for accurate and detailed information, such as the local name and its meaning, diagnostic characteristics, distribution, special uses and conservation practices. In addition, bamboo specimens were collected. A final phase was a group interview of local leaders and experienced persons to assess the nature of use and confirm the local names of species. Some older people were chosen because they have good past and recent knowledge.

Information on the culm habit (strictly erect, pendulous or climbing), the rhizome system (sympodial or monopodial), culm characteristics (height, diameter, branching, node, internode, etc.), culm sheaths, leaves, and inflorescence were recorded. Some specimens, mainly those of unidentified species, were collected for identification and nomenclature later. Other information on distribution, habit, utilization, local names, and market data were also recorded.

Collected specimens were examined and identified. An ethno botanical inventory based on the biosystematics and ethno botany was prepared. The inventory included scientific names, vernacular names, uses, distribution, and voucher specimens.

## RESULTS

### *Distribution habit and areal types*

Table 1 shows the distribution of bamboo in Xishuangbanna and other areas. The following points emerge.

- (1) The distribution of the genus *Chimonocalamus* covers Wenshan and Honghe prefecture of Southeast Yunnan, and Dehong prefecture of Southwest Yunnan. These two distributions did not overlap with each other since there was no *Chimonocalamus* in Xishuangbanna according to old literature, but *Chimonocalamus fimbriatus* var. *ligulatus* is now found in Xishuangbanna.

- (2) The species of *Fargesia* and *Yushania* are mainly distributed in high mountain coniferous forests of Southwestern China. We have found that species of the two genera have been found in mountain areas of Xishuangbanna. Perhaps Xishuangbanna is the southernmost distribution for *Fargesia* and *Yushania*.
- (3) The genus *Indosasa* is a component of S. E. Yunnan and Xishuangbanna is also the southern most distribution for this species.
- (4) Most species of *Gigantochloa* are found in Xishuangbanna, but are not reported in other areas of Yunnan.
- (5) *Phyllostachys* spp. are mainly distributed and/or cultivated in the middle and lower reaches of the Yangtze River and species of *Bambusa* are commonly distributed in Guangdong and Guangxi provinces. On the other hand, the genera

**Table 1.**

Comparative distribution of some bamboo species in Xishuangbanna, and adjacent and other areas

Genera	Areas										
	X	WY	CY	NEY	SEY	SC	EC	V	M	T	I
<i>Ampelocalamus</i>	+1	—	—	2	—	1	—	—	—	—	—
<i>Bambusa</i>	7, *1, ?2	8	3	2	7	42* 13	9 *3	27	25	13	29 *3
<i>Cephalostachyum</i>	2	5	—	—	—	4	3	3	8	1	6
<i>Chimonobambusa</i>	2, *1	1	1	5	4	—	—	—	2	—	4
<i>Chimonocalamus</i>	*1	2	—	—	—	6	—	—	—	—	—
<i>Dendrocalamus</i>	26, *29, ?22	13	4	—	11	5	1	11	17	14	14 *3
<i>Fargesia</i>	1, ?1	25	4	5	2	—	—	—	1	—	—
<i>Gigantochloa</i>	10, ?10	—	—	—	—	#1	—	7	11	10	10
<i>Indosasa</i>	3, ?1	1	—	—	4	8 *1	1	1	—	1	—
<i>Melocalamus</i>	3, *1, ?1	3	—	—	1	1	—	1	—	1	—
<i>Phyllostachys</i>	3, ?3	2	7	7	4	3 *4	43 *18	6	3	1	5
<i>Pleioblastus</i>	1	—	2	1	—	3	15 *4	—	—	—	1
<i>Pseudostachyum</i>	1	—	—	—	—	1	—	1	2	—	1
<i>Schizostachyum</i>	3	1	—	—	5	5	1	9	3	5	17
<i>Teinostachyum</i>	?1	—	—	—	1	—	—	1	3	1	—
<i>Thyrsostachys</i>	2	1	—	—	—	1	—	1	2	2	2
<i>Yushania</i>	1	10	3	7	6	2	—	—	—	—	—

Areas: X — Xishuangbanna, WY — Western Yunnan, CY — Centre of Yunnan, NEY — Northeastern Yunnan, SEY — Southeastern Yunnan, EC — Eastern China, SC — Southern China, V — Vietnam, M — Myanmar, T — Thailand, and I — India.

