



Kam Guilzhouh nyim Guangxxih di Benxtux Wenchual nyim Zihyuanc dih Gonxliix

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Research

Abstract

Kam Guilzhouh nyim Guangxxih di Benxtux Wenchual nyim Zihyuanc dih Gonxliix: Kam Local Indigenous Knowledge and Sustainable Resource Management in Guizhou and Guangxi Provinces.

Historically, the Han Chinese forcibly displaced Kam people from the best agricultural land. Today, the Kam cultural landscape largely encompasses the border regions of Guizhou, Hunan and Guangxi Provinces, in which lie verdant riverine mountains and valleys. Sufficient water resources support Kam rice cultivation and the broadleaf and evergreen forests of the humid subtropical montane ecosystem. The Kam have dwelled in this diverse environment for approximately 2,000 years developing unique livelihood strategies of harvesting fish and grain from paddy fields, integrating agroforestry and agriculture on mountain slopes and applying specialized knowledge and skills in utilizing local natural resources. Kam people believe that spirits inhabit elements in nature and the world around them, thus great respect should be given to these supernatural beings. Kam resource management practices support regional vegetation where hillside pastureland and forage for domestic animals are ample. Kam rice paddies and fishponds have been judiciously maintained, contributing to Kam cultural survival and development.

Introduction

The Kam nationality is the eleventh largest of the fifty-six ethnic minorities of Mainland China. Kam people primarily reside in twenty counties where Guizhou, Hunan and Guangxi Provinces meet. A relatively small number emigrated to, and live scattered in Hubei Province. According to the 1990 China national census, the population of the Kam people was 2.5 million. In 1990, approximately 1.4 million Kam dwelled in Guizhou Province, 750,000 in Hunan Province and 300,000 in the Guangxi Zhuang Autonomous Region (Figure 1). The national census of

2000 revealed that the Kam population increased to 2.96 million since the intervening decade. The population was 2,514,014, of whom 1,089,691, or 43% resided in eight counties of Qiandongnan, Guizhou: Liping, Tianzhu, Congjiang, Rongjiang, Jinping, Sansui, Jianhe and Zhenyuan. There are large Kam communities in Tongdao County, Hunan Province and in Sanjiang and Longsheng, Guangxi Province. Of the southern and northern Kam population, the southern Kam live a more traditional lifestyle (Burusphat *et al.* 2000:IV-VI, Edmondson & Solnit 1990:11, Geary & Pan 2003:284-288, Long & Geary 2000:165, Rossi & Lau 1990:5).

The purpose of this pilot study is to contribute to the Local and Indigenous Knowledge Systems project under the UNESCO Sustainable Development Programme, which builds dialogue among traditional knowledge holders, researchers, resource managers and decision-makers to enhance biodiversity conservation and to secure the active and equitable role of local communities in resource governance. The cultural survival of Kam knowledge as a dynamic living resource depends upon its continuing inter-generational transmission (UNESCO-LINKS 2009). Our

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project aims to increase awareness of Kam Ethnic Minority traditional knowledge and to promote conservation and sustainable management of the cultural and natural resources within the regions. Local indigenous knowledge is an integrated system of beliefs and practices that are culturally distinctive, encompassing specialized understanding about soils, water, wild plants, animals, crops, medicines, forests and rituals. Kam traditional knowledge represents the spiritual and cosmological forces that are integral to Kam life and culture.

Additional goals are to record social and environmental change within the Kam cultural landscape, the documentation and conservation of Kam local indigenous knowledge systems and to provide resources for sustainable community development. The ultimate objective is to realize harmonious development between human beings and the natural environment, according to the World Commission on Environment and Development. The strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. A proposed legal principle is that all people have the fundamental right to an environment that will sustain their health and wellbeing (World Commission on Environment and Development 1987:44, 65, 348).

In July and November 2006, collaborative ethnographic assessment and data collection were conducted within Kam communities in order to document local and indigenous livelihood knowledge and the interactions between

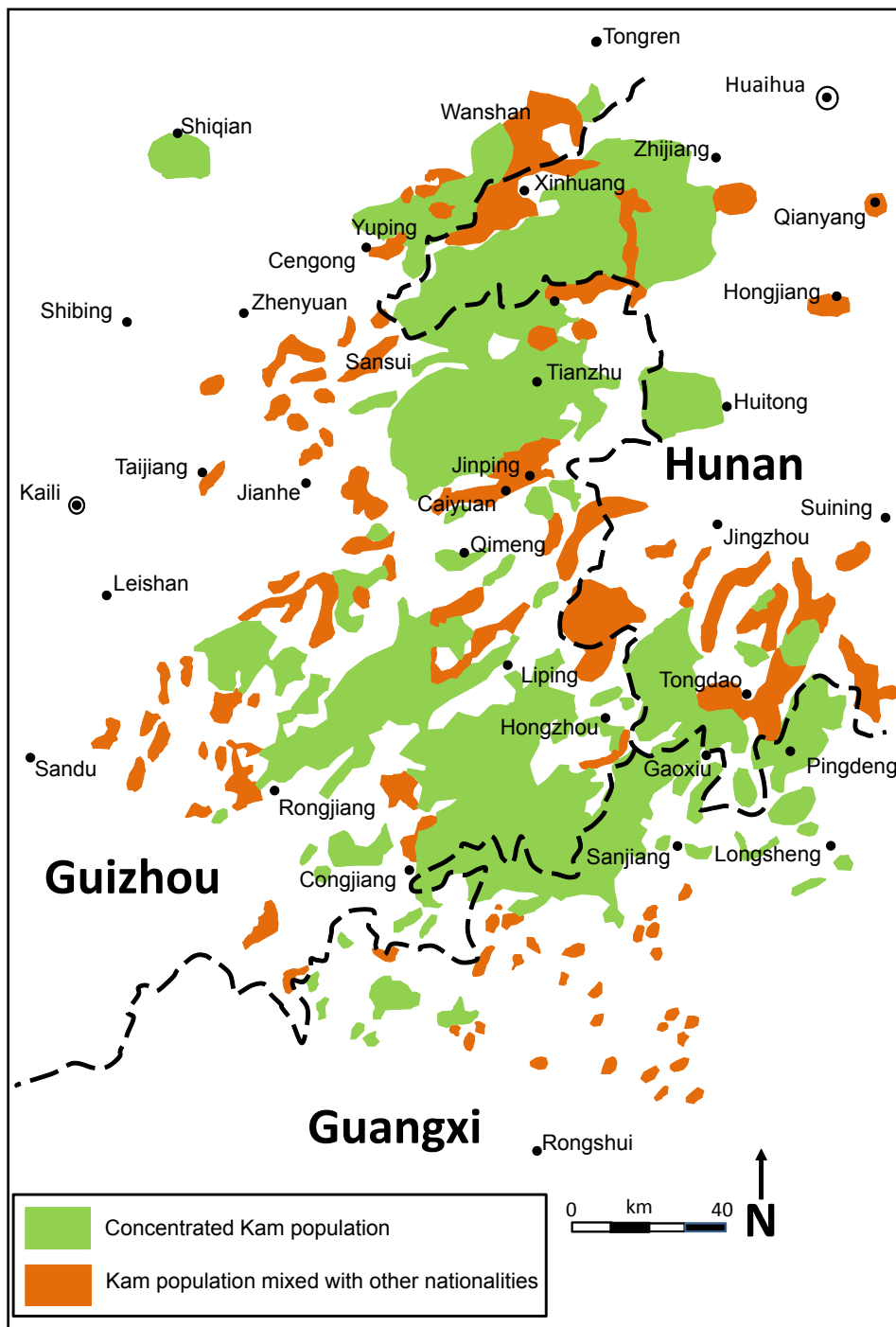


Figure 1. Primary Kam population distribution in southern China. Reproduced with permission of the original author from Geary *et al.* 2003:27. Research sites in Gaoxiu Village (26°00'01.94"N, 109°42'25.96"E) and Caiyuan Village (26°38'28.88"N, 109°08'58.84"E).

the Kam local ecosystem and the societal system. Kam ethnoecology: the interactions between environment and culture were studied with Kam experts. Participatory research on key concerns and issues, and social and environmental changes in Kam local resource management and traditional indigenous knowledge under the current socioeconomic situation in the regions were recorded.