(\*) Naturally distributed or cultivated species, (#) Introduced species, (\*) Variety or form, (?) Unidentified species.

*Dendrocalamus*, *Gigantochloa*, *Thyrsostachys*, and *Melocalamus* are mainly distributed in Yunnan, especially in Xishuangbanna.

- (6) Most species of tropical bamboo (e.g. *Dendrocalamus*, *Gigantochloa*, *Bambusa*, *Schizostachyum*, *Melocalamus*, and *Thyrsostachys*, etc.) that have been reported in South-East Asian countries are in Xishuangbanna. This indicated that there is a close relationship between bamboos in Xishuangbanna and those in Southeast Asian countries

The distribution of bamboos is shown in Fig. 1. The following points are relevant.

- (1) Southern China. There is little similarity between bamboos in Xishuangbanna and those in Southeast China. There are more than 40 species of the genus *Bambusa* growing in southern China especially in Guangxi, Guangdong, and Hainan provinces, but less than 10 species and varieties occurred in Xishuangbanna (Table 1). Species of *Gigantochloa*, *Thyrsostachys*, and *Cephalostachyum* are widely distributed in both Xishuangbanna and the Southeast Asian areas (Myanmar, Thailand and Vietnam in Table 1). These species do not occur naturally in Southern China, and few species are cultivated.
- (2) Eastern China. More than 50 species of *Phyllostachys* and 15 species of *Pleioblastus*, are distributed in Eastern China, with Xishuangbanna being regarded as the southern edge of both genera in which only 5 and 1 species have been recorded, respectively. This means that bamboos of these two areas are rather different.

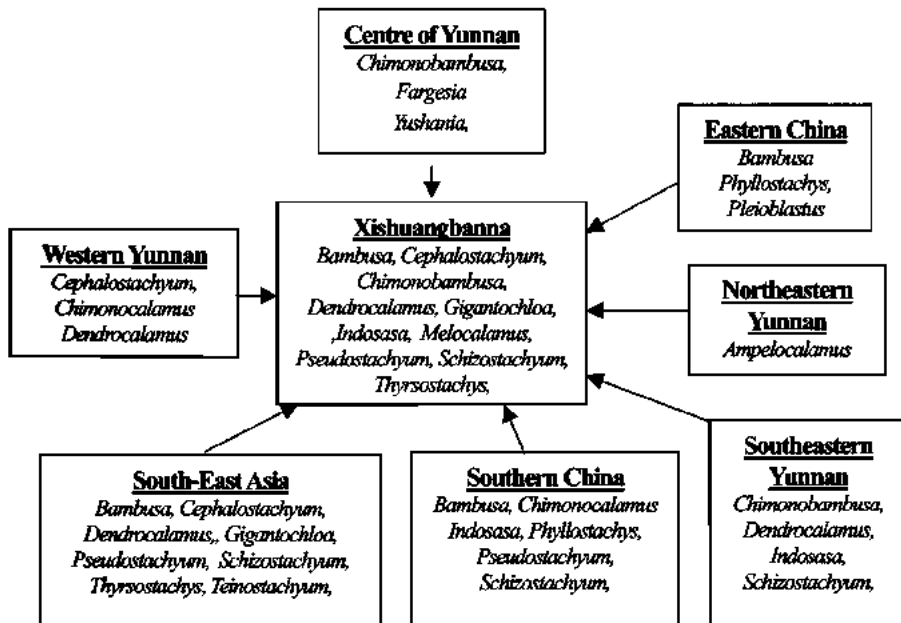


Figure 1. Relationship of bamboo genera of Xishuangbanna to other neighbouring areas.