Genuine partnerships were established to facilitate the valuation of Kam local knowledge systems and to institute its effective protection, and to promote capacity-building and sustainable management of Kam natural and cultural resources.

Transdisciplinary research is useful for reuniting the fragmented fields of natural history, ecology, biology, photography, linguistics and anthropology (Posey 1996:11) and it transcends the boundaries of conventional academic branches of knowledge. This participatory study is about giving voice to the Kam people by integrating them into the research process in a genuinely collaborative manner. Principal to this approach is a commitment to community participation, respectful dialogue, empirical fieldwork and the accurate documentation of Kam traditional knowledge, community and household needs, livelihoods strategies, and sustainable resource management. In an international context and on a local level, our project addresses critical human issues concerning local and indigenous knowledge systems, ethnicity, development and change, policy, social and environmental transformation, and sustainability. It employs participatory methods to identify the practices, concerns, needs and preferences of the Kam people with consideration for affecting policy in a positive

way, and promoting the economic wellbeing and cultural integrity of Kam communities of China.

Background

The Kam people are primarily rice farmers, pisciculturists, agroforesters and carpenters. Professional carpentry is often intergenerational within a family and it takes many years to master it well. *Cunninghamia lanceolata* (Lamb.) Hook., **meix beens2** [pen³²³] in the Taxodiaceae is the most familiar wood to Kam carpenters, who are paid for their work with money, rice or labor. *Cunninghamia* is harvested from nearby mountain forests and is hand sawn. The logs are stripped of their bark and left to dry on mountain slopes. Drum towers, **beengc2** (Figure 2), which resemble *Cunninghamia* trees, are the highest and most outstanding architectural feature of Kam villages that are constructed employing the system of mortise and tenon. The two join together securely so that nails are not required. Drum towers were originally erected with a wooden drum inside to warn villagers in the event of an intruder. Before a village was built, the drum tower was the first structure to be raised. Drum towers serve as community meeting places and are a symbol of village unity. Covered wooden wind-rain bridges, **jiuc wap** [tiu²¹² wa³⁵],



Figure 2. Kam Women's Drum Tower, **beengc2** in Gaixiu Village. © John Amato.

which provide shelter during inclement weather, are also distinctive landmarks within the Kam cultural geography. Skilled carpenters are renowned as experts in their creation and also carve geometric figures, phoenixes, lions, tigers, lotus flowers, pumpkins, gourds, dragons, snakes, fish and tortoise heads on wind-rain bridges, drum towers, furniture and veranda beams (Burusphat *et al.* 2000:VII, XIV, 17, 99, 146, Edmondson & Solnit 1990:11, Geary *et al.* 2003:47-49, 122-123, Rossi & Lau 1990:75-82).

In the southern Kam region, carpenters are employed to build new drum towers and wind-rain bridges, however, relatively few new drum towers or wind-rain bridges have been constructed in the late twentieth century. Some wind-rain bridges have fallen into disrepair. Local governments lack sufficient funds to maintain these culturally significant structures and contributions from the Kam communities are quite limited. Preservation of Kam drum towers and wind rain bridges is crucial because they represent the unique cultural heritage of the Kam people (Su Yingren, personal communication, 18 July 2006).

During the "Cultural Revolution," which seriously impacted ethnic cultures of China, Kam cultural relics disappeared; drum towers were damaged and temples were destroyed. Some Kam communities repaired and rebuilt their drum towers and temples but without assistance from the government. In the city of Jinping of Jinping County in Qian Dongnan Autonomous Minority Prefecture of Guizhou Province, Fei Shan Kam Temple artifacts were severely ravaged during the putative Cultural Revolution. Large, historical stone tablets with engraved names of contributors and members were cast into a trash heap in a yard adjoining the Temple grounds. A great, carved stone lintel was buried beneath rubbish along with historical paintings that were discarded and damaged. The devastation to Kam cultural artifacts is apparent today and was documented in this study. In July 2006, Kam elders, teachers and local government officials were contacted to examine the destruction with the research team. In November 2006, the site was revisited to monitor the situation. UNESCO, UNDESA and the UN Permanent Forum on Indigenous Issues were alerted to the desecration, which undermines the cultural patrimony of the Kam nationality. Immediate reparation measures are required in order to protect and preserve significant historic cultural resources of the Kam Ethnic Minority.

Kam people reflected on the Chinese acculturation policies and wanton acts of destruction during the nominal Cultural Revolution. They witnessed extensive burning and demolition during this period and those memories still cause pain today. The more one realizes the irreplaceable value the sacred and ceremonial places and relics have, the more painful it is (Yang Tongyin, personal communication, 29 October 2006). We returned to the Jinping Fei Shan Kam Temple in November 2006 to see if anything had been done to protect the significant and histori-

cal Kam objects that are associated with the Temple. The historical stone tablets, carved stone lintel and paintings are still buried amid a trash heap in a yard beside the Temple.

Methodology

Within the framework of UNESCO's Science Policy and Sustainable Development Programme on Local and Indigenous Knowledge (UNESCO-LINKS) United Nations Educational, Scientific and Cultural Organization, the United Nations Department of Economic and Social Affairs (UNDESA), Division for Social Policy and Development, through the United Nations Permanent Forum on Indigenous Issues, International Expert and ethnoecologist, Amy Eisenberg, Professional photographer, John Amato and botanist, Dengtao jointly undertook participatory research on Kam Local Indigenous Knowledge and Sustainable Resource Management in close cooperation with the Kam Ethnic Minority Community of China and relevant ministries responsible for ethnic development. The comprehensive photodocumentation with detailed descriptions of this study can be viewed at: www.pbase.com/jamato8.

Ethnographic assessment of Kam ecology, botany, medicine, agriculture, pisciculture and agroforestry methods was conducted involving systematic plant collection, identification and verification, photodocumentation, data collection through interviews, participant observation, respectful and reciprocal dialogue and cross-cultural communication. Plant specimens were collected, pressed, labeled, recorded and deposited in the Jishou University Herbarium (JIU) in Xiangxi Tujia and Miao Autonomous Prefecture of Hunan Province. The multidisciplinary research team carried out numerous ethnographic interviews conducted in Mandarin and Kam language, and natural history field investigations on the ecological and social environment within the Kam cultural landscape. We resided in the Kam villages of Gaoxiu and Caiyuan and interacted with many Kam participants daily. We celebrated the New Rice Festival and the opening of a new drum tower in Gaoxiu Village with Kam people in the southern Kam region.