- (3) Western Yunnan. Many species in Western Yunnan are similar to Southeast Asian species, but there are some differences between Xishuangbanna and western Yunnan (Fig. 1, Table 1). Most of the tropical bamboo species that belong to *Dendrocalamus*, *Bambusa*, *Cephalostachyum* and *Melocalamus* also occur in both Western Yunnan and Xishuangbanna. Five species of *Cephalostachyum* are recorded in Western Yunnan, and only two are reported in Xishuangbanna. Species of the genera *Neosinocalamus*, and *Monocladus* are found only in Western Yunnan. Similarly, *Gigantochloa* is only found in Xishuangbanna.
- (4) South-eastern Yunnan. There are differences in species in Xishuangbanna and South-eastern Yunnan. Many species of the genera *Indosasa*, *Schizostachyum*, *Chimonocalamus*, *Ferrocalamus*, and *Bambusa* are distributed in South-eastern Yunnan, but only a few species have been reported in Xishuangbanna. For example, 6 species of *Chimonocalamus* and 4 species of *Indosasa* occur in Southeastern Yunnan, but only 1 species of *Chimonocalamus* and 3 species of *Indosasa* are found in Xishuangbanna. *Ferrocalamus* are found only in Southeastern Yunnan. *Thyrsostachys*, *Pseudostachyum*, *Gigantochloa*, and *Cephalostachyum* are widespread in Xishuangbanna, but have not been reported in south-eastern Yunnan. Many species of *Dendrocalamus* are distributed in both areas, but *Dendrocalamus barbatus*, and *D. hamiltonii* are widespread only in Xishuangbanna.
- (5) Central Yunnan. There is a limited relationship in bamboo species between Xishuangbanna and Central Yunnan. Many species of *Fargesia*, and *Yushania* are distributed in Central Yunnan, but only 2 species of *Fargesia* and 1 species of *Yushania*, respectively, are reported in Xishuangbanna. Of the genus *Dendrocalamus*, only *D. giganteus* is found in both areas.

There are five areal types of seed plants in Xishuangbanna based on the theory of Wu [3] and the bamboo genera in Xishuangbanna belong mainly to the tropical component (Table 2). This further shows that there are similar bamboo species in Xishuangbanna and Southeast Asia.

### *Indigenous utilization*

In Chinese culture, bamboo is referred to as 'gentleman' and together with orchid, chrysanthemum and plum, referred to as the Four Noble Plants of Chinese garden lore. Bamboo, plum and the pine together are referred to as the Three Friends of Winter.

The indigenous people of Xishuangbanna have many traditional uses of bamboo. Indigenous utilization and practices reflect the experiences and accumulated body of knowledge that are based on the understanding of the characteristics and quality of bamboos and their environments.

**Table 2.**

The areal types and subtypes of bamboo genera in Xishuangbanna

Areal types	Subtypes	Genera
Pantropic	Trop. Asia, Africa and C. to S. Amer. disjuncted	<i>Bambusa</i>
Trop. Asia to Trop. Africa	Trop. Asia to Trop. Africa S., SW. China to India and Trop. Africa (disjunct distribution)	<i>Cephalostachyum</i> , <i>Dendrocalamus</i> , <i>Gigantochloa</i> , <i>Yushania</i>
Trop. Asia (Indo-Malesia)	Trop. Asia (Indo-Malesia) Trop. India to S. China (esp. Yunnan) Vietnam (or Indo-Chinese Peninsula) to S. China (or SW. China)	<i>Chimonobambusa</i> , <i>Dinochloa</i> , <i>Melocalamus</i> , <i>Schizostachyum</i> <i>Chimonocalamus</i> , <i>Thyrsostachys</i> , <i>Pseudostachyum</i> , <i>Teinostachyum</i> , <i>Indosasa</i>
E. Asia	E. Asia Sino-Himalaya (SH) Sino-Japan (SJ)	<i>Phyllostachys</i> <i>Fargesia</i> <i>Pleioblastus</i>
Endemic to China	Endemic to China	<i>Ampelocalamus</i>

**Building materials and housing tools.** Bamboo is the oldest and most widespread building material used by the local communities in Xishuangbanna because it is cheap, readily available and easy to work with. Most of the traditional bamboo houses are often two-storied constructions, which are usually square-shaped. People live in the upper storey, and the lower storey has only pillars without walls; the open space is often used for the storage of agricultural tools, firewood, or as a shed for domestic animals and poultry.

The considerations on the use of bamboo for building a house include:

- (1) Choice of species. Different bamboo species are used for different parts of the building. Bamboo culms of large diameter, thick-walled and relatively shorter internodes are often used for pillars, scaffolding, or other support framework. The bamboos suitable for this purpose are *Dendrocalamus giganteus*, and *D. sinicus*. For walls, roofs, and cells the species that are often used are those with durable and smooth culms, such as *Dendrocalamus membranaceus*, *D. barbatus*, *Bambusa sinospinosa*, and *B. lapidea*. *Chimonobambusa quadrangularis*, *Thyrsostachys siamensis*, and *Gigantochloa nigrociliata*, species with small diameter, thick-walled and more durable culms, are often used for rafters.
- (2) Cutting season. A suitable time for harvesting is very important for bamboo used for building. Usually, the best time for cutting bamboo culms is during winter after the rainy periods. The felled bamboo would dry easily in the field

and need not be transported and kept in sheds. Bamboo harvested in winter is usually not attacked by insect pests and fungi.