Kam communities are faced with persistent challenges to protect their cultural and natural resources and maintain their unique local knowledge systems and identities. The most important goal of the participatory process in this study is to engage Kam people directly in discussing their personal and collective experiences regarding their traditional knowledge systems and resources, development, policy, and social and environmental change. Recorded open-ended interviews were conducted, participant observation, and natural history exploration were employed; thus information from both formal and informal data con-

tributes to the findings. Every Kam person in this study is our teacher.

Kam experts were consulted in determining the appropriate gifts to be provided for each participant in the study. Every person interviewed was compensated and given useful goods such as fruits, vegetables, meat and household items as well as photographs of themselves, their family and friends. A portable Canon Selphy CP710 Compact Photo Printer was utilized in the field for making photographic prints for Kam collaborators. As partners in this research endeavor with the Kam people, we contributed to the creation of a Gaoxiu Village Women's House and the development of a Gaoxiu Elders' Activity Center. The project provided financial assistance for Kam scholars, and the Kam of Caiyuan Village in Guizhou Province for protecting their significant sacred, ceremonial and historical objects that are situated along the Qingshui River. Some of the Kam relics were moved to higher ground so that they would not be submerged under water by the damming of the Qingshui Jiang.

John Amato developed a photographic Kam local and indigenous knowledge database and inventory including photodocumentation of cultural and environmental changes in Kam lives and livelihoods, communities and traditional technology. John systematically photographed pertinent information in this study while applying ethical standards and approved scientific research methods in visual anthropology. If one wishes to photograph, the visual anthropologist must consider the feelings of the people (Collier & Collier 1986:170, 24). The systematic photographic data set contains photodocuments that illustrate specific aspects of people's lives and livelihoods, Kam botanical and medical practices, ethnographic interviews, natural history, social and environmental conditions and change, areas of concern to the Kam people, and cultural and natural resource management within the study areas. The database of visual ethnoecology is a useful long-term resource for reconstructing information about Kam life and culture.

Scientific photodocumentation and natural history exploration in our project are used as a means of orientation by making an overview through the research area and recording geographical, biological and cultural phenomena while reinforcing, documenting and referencing ethnographic statements. Photography gathers selective and specific information with qualifying and contextual relationships, and as a research tool with its associated methodologies, it extends our perceptions if we make skilled and appropriate use of it. Kam culture, as every culture, must be seen on its own terms. Through the legitimate field of visual anthropology, it is possible to learn to see through the eyes of the Kam people. Their perceptions are directly related to their interactions with their total environment, in which Kam history, cosmology and ecology are interrelated elements that shape the Kam world (Collier & Collier 1986:xv-xvii, 5-17).

The interviews were reviewed including clarification of expressions by Kam consultants and linguists, who are familiar with southern and northern Kam language. Kam linguists provided the standard phonetic spelling of Kam words and plant names that appear in brackets after some of the scientific nomenclature in this paper. Participatory research is an ongoing interactive process; therefore, consultation with Kam experts continues. Continued dialogue, feedback, suggestions and corrections are highly regarded, and gratefully received and acknowledged. An ongoing effort is being made toward maintaining established friendships, with a willingness to understand and identify the necessities and priorities of the Kam people and their communities.

Gaoxiu Village leaders expressed a great need for environmental protection measures, assistance in establishing springs; places to drink fresh water and to safeguard the water, good sanitation and sustainable garbage management, restroom facilities and improvement of the dangerous and treacherous dirt road to Gaoxiu Village. Kam residents stated that the road was built in 1980 and was to be paved in 2005, however the local government misappropriated funds that were designated for rural development. As a consequence, the road was not constructed properly or paved. There are numerous serious accidents on this unimproved road that is often impassable during the rainy season. Kam leaders of Gaoxiu Village, local government officials of Sanjiang Dong Autonomous Prefecture of Guangxi Province, and Kam leaders of Caiyuan Village and local government officials of Jinping County in Qian Dongnan Autonomous Minority Prefecture of Guizhou Province were consulted to discuss and convey the needs of rural Kam communities.

An attempt is being made to elucidate and translate the experiences, observations, perceptions and cultural concerns of the Kam people into information that can be useful for the Kam community and relevant ministries responsible for ethnic development. Elucidation, translation and contextualization of the findings into applicable recommendations can help achieve the goal of incorporating Kam concerns and community needs into sustainable natural resource management and cultural resource preservation legislation and policy. The findings of this study, based on Kam perspectives are designed to aid in understanding and appreciating the cosmological vision, local knowledge resources and needs of the Kam people, for the benefit of their communities and future generations, and to increase international awareness and respect for Kam traditional knowledge and to promote sustainable resource management within the Kam cultural landscape.

Kam Ethnobotany

The Kam have a well-developed comprehensive ethnobotanical inventory (Figure 3) and a diverse pharmacopoeia of traditional medicine and useful plants in which



Figure 3. Kam plant expert, Long Xian Qian of Caiyuan Village. © John Amato.

hundreds of species have been employed for centuries in preventing and curing disease (Huang *et al.* 1996:267-268). Some of the most commonly used medicinal plants by the Kam are in the following plant families; Asteraceae, Fabaceae, Rosaceae, Rubiaceae, Poaceae, Liliaceae, Lamiaceae, Rutaceae, Polygonaceae and Apiaceae. Kam healers have created a special school of medicine, which embodies the life and wisdom of the Kam people (Liu & Long 1996:183).

Kam Medicine

Before going to the mountains, traditional Kam healer of Gaoxiu Village, Wu Shun Jun sings a spirited plant medicine gathering song. Kam practitioners of local medicine perform acupuncture, acupressure, therapeutic massage, bloodletting and plant healing while applying oppositional principles that are unique to the Kam medical system. Rice wine and tea seed oil, **juc xac**, from the seeds of *Camellia oleifera* Abel, **meix yuc** (Burusphat *et al.* 2000:102, 148) in the Theaceae are employed in Kam medicinal preparations, therapeutic massage and other curative applications. Gaoxiu local healer, Wu Shun Jun (Figure 4) would like to create a small teaching and healing center for Kam Medicine in his village. In 1991, he was given a commemorative honor for saving a seriously ill man's life

through his healing arts. Wu Shun Jun's wife, Yang Bei Xiao assists him with his health and wellness practices. His grandfather taught him Kam medicine and he is teaching this very specialized intergenerational knowledge to his son. Wu Shun Jun began treating people when he was 12 years old. Traditional Kam doctors also practice veterinary medicine.

In the past, glutinous rice, *Oryza sativa* L., **oux lail (oux jos)** in the Poaceae was the staff of life for Kam people. It is referred to as Kam rice or good rice and is distinguished from another cultivar of *O. sativa*, which is Han (Chinese) rice, **oux gax** (Burusphat *et al.* 2000:189). *Oryza sativa* is an aquatic annual in the tribe Oryzaceae. It has erect culms and leaf sheaths that are slightly inflated below. Its panicle is loosely contracted and nodding at maturity and the rice spikelets are oblong to oblong-lanceolate. The rice caryopsis is a dry one-seeded fruit whose ovary wall is united with the seed coat.