- (3) **Water leaching and culm curing.** The cut bamboo culms are often immersed in muddy or stagnant water for several months, then in running water in the river for several weeks to allow the starch content of culms to leach out. In indigenous communities, the freshly cut culms or the culms after water leaching are often dried beside the river or pond for several weeks.
- (4) **Stone base.** Large boulders that can protect the culms against decay are often used as a stone base to support the pillars.
- (5) **Fumigation.** A fire pit is often located in the centre of the house. The smoke from the fire pit turns the culms black and destroys the starch in the parenchyma cells to deter insect infestation.

*Bamboo foods.* Young bamboo shoots which are reported to be high in protein, minerals, e.g. calcium, phosphorus and iron, vitamins (such as thiamine and ascorbic acid), 17 kinds of amino acids, and low in fat [2], are widely used as palatable vegetables in Xishuangbanna. A number of products can be prepared from bamboo shoots based on their characteristics.

- (1) **Fresh bamboo shoots.** Shoots of *Dendrocalamus hamiltonii*, *D. semiscandens*, *D. brandisii*, and *D. asper*, all are sweet and that of *Schizostachyum funghomii* is neither sweet nor bitter. These can be cooked directly. The shoots of *Indosasa singulispicula*, and *Indosasa* spp. are bitter, but can be cooked directly or roasted for eating.
- (2) **Sour bamboo shoots.** The bamboo shoots are cut into pieces and cleaned, mixed with salt, chilli, ginger, flavouring and water, and then put into a jar or container. This product is sometimes cooked together with meat, fish, and other ingredients as a traditional meal in festivals.
- (3) **Dry bamboo shoots.** The bamboo shoots are cut into pieces, then cleaned and dried. Before cooking they may be soaked in hot water for several hours. Shoots of *Dendrocalamus giganteus*, *D. calostachyus*, *D. barbatus*, *D. membranaceus*, and *Schizostachyum funghomii* are used for this purpose.
- (4) **Pickled bamboo shoots.** Some bamboo shoots, such as those of *Dendrocalamus giganteus*, *D. barbatus*, *D. calostachyus*, *D. membranaceus*, *D. sikkimensis*, *Bambusa sinospinosa*, *Gigantochloa nigrociliata*, and *Pseudostachyum polymorphum*, are bitter and are immersed in hot water for one or two days before being cooked. In some areas the shoots are wrapped in banana leaves and washed in running water for 4–5 days to remove the bitter taste.
- (5) **Pressed bamboo shoots.** The flakes or pieces of bamboo shoots are pressed into a bamboo tube and left for 3–4 months before cooking.
- (6) **Bamboo tube.** Glutinous rice is cooked in bamboo culms (e.g. *Cephalostachyum pergracile*, *Bambusa polymorphum* and *Schizostachyum funghomii*) to



produce bamboo-tube rice. Usually, *Cephalostachyum pergracile* is the choice for rice-cooking because of its medium-sized culms, with long internodes that are attained in 2–3 years. The thin scented coating inside the culms gives the rice a unique aroma.

**Agricultural tools and handicrafts.** Bamboo is used in every aspect of agriculture in Xishuangbanna. It is used for fences, to make crates, baskets, and as a carrying pole. In the field, people put bamboo mats on the ground onto which harvested rice is laid for drying and cleaning. The people working in the forest drink water from a bamboo tube (e.g. *Dendrocalamus giganteus*, *D. calostachyus*) such as 'Ha-ge' in Mengsong of Hani communities.

Bamboo poles (culms of *Dendrocalamus giganteus*, *D. barbatus*, *D. membranaceus*) are used as props to support fruit-bearing banana, and as trellises for *Passiflora caerulea* (bluecrown passionflower), *Cucurbita moschata* (pumpkin), *Lagenaria siceraria* (calabash gourd), *Luffa cylindrica* (suakwa vegetable sponge), *Vigna sinensis* (cowpea), and other agricultural vines.

Bamboo is also indispensable in fishing and hunting. For example, fishing traps, fishing rods, fish pens, fishing pots, fishing nets, harpoons, arrows, bird-call snare, birdlime on bamboo culms, crossbows, and bird-cages, are made from bamboo (e.g. *Schizostachyum funghomii*, *Melocalamus compactiflorus*, *Dendrocalamus hamiltonii*, and *D. calostachyus*) by indigenous communities in Xishuangbanna.

Tools made of bamboo are very useful for agricultural activities, e.g. baskets such as open-weave baskets, backpacks, bamboo casks, fish baskets, and hand-baskets which are used for transporting goods, winnowing trays for cleaning grains; bamboo rafts and hanging bridges used in crossing rivers or streams. In the market, containers made of bamboo are used to keep rice longer and in better condition than other containers. Bamboo pipes are used for transporting and fetching water from the source to place of use. In the field, water containers made of bamboo are very common while bamboo culms and strips are used for fencing. Generally, *Dendrocalamus giganteus*, *D. membranaceus*, *D. barbatus* and *Schizostachyum funghomii* are suitable for these purposes.

**Medicine.** In indigenous communities of Xishuangbanna, many species of bamboos are used for medicine. A good example is 'aqgyul' (*Dendrocalamus hamiltonii*) in the Hani communities, whereby the water from the burning culm is drunk for curing fever. In the Dai communities, culms of *Bambusa vulgaris* cv. *vittata* are used to cure oedema in older men. A root and bud decoction of *Gigantochloa albociliata* is used for curing women's diseases, e.g. dysmenorrhoea, irregular menstruation, and postpartum blood clots. Some leaves of bamboo (e.g. *Phyllostachys nigra*) are used for curing malaria. A piece of culm of *Dendrocalamus hamiltonii* mixed and boiled with ginger and garlic can be used against food poisoning. The famous Dai medicine book, 'Danhaya', has documented the uses of bamboo for curing many kinds of diseases. The Dai communities use a kind of decoction, which

is made from the nodes of *Schizostachyum funghomii* with petiole of *Areca catechu* for curing headache, body ache, common cold and to increase appetite. The root of *Dendrocalamus* spp. with leaves of *Areca catechu* fruit or *Alpinia galanga*, root of *Gendarussa vulgaris* and root of *Adhatoda vasica* are made into a decoction and taken to induce urination. The water extract from boiled *Bambusa vulgaris* cv. *Vittata*, *Nicolsonia renifolia*, *Dillenia indica*, *Mahonia* spp. sugar and rice, is said to be effective in treating hepatitis. In addition to the specific items in these medicinal mixtures, the indigenous people also know the exact quantities of each component.

*Festival and musical instruments.* In community festivals, the bamboo culm is used in celebrating activities. In the Hani community, a long bamboo culm (about 2 m) is used as a prop or instrument in native dancing. A number of musical instruments are made from bamboo culms. Gourd pipes (in Kumo communities), mouth harps (e.g. 'bi' in Dai communities, 'bideng' in Kemo communities, etc.) and 'daidi' (in Kemo communities) are made of bamboo.

*Folk beliefs and religious activities.* In some Hani communities, the top of the bamboo shoot is cut and shaped into a flower and dried under the sun. The 'flower' is placed on the village-door or beside the road, to drive away ghosts. Like the Hani, the Bulang people often use a bamboo culm sheath as a substitute for the Buddhist scriptures and together with tea, and bamboo shoots are offered to the spirit with the belief that this can get rid of headache and stomach ache. Sometimes, people go to the temple and sit on a specially made frame of three bamboo culms and bring sand, rice, grains and water placed into four internodes, and ask the eminent monk to save them from sin and rid them of disease.

Bamboo traditionally plays an important role at the ceremonies for the dead in Dai communities. For example, *Bambusa sinospinosa*, like *Ficus religiosa* (bodhi tree), the Buddhist tree, is respected and is not cut in any way. In the funeral ceremony after praying to Buddha, a woven bamboo house is put into the funeral pyre and cremated with the dead body to ensure the dead person has a comfortable after-life. At the village-door of Dai communities, a bamboo, banana and other materials are put together on both sides of the door together with bamboo internodes with sand, grains, and rice for protection.

The Jinuo people often use bamboo to construct a small house as a simple altar or spirit house on a tomb. For the Jinuo communities, the tomb houses form a special landscape.

Knives, arrow, bamboo weaving, and bamboo water containers are often buried with a dead person in Kucong communities. This is used as symbol to suggest that the dead person lives in a spiritual world.