Kam women of Gaoxiu Village save the water from cooked rice and use it as a hair wash. It is left on the hair for 30 minutes and then rinsed out. Rice water is a very useful constituent in Kam medicine for topical applications. There are more than forty types of glutinous rice cultivated in the southern Kam region including red, purple, black and fra-



Figure 4. Kam healer, Wu Shun Jun discusses plant medicine in Gaoxiu Village. © John Amato.

grant glutinous rice, from which the best wine is made. Rice wine is an extremely important element in Kam medicinal preparations, for therapeutic massage and other external as well as internal healing treatments.

Culms of dried glutinous rice are cut into short strands and tied together into a bundle. Incantations are recited and the bundle is hung around a Kam child's neck to protect the child from harm (Geary *et al.* 2003:149). *Oryza sativa* is grown primarily in flooded fields throughout most of China and was domesticated in Southeast Asia. It is widely planted in tropical and warm-temperate regions of the world with many different cultivated races (Liu & Phillips 2006a:182-184).

Camellia oleifera, **meix yuc** (Burusphat *et al.* 2000:148) is an endemic evergreen shrub or tree in the Theaceae with leathery leaf blades, globose to ellipsoid woody capsules (Figure 5) and wingless brown to reddish brown seeds. The seeds possess oil that is extracted and used primarily in cooking and Kam medicinal preparations for therapeutic massage and other curative applications. Kam healers of Gaoxiu Village use *C. oleifera* for treating stomachaches.



Figure 5. The woody capsule of *Camellia oleifera* Abel, **meix yuc**. © John Amato.

A deep muscle massage with tea seed oil, **juc xac** (Burusphat *et al.* 2000:102), while significant pressure is applied to the feet and calves, is a restorative method for relieving stomach pain. *Camellia oleifera* has been extensively cultivated for its seed oil; therefore it is difficult to discern whether plant material is from wild, cultivated or escaped specimens. This important economic woody plant is the hardiest species of *Camellia* with the northernmost range. *Camellia oleifera* has the longest history of cultivation and utilization in China. It grows in forest thickets and has a strong wood that is fashioned into large hooks for hanging objects.

Juncus effusus L. is a densely tufted native perennial in the Juncaceae with thick creeping rhizomes and many flowered inflorescences. The ovoid oblong capsule bears many ovoid oblong reticulate seeds. Kam people of Gaoxiu Village have used the pith of *J. effusus* for drawing hot *Camellia oleifera*, tea seed oil, **juc xac**, which is utilized in medical applications for relieving pain. The outer epidermis of *J. effusus* is removed and the pith serves as a wick for applying the oil to the body. Wu & Clemants (2000:48) documented that the pith is also employed as a wick for oil lamps and candles, and is used medicinally as a tranquilizer and diuretic. *Juncus effusus* grows along forest margins, wet grasslands, boggy areas and standing water, lakesides, riverbanks, fields and rice paddies. It is widespread in tropical montane and temperate regions of the world.

Acorus calamus L., **xengp jox** (Burusphat *et al.* 2000:249) is a marsh or emergent herbaceous aquatic perennial in the Acoraceae with linear leaves and a stout pinkish, aromatic horizontal rhizome. Its leaves have a distinct midrib on both sides and its flowers are yellowish. The fruit is an oblong red berry with few seeds. *Acorus* rhizomes, rice and tea leaves are often placed in a cloth bag and hung around a Kam child's neck to prevent the child's soul from fleeing when she/he is frightened (Geary *et al.* 2003:148-149). In Gaoxiu Village, *A. calamus* is given to Kam children to wear for protection, and it is hung with a woody plant above the door of Kam homes to keep ghosts out. Mabberley (1997:8) recorded that *A. calamus* rhizomes have been used medicinally for centuries as a holy oil to anoint altars and sacred vessels. It is employed as a tonic, to treat toothaches and dysentery and has been hung at night to keep evil spirits from children. It is also utilized as an effective natural insecticide because of its terpenes. *Acorus calamus* is cultivated and found throughout China.

Acorus gramineus Sol. is an endemic, medicinal herbaceous perennial in the Acoraceae with fragrant linear leaves and densely branched, short creeping aromatic rhizomes. It produces numerous yellow green flowers and yellow ovoid globose capsules with seeds that are hairy at the base. Kam people of Gaoxiu Village use the leaves of *A. gramineus* as an important ingredient for flavoring **bal taot** (Yang, Tongyin, personal communication, 17 No-

vember 2006), a traditional Kam raw fish dish. *Acorus gramineus* grows in Asia on moist rocky outcrops and along streams below 1800 meters in elevation. The rhizomes of all *Acorus* species are employed in the treatment of chronic bronchitis, diarrhea, abdominal distension, chills and colds and are applied topically for treating abscesses.

Alangium faberi Oliv. is an endemic, latex-producing, deciduous shrub in the Alangiaceae with smooth bark, slender branchlets and spirally arranged simple, thinly papery to membranous leaves. Its flowers are axillary and the fruit is a drupe that is light purple when mature. Kam people of Caiyuan Village eat the fresh leaves of *A. faberi* in moderation as medicine for treating rheumatism. One must not eat too many leaves or it may cause jerking or twitching and convulsive movements. Mabberley (1997:20) indicated that various species of *Alangium* are cultivated ornamentals, sources of timber and medicine. *Alangium faberi* grows in open forests near Caiyuan Village.

Aleuritopteris argentea (S.G. Gmel.) Fée is a small and strikingly beautiful native fern in the Sinopteridaceae with clustered, white or yellow farinose pentagonal or ovate-pentagonal bipinnatifid frond blades that have an acuminate apex. The false indusia associated with the sori; clusters of spore producing receptacles, is yellowish-green and membranaceous and its rhizomes are erect or ascending. The frond petiole is lustrous, chestnut colored or ebony. Kam people of Gaoxiu Village prepare a medicinal tea of the entire plant with its rhizomes for treating diarrhea. *Aleuritopteris argentea* grows in limestone crevices or rocky walls and is widely distributed throughout China.

Angelica sinensis (Oliv.) Diels is an endemic perennial in the Apiaceae with purplish green ribbed stems, 3-lobed ovate or ovate lanceolate leaflets with irregular margins, umbellules of many white flowers and ellipsoid or suborbicular ribbed and broadly winged fruits. Its roots are cylindrical with many succulent, strongly aromatic rootlets. Kam people of Gaoxiu Village prepare the root of this wild and cultivated medicinal plant as an invigorating tonic. The roots are cooked with meat and consumed for promoting general good health. *Angelica sinensis* grows in forests and shrubby thickets (She *et al.* 2005:168).

Artemisia argyi H. Lévl. & Vaniot, **ngaih** (Burusphat *et al.* 2000:168) is a tall, pubescent, strongly aromatic medicinal herbaceous perennial or subshrub in the Asteraceae with numerous lateral roots and oblong or ovoid oblong achenes. The Kam hang *A. argyi* above the doorway to their houses for protection with *Typha orientalis* C. Presl, **jiang bu**. *Artemisia argyi* leaves are applied in healing as a vermifuge, antiasthmatic, antiseptic, expectorant, febrifuge and styptic. The leaves of some *Artemisia* species are used to treat coughs and are also employed in moxibustion. Mabberley (1997:57) stated that a volatile oil extracted from the plant is quite effective in the treatment of

bronchitis and asthma. Artemisin, an efficacious antimalarial is derived from another species of *Artemisia*. *Artemisia argyi* grows in disturbed areas, along roadsides, on mountain slopes and hillsides in lower elevations.

Asparagus filicinus Buch.-Ham. ex D. Don is an herbaceous plant in the Liliaceae with many branched, erect stems and a short rhizome bearing a cluster of fusiform roots that are swollen at the base. Its leaves are reduced to scales and the fruit is a deep green berry with few seeds. Kam healers of Gaoxiu Village use *A. filicinus* as medicine for treating intestinal problems. It grows in forests, thickets and moist, shaded areas of valleys (Chen & Tamanian 2000:210).

Aspidistra lurida Ker Gawl. is an endemic, rhizomatous herbaceous perennial in the Liliaceae with solitary, stiff narrowly lanceolate leaves, dark purple nodding solitary flowers and a berry fruit. Kam people of Gaoxiu Village macerate the entire plant for preparing a medicinal tea to be taken internally for treating liver cancer, headaches and toothaches. *Aspidistra lurida* grows in rock crevices of limestone mountains in southern China (Liang & Tamura 2000:246).

Aster indicus L. is a native herbaceous perennial in the Asteraceae with elongate rhizomes, stolons and a loose corymb of flower heads bearing bluish purple ray florets and yellow disc florets that produce dark brownish compressed achenes. Gaoxiu Village Kam people use the leaves, flower heads and rhizomes of *A. indicus* as medicine for treating fever in children. The leaves and flower heads are gathered in spring, summer and autumn and cooked with chicken. The healing broth and chicken are consumed as a febrifuge and tonic for maintaining good health. In winter, the rhizomes are collected for medicine when aboveground plant parts are unavailable. *Aster indicus* is widely distributed in wet areas of Asia from sea level to low elevations.

Belamcanda chinensis (L.) DC. is an herbaceous perennial in the Iridaceae with knobbly pale brown rhizomes, a well-developed erect, leafy aerial stem and sword-shaped leaves. Its inflorescence of reddish orange flowers with dark spots is dichotomously branched and its obovoid or ellipsoid unbeaked capsules bear black glossy seeds. Kam people of Gaoxiu Village regard *B. chinensis* as an important healing plant that is used to treat sore throats and tonsillitis. A tea is prepared from the macerated rhizome and is consumed in moderation. Pregnant women should not drink this medicinal tea. The Kam also apply the macerated rhizome as a poultice to itching and irritated skin. *Belamcanda chinensis* is a native plant of China that is often cultivated and the rhizome is used in traditional medicine (Zhao *et al.* 2000a:312-313).

Buddleja davidii Franch. is an ornamental shrub with serrate leaves and fragrant violet to dark purple or white flow-

ers with an orange-yellow throat. Its capsules are brown with ellipsoid winged seeds. Kam people of Gaoxiu Village use *B. davidii* as an ichthyotoxin. It is also valued as a medicinal and cultivated plant that attracts butterflies. *Buddleja davidii* grows in thickets, on mountain slopes and in drainages.

Buddleja lindleyana Fortune is an endemic shrub in the Loganiaceae with brown stems and purple flowered terminal spicate inflorescences that have rusty pubescence and stellate hairs. Its capsule is ellipsoid bearing pale brown winged seeds. Kam people of Gaoxiu Village make a poultice of the fresh leaves for healing knife lacerations, however it is a poisonous plant, therefore it must be used in moderation. The Kam also employ this species as an ichthyotoxin. *Buddleja lindleyana* was growing along a stream in Gaoxiu Village. It is a cultivated plant that is found in the mountains, along trailsides, streams and forest edges (Li & Leeuwenberg 1996:333-335).

Callicarpa kwangtungensis Chun is an endemic shrub in the Verbenaceae with purplish branchlets, many white or purplish flowers and a small globose yellow glandular drupe with small oblong seeds. Kam people of Gaoxiu Village use the macerated leaves and fruits topically to treat rashes and itching, and as a haemostatic poultice while applying pressure, to stop bleeding. Mabberley (1997:115) recorded that some species of *Callicarpa* are cultivated ornamental shrubs and others are used as fish poisons. *Callicarpa kwangtungensis* grows in mixed forests of China (Chen & Gilbert 1994:15).

Centella asiatica (L.) Urb. is a native herbaceous perennial in the Apiaceae with slender creeping stems and simple leaf blades with palmate venation. The leaves form rosettes along the stem and the inflorescence is an umbel with few flowers. The flowers are white or rose-tinged and the fruit is laterally compressed. Kam people of Gaoxiu Village use *C. asiatica* to heal broken bones and bruises. They macerate the entire plant and add this to alcohol to create a tincture, which is then applied topically to the area of the fracture or bruise in the form of a bandage. Kam healers apply plaster casts and splints using this medicinal plant. *Centella asiatica* is sometimes consumed and is an important traditional local medicine. It grows in shady and wet, grassy areas along river margins and is widespread throughout tropical and subtropical regions of the world (She & Watson 2005:18).

Chimonanthus praecox (L.) Link is a medicinal and ornamental shrub or treelet in the Calycanthaceae with opposite papery, elliptical leaf blades and axillary fragrant flowers that appear before the leaves emerge. The flowers are yellow and purplish red and are used as medicine to treat thirst and depression. The aromatic oils from the flower buds are applied to burns and the leaves and roots are employed as medicine for colds, rheumatism, contusions, strains, cuts and hemorrhages. Kam people of Caiyuan

Village make a poultice of the leaves for treating itching irritated skin and epidermal diseases. The mature stems are administered for relieving rheumatism, aches and pains. *Chimonanthus praecox* grows in mountain forests near Caiyuan Village along the Qingshui River.

Cinnamomum camphora (L.) J. Presl, **meix gungl**, (Burusphat *et al.* 2000:147) is a large evergreen camphor-scented tree in the Lauraceae with medicinal properties. The leaves are alternate and ovate-elliptic and the fruit is ovoid or subglobose and purple-black. Kam people of Gaoxiu Village use the leaves and fruits of *C. camphora* as medicine. They prepare a healing tea of the leaves to wash itchy and irritated scalp. The fresh fruit is eaten for excessive alcohol consumption. *Cinnamomum camphora* is an aromatic tree that is the source of camphor, which is derived from the stem, root, branches and leaves. Camphor is used medicinally as a stimulant, antispasmodic, antiseptic and rubefacient. The beautifully grained, light brownish wood is easily polished and used for furniture, cabinets and interior finishes. *C. camphora* has been introduced, and cultivated in valleys and on mountain slopes in many countries of the world (Li *et al.* 2008:166-187).

Cirsium japonicum DC. is a native herbaceous perennial in the Asteraceae with tuberous roots, erect grayish white pubescent ribbed stems, winged petiole margins and red to purple flowers. Kam people of Gaoxiu Village use the root to treat localized swelling and edema, skin irritations, sore throat and an imbalanced system. The roots possess anti-inflammatory, diuretic and haemostatic properties. *Cirsium japonicum* grows in forests, along forest margins, thickets, grasslands, disturbed areas, farmland, roadsides and streams.

Clerodendrum bungei Steud. is a cultivated ornamental shrub in the Verbenaceae with ovate leaves, conspicuously swollen flower bud tips, terminal pinkish, red or purple flowers and the fruit is a blue-black drupe. *Clerodendrum bungei* is a local Kam medicine in Caiyuan Village.

Commelina benghalensis L. is a native herbaceous perennial in the Commelinaceae with creeping stems, numerous pubescent branches and alternate ovate leaves. It has zygomorphic blue flowers and an ellipsoid capsule with cylindrical or semicylindrical black seeds. Kam people of Gaoxiu Village prepare a tea of the entire plant for regulating menses. *Commelina benghalensis* is a traditional medicine with anti-inflammatory, febrifugal and diuretic properties that is also used by the Kam as fodder for animals, and food for developing fish in the fishponds. It grows in moist and shaded places in the lowlands (Hong & DeFilippes 2000a:37).

Crassocephalum crepidioides (Benth.) S. Moore is an herbaceous plant in the Asteraceae with erect stems, alternate elliptic or oblong-elliptic leaf blades, numerous reddish-brown or orange tubular florets and brownish nar-

rowly oblong achenes. Kam people of Gaoxiu Village use *C. crepidioides* for treating fevers. A medicinal tea of the leaves, young stems and water is prepared in an earthenware pot. Utilization of a ceramic vessel produces more effective medicine and metal cookware should not be employed. *Crassocephalum crepidioides* is traditionally used to invigorate the spleen and treat indigestion. The young tender leaves are eaten as a wild vegetable. *Crassocephalum crepidioides* grows on mountain slopes, along roadsides, streams and thickets of Asia.

Crinum asiaticum L. var. *sinicum* (Roxb. ex Herb.) Baker is a bulbiferous native, herbaceous perennial in the Amaryllidaceae with basal, dark green linear lanceolate leaves that possess visible fibers when torn. Its bulbs are narrowly cylindrical and the erect flowering stems are solid. The flowers are fragrant, greenish white and tubular, and the fruit is a subglobose capsule bearing seeds with a grayish white spongy seed coat. The Kam of Gaoxiu Village use the leaves for healing broken bones and sprains. The fresh leaves are macerated and applied topically as a poultice with a splint for supporting and immobilizing the affected area. Plant healer, Yang Chang Jun regards *C. asiaticum* L. var. *sinicum* as one of the most effective and beneficial plant species for treating fractures and sprains. It is widely cultivated as an ornamental and medicinal plant. *Crinum asiaticum* L. var. *sinicum* grows along seashores, sandy places and riverbanks of Asia (Ji & Meerow 2000a:265-266).

Curculigo orchioides Gaertn. is a native herbaceous perennial in the Amaryllidaceae with lanceolate to linear leaf blades and flowering stems that are almost entirely enclosed in a base of sheathed petioles. It has many yellow flowers, a beaked berry, small seeds and erect rhizomes. Kam people use the rhizome of *C. orchioides* as medicine for treating lower back pain and fractures of the skull. The rhizomes with wine are made into a tincture that is massaged into the affected area with the handle of a knife. After the area is massaged with the solution, it is wrapped in cotton gauze. An emetic tea is prepared of the rhizome, which causes vomiting. According to Kam local medicine, if one falls from a great height and the trauma results in internal bleeding, the tea of *C. orchioides* will cause the person to vomit the coagulated blood. *Curculigo orchioides* grows in forests and on open grassy mountain slopes (Ji & Meerow 2000b:272).

Cuscuta chinensis Lam. is an herbaceous parasitic plant in the Convolvulaceae with thin, twining thread-like yellow stems and short-lived root systems. Its leaves are reduced to minute scales and its white flowers are in clusters. Kam people of Caiyuan Village make an extremely bitter tea of *C. chinensis* for treating kidney ailments. In Gaoxiu Village, a medicinal tea of the entire plant is prepared as a treatment for paralysis. *Cuscuta chinensis* is widespread in China and is found in open fields, mountain slopes, thickets and sandy beaches, often growing on

plants in the Fabaceae, Asteraceae and Zygophyllaceae (Fang *et al.* 1995:322-325, Mabberley 1997:201).

Daphne odora Thunb. is an evergreen shrub in the Thymelaeaceae with alternate leathery leaves, winter-blooming fragrant flowers and a succulent berry fruit. The Thymelaeaceae is a plant family of toxic trees and shrubs that produce glycosides and daphnin, which is a bitter substance. *Daphne odora* is widely cultivated as a fragrant ornamental and local medicinal plant. Kam people of Caiyuan Village place *D. odora* beside their pillow for a deep, peaceful and dreamless sleep. Mabberley (1997:164, 713) documented that some species of *Daphne* produce bark fiber and are safe and effective abortifacients and insect repellents.

Digitaria sanguinalis (L.) Scop. is a native annual grass in the Poaceae with linear-lanceolate leaf blades and a digitate or subdigitate inflorescence. Kam people of Gaoxiu Village prepare a medicinal tea of the entire plant for treating colds and fevers. It is prescribed along with *Vitex negundo* L., *Piper wallichii* (Miq.) Hand.-Mazz. and other healing plants. *Digitaria sanguinalis* is also good forage that grows in fields, along roadsides and disturbed areas of warm temperate and subtropical uplands throughout the world (Chen & Phillips 2006a:542-543).

Diospyros kaki L.f., **minx** [min³¹] is a widely cultivated deciduous tree in the Ebenaceae that has alternate, papery leaves and a fleshy yellow to orange flattened globose berry with an enlarged persistent calyx. The sweet and edible fruits contain laterally compressed dark brown seeds. The persistent calyx of some varieties of *D. kaki* is used to treat hiccups, and the mature fruits are prescribed as a stomachic, a medicine or tonic that promotes the appetite or aids in digestion. Juice extracted from the immature fruits is employed in treating hypertension, and as a preservative for construction materials. *Diospyros kaki* was growing in the courtyard of the Caiyuan Village Primary School, which was flooded by the damming of the Qingshui Jiang. This cultivated species grows in forests and thickets on mountain slopes and is naturalized in some areas (Li *et al.* 1996:225-226).

Equisetum hyemale L. is a medicinal, rhizomatous perennial in the Equisetaceae with transversely ridged hollow stems, reduced whorled leaves and terminal spore-producing cones with an acuminate apex. The Kam of Caiyuan Village make a tea of *E. hyemale* for treating rheumatism, aches and pains and to enhance circulation. The tea is taken internally and applied topically as medicine. Kam people of Gaoxiu Village prepare a healing tea of the entire plant of *Equisetum* species for relieving bloating, gas and indigestion. Mabberley (1997:260) noted that the shoots of some species of *Equisetum* are eaten as a vegetable and the cones are sweet and juicy. *Equisetum hyemale* grows in moist places, along riverbanks, roadsides, ditches and seepage areas.

Ficus pumila L. is a native, climbing shrub in the Moraceae with alternate, dimorphic leaves, short aerial roots, and axillary pedunculate pear-shaped, globose or cylindrical figs that are yellowish green to pale red when mature. The fig is a syconium, which is a fleshy swollen receptacle that develops into a multiple fruit whose numerous embedded achenes are completely enclosed within. *Ficus pumila* and other members of the subgenus *Synoecia* are pollinated by *Wiebesia* fig wasps, which are very specialized symbiotic pollinators (Wu *et al.* 2003a:66-70). Kam people of Caiyuan Village make a jellylike medicinal tea of the fruits and seeds for menstrual bleeding, and as an abortifacient. The fruits and seeds are mixed with sugar, **dangc**² (Burusphat *et al.* 2000:39) and water to make a refreshing gelatinous drink. *Ficus pumila* is a liana that climbs on large trees in Caiyuan Village.

Ficus stenophylla Hemsl. is a shrub in the Moraceae with milky latex and branchlets that possess grayish white bristles. The entire simple leaves are papery and its axillary, ellipsoid globose figs are dark red when mature (Wu *et al.* 2003a:58-59). Kam people of Caiyuan Village use the milky exudate for lactating women with sore nipples as a result of breastfeeding. The fresh leaves, milky latex and bark are applied as a poultice to relieve sore nipples of nursing women. *Ficus stenophylla* was growing along the Qingshui Jiang and streams near Caiyuan Village.

Ginkgo biloba L., **meix yinhan** (Su Yingren, personal communication, 20 December 2006) is an endemic deciduous tree in the Ginkgoaceae with a tall trunk and pale green flabellate leaves that turn bright yellow in autumn. *Ginkgo biloba* has been cultivated as a shade tree for thousands of years, however it is now a rare species in the wild. Kam people of Gaoxiu Village eat the medicinal young bitter leaves, which are prepared as tea for treating coughs. The fleshy one-seeded reproductive structures are irritating and have a rancid odor when mature, however the elliptic seeds are edible. *G. biloba* is a relict species of the Mesozoic that was formerly widespread throughout the world. It is a sacred tree to Buddhists and is often planted near temples. The leaves are used for pesticides, the roots are applied as medicine, the wood is employed in furniture making and the bark yields tannin. *G. biloba* is scattered in broad-leaved forests and valleys on acidic and well-drained yellow loess (Fu *et al.* 1999a:8).

Girardinia diversifolia (Link) Friis is a robust, native herbaceous plant in the Urticaceae that is armed with stinging hairs and its stems are often woody at the base. This species is a local Kam medicine in Caiyuan Village that is applied as a poultice and tea for rheumatism and other inflammatory aches and pains. *Girardinia diversifolia* grows along forest margins, moist shady areas, stream banks, and disturbed soils near villages. *Girardinia* species have alternate leaves with dentate margins, and long stinging hairs that are very strongly irritating. It is cultivated for its stem fibers, which are used to make ropes, nets and

coarse cloth. *Girardinia* is applied as a febrifugal medicine and its boiled young shoots are eaten as a vegetable (Chen *et al.* 2003b:78-81, 90-91).

Gladiolus x gandavensis Van Houtte is an introduced, cultivated ornamental herbaceous perennial in the Iridaceae whose basal stem is swollen into a corm; a short and rounded underground organ that stores food over the long winter and produces new foliage in the spring. *Gladiolus x gandavensis* has fanlike clumps of stiff, sword shaped leaves with parallel veins and numerous large and brightly colored showy irregular flowers that are arranged on one-sided spikes. *Gladiolus x gandavensis* exhibits considerable floral diversification. Kam plant healer, Wu Shun Jun of Gaoxiu Village cultivates this plant for treating lung and liver cancer. Its green fruit, which is a capsule is added to wine as a tincture or made into a medicinal tea. If one falls from a great height and suffers physical trauma, the tincture or infusion of the green capsules of *G. x gandavensis* is massaged topically onto the affected area of the body. Plant healer, Yang Chang Jun of Gaoxiu Village employs the leaves of *G. x gandavensis* for treating broken bones and sprains. The leaves are macerated and applied topically as a poultice with a splint for supporting and immobilizing the affected area. This species was cultivated on a hillside above Gaoxiu Village rice fields. Yang Chang Jun considers *G. x gandavensis* one of the most important medicinal plants for treating fractures and sprains. It grows in full sun or partial shade in moist, well-drained soils and is widely cultivated as an ornamental throughout the world.

Gynura bicolor (Roxb. ex Willd.) DC. is a tall herbaceous perennial in the Asteraceae with leafy branched and spreading decumbent to erect flaccid and fleshy stems that are slightly woody at the base. It has alternate petiolate obovate or oblanceolate purplish irregularly dentate leaves and orange-yellow florets. Kam people of Gaoxiu Village grow this useful plant and macerate its leaves, which are then applied as a poultice for bruises. The leaves are also made into a medicinal tea for regulating menses. *Gynura bicolor* is cultivated as a healing plant and as a vegetable. It rarely escapes cultivation and grows in forests on mountain slopes and in rocky or moist places by rivers.

Hedera sp. is a medicinal, woody climbing ornamental vine in the Araliaceae with lobed evergreen leaves and aerial roots. Its inflorescence is a compact terminal raceme of umbels and the fruit is a globose drupe with ovoid seeds. Kam people of Caiyuan Village make a tea of *Hedera* that is taken internally and applied as a wash for rheumatism and other aches and pains. It grows in forests and along roadsides and rocky slopes, climbing on trees or rocks near Caiyuan Village.

Hedyotis uncinella Hook & Arn. is a native perennial in the Rubiaceae with 4-angled branches, opposite leaves, ter-

minal and axillary dense globose heads of white flowers with a hairy throat, and subglobose fruits. Kam people of Gaoxiu Village use *H. uncinella* as medicine for treating red and irritated eyes and swelling around the eye area. The entire plant is macerated, mixed with rice water and made into a poultice that is applied topically and proximally to the eyes. This traditional Kam medicine, which is also used for snakebites, has been employed effectively for generations. *Hedyotis uncinella* grows in lowland areas of tropical and subtropical Asia.

Hypericum japonicum Thunb. is a native herbaceous annual in the Clusiaceae with extensively branched stems, thickly papery leaf blades and a many-flowered terminal inflorescence of pale to bright yellow or orange stellate flowers. The stems and leaves are dotted with dense glands and the cylindrical to globose capsule contains straw yellow seeds. Kam people of Gaoxiu Village use the entire plant to prepare a medicinal tea for treating children's fever and eye problems. *Hypericum japonicum* is a very variable species that grows along rice fields, ditches, marshes, grasslands and disturbed areas.

The Kam people of Caiyuan and Gaoxiu Villages employ a number of plant species that are used as ichthyotoxins. *Illicium macranthum* A.C. Sm., **meix yao (mi jau)** or **meec yoc** [me' jo'] (Yang Tongyin, personal communication, 5 October 2006) is an evergreen shrub or tree in the Illiciaceae with alternate leathery leaves and young aromatic twigs that have oily or resinous cells. The Kam of Caiyuan Village use the branches, leaves and fruits as an ichthyotoxin. The leaves, flowers and fruits are extremely poisonous. *Illicium macranthum* grows in forests and along mountain slopes between 1600-2800 meters.

Iris confusa Sealy is an endemic herbaceous perennial in the Iridaceae with stout, creeping rhizomes, erect cane-like flattened stems and yellowish green sword-shaped leaves clustered into a terminal fan. The flowers are white or bluish tinged and the capsule is ellipsoid, bearing dark brown seeds. Kam people of Gaoxiu Village use the leaves for healing broken bones and sprains. The leaves are macerated and applied topically as a poultice with a splint for supporting and immobilizing the affected area of the body. Plant healer, Yang Chang Jun believes that *I. confusa* is among the most valued medicinal plants for treating fractures and sprains. *Iris confusa* grows along forest margins, open groves, hillsides, grasslands and ditches of southern China (Zhao *et al.* 2000b:308). The Kam consume fish that are fed fresh *Iris tectorum* Maxim. as medicine to treat stomachaches (Liu & Long 1996:184).

Ligustrum lucidum W.T. Aiton is an endemic shrub or tree in the Oleaceae with opposite simple leathery or papery leaves and a solitary, berry-like drupe. The fruit is deep bluish black and turns reddish black when ripe (Chang *et al.* 1996:302-303). Kam people of Gaoxiu Village use the leaves for treating liver ailments caused by excessive al-

cohol consumption. They eat the fresh leaves in moderation, and also dry and store some for later use. The dried leaves are prepared as a medicinal tea and the delicious fruit is ingested as a tonic, which is a substance taken to give a feeling of vigor or wellbeing. *Ligustrum lucidum* grows in wooded areas and is cultivated in Gaoxiu Village.

Lobelia chinensis Lour. is a small herbaceous perennial in the Campanulaceae with fibrous roots, alternate and sessile narrowly elliptic or lanceolate leaves and axillary solitary flowers that are white, pink or pale purple. Its fruit is a capsule and the seeds are ellipsoid and compressed. Kam people of Gaoxiu Village regard *L. chinensis* as an important medicine for treating cancer and snakebites; however it is not commonly used. The entire plant including the roots is macerated and made into a medicinal tea. A decoction of the plant is employed traditionally as a febrifuge, diuretic, and for treating sores and abscesses. *Lobelia chinensis* is widely distributed in eastern Asia in wet to moist grasslands and rice paddies.

Loropetalum chinense (R. Br.) Oliv. is a native much branched shrub or small tree in the Hamamelidaceae with stellate hairs and a terminal inflorescence of white, pale yellow or red flowers. Its petals are strap-like and the fruit is a capsule with ovoid globose or ellipsoid seeds. Kam people of Gaoxiu Village ingest the flowers as medicine for treating diarrhea, **beengv eex** [pen⁵³ e³¹] (Burusphat *et al.* 2000:17). *Loropetalum chinense* is widely cultivated in China and grows in forests, thickets and on open hillsides (Zhang *et al.* 2003b:32-34).

Lygodium japonicum (Thunb.) Sw. is a climbing fern in the Lygodiaceae with lanceolate-triangular fertile pinnae and creeping stems. Kam people of Caiyuan Village make a medicinal concentrate of *L. japonicum* by extracting its fresh bitter juice, which is taken as a tea to relieve colds, inflammation, kidney stones and other renal ailments. This native plant, which is also grown, often escapes from cultivation and has been reported as weedy in some areas. Its dense canopy can eliminate underlying vegetation in certain habitats. Mabberley (1997:426) wrote that *L. japonicum* is used as a weaving material for making baskets, fish traps, mats and yarn.

Macropanax rosthornii (Harms) C.Y. Wu ex C. Ho is an endemic tree in the Araliaceae with palmately compound leaves and 3-7 sessile oblanceolate to narrowly ovate papery leaflets with serrate margins. Its inflorescence is paniculate; a loosely branching cluster of umbels and the fruit is an ovoid to globose drupe. Kam people of Gaoxiu Village macerate the shoots, leaves, stems and young branchlets of *M. rosthornii* and add this to wine to produce a tincture. A medicinal tea is also prepared from the fresh or dried plant parts, which is consumed and used as a wash for treating arthritis and pain. A poultice or compress is made from the infusion or tincture of the fresh or dried

plant parts soaked in rice wine, which is applied externally to the affected area of the body. *Macropanax rosthornii* grows in shaded places in forests, scrub and along roadsides of the lowlands.

Mahonia bealei (Fortune) Carrière is a native shrub or small tree in the Berberidaceae with shiny pinnately compound leaves, yellow flowers and a dark purple or dark blue berry. Kam people of Gaoxiu Village prepare a medicinal decoction of the chopped leaves, stems and roots as a dressing for fractures, sprains and burns. The bitter yellow decoction is also taken internally to assist in the healing process. The older the stem and root, the more effective is its medicinal value. If one's internal constitution is hot, the decoction will cool and refresh the system. *Mahonia bealei* grows along forest margins, weedy mountain slopes, streamsides, roadsides and thickets.

Mallotus barbatus (Wall.) Müll. Arg. is a shrub in the Euphorbiaceae with milky latex and stellate hairs. Its alternate leaves are papery, peltate and ovate-triangular and its globular fruit is a capsule. Kam people of Caiyuan Village use the root as medicine to treat stomach ailments. Gaoxiu Village Kam people employ the stems of *M. barbatus* for treating hepatic disorders. The stems are cut into small pieces and cooked with pork. The medicinal broth and pork are consumed to relieve liver problems. Mabberley (1997:433) indicated that some *Mallotus* species produce dyes that are of local importance. *Mallotus barbatus* grows in open, disturbed or burned areas primarily in deciduous or mixed evergreen forests, light thickets, along forest paths in limestone, shale or sandstone soils.

Marsilea quadrifolia L. is a small native fern in the Marsileaceae with slender and creeping branched rhizomes that have brownish hairs, and nodes bearing several leaves. The leaves possess 4 obtriangular leaflets with distinct venation. The reproductive structure is a long, elliptic deep brown and woody sporocarp that produces dimorphic spores. Kam people of Gaoxiu Village regard this fern as an important medicine and prepare a tea of the entire plant for treating kidney stones and renal ailments. *Marsilea quadrifolia* is a diuretic that reduces edema and possesses anti-inflammatory properties. The entire plant is applied externally as a haemostatic, for treating snakebites, insect bites, stings and injuries to the skin, and is also used as a forage and food for fish in the paddy fields and fishponds. This species may be consumed if it is growing in fresh, clean water. *Marsilea quadrifolia* is a fern of tropical and temperate climatic zones that grows in shallow silt and rice fields, and along ditches and ponds where it floats on the surface of the water or extends beyond it.

Melastoma dodecandrum Lour. is a native, creeping evergreen shrublet in the Melastomataceae with numerous branchlets, opposite stiff papery and pubescent ovate to elliptic leaf blades, terminal 5-merous lavender to purple

showy flowers and many seeded succulent globular fruits that are black when mature. Kam people of Gaoxiu Village employ the entire plant as a local medicine in all seasons. If one's internal body system is hot, the sweet fruits are eaten in the fall when ripe and this will cool and refresh one's constitution. In winter, the roots are gathered, macerated and made into a tea for treating stomachaches. In spring, summer and autumn, the aboveground parts of the plant are collected and prepared as a medicinal tea with sugar. Three teaspoons of the tea are ingested three times daily before retiring. Gaoxiu Village Kam people eat the fresh ripened fruit to treat stomach pain and the sweet fruits are also given to babies when weaning from breastfeeding. Kam people of Caiyuan Village apply the fruits of *M. dodecandrum* to cuts, and the astringent plant is employed as a treatment for dysentery and rheumatism. *Melastoma dodecandrum* grows in open fields, thickets, grasslands, and along trailsides.

Melia azedarach L., **ku lian xu** (Huang Xiao Yu, personal communication, 04 January 2007) is a fast-growing tree