*Horticulture and environment stabilization.* The bamboo forests have many influences on the ecological and social systems. A proverb of the Dai people is: 'Elephants follow the forest, climate follows the bamboo, and Dai people follow

the water', suggesting that Dai people have a very close relationship with forest, bamboo, and water. Indeed, they believe that bamboo plays a very important role in maintaining and conserving the climate and environment.

Bamboo can be used as an ornamental plant to beautify the landscape. For example, *Bambusa vulgaris* cv. vittata, has yellow culms with green longitudinal streaks. *Bambusa vulgaris* cv. warnin, has shorter internodes and is attractively shaped. The leaves of *Thyrsostachys siamensis* are small, and the culms very straight. All of them have been brought into cultivation in home gardens, temples, and village groves.

Cultivation of bamboo around the house and village creates a good, healthy environment and because of this the indigenous communities in Xishuangbanna have initiated planting of bamboos. The bamboo forest protects the village or house from strong wind and helps conserve moisture. The indigenous communities believe that the bamboo forest keeps them warm during the winter, and cools the temperature during the summer. Bamboo can also conserve water, act as a windbreak and control soil erosion.

## CONCLUSIONS

More than 100 species, varieties, and forms of bamboo belonging to 18 genera have been identified in Xishuangbanna. Most species found in Xishuangbanna belong to the genera *Dendrocalamus*, *Gigantochloa*, *Bambusa*, *Melocalamus*, *Phyllostachys*, and *Indosasa*. Others species are from the genera *Schizostachyum*, *Cephalostachyum*, *Thyrsostachys*, *Chimonobambusa*, *Chimonocalamus*, *Pseudostachyum*, *Fargesia*, *Yushania*, *Pleioblastus*, *Teinostachyum*, and *Ampelocalamus*. In the indigenous communities, the commonly cultivated species belong to the genera *Dendrocalamus*, *Bambusa*, *Thyrsostachys*, *Schizostachyum*, *Gigantochloa*, *Indosasa*, and *Cephalostachyum*. The relationship of bamboo species between Xishuangbanna and South-East Asian countries is closer than that between Xishuangbanna with other neighbouring areas in China.

The large areas of bamboo forest provide a source of important raw materials of economically desirable species for the indigenous communities. In return, the indigenous communities have developed knowledge for the efficient utilization of bamboo resources.

## REFERENCES

1. Y.-H. Li, S. Pei, Z. Xu, H. Zhu, Y. Xia, S. Chen, J. Xu, S. Tong, C. Long, G. Tao, B. Li and K. Wang, *List of Plants in Xishuangbanna*. Yunnan Publishing House of National Minorities, Kunming (1996).
2. Y. Yang and C. Hui, *Bamboo Shoots and Industrialized Exploitation*. China Forestry Publishing House, Beijing (1998).
3. Z.-Y. Wu, The areal-types of Chinese genera of seed plants, *Acta Botanica Yunnanica* **IV**, 1-139 (1991).

## Historical column

*This time I selected a brochure published in 1925 by the United States Department of Agriculture, under the title 'Bamboos: their culture and uses in the United States', as Department Bulletin no. 1329. The author was B. T. Galloway. Figure 1 gives the front page, from which you can see the content. It really covers all topics about bamboo; unfortunately, a long time ago, I made only a copy of the chapter called 'Bamboo for timber', which I will copy here in full. I like this text: it gives so many items of remembrance!*

"The lightness and strength of the large timber bamboo make it very valuable in many kinds of construction work. Lack of knowledge as to how to handle such material is one of the drawbacks here. A Japanese or Chinese craftsman will take this wood and do many things with it that would be entirely beyond our own carpenters. Note the scaffolding where large construction work is under way in any Japanese city. It is made entirely of bamboo poles lashed together in such fashion that it is quickly put up, taken down and used over and over again. An American would find difficulty in moving on one of these scaffolds, but the Japanese workman clings to the round smooth poles with his bare feet, like a chicken on a roost. Many of the cozy homes of Japan are built almost entirely of timber bamboos. Unsplit poles are used for supporting posts, rafters, and beams; split poles are employed for siding and many other purposes.

The Japanese as well as other peoples of these Eastern countries use the thin-walled bamboos split and woven into a kind of coarse matting for both exterior and interior construction. In the Philippines this material is called 'sawale', and according to a bulletin issued by the Philippine Department of Agriculture it has value for the construction of light bungalows even in temperate climates. Quoting from the bulletin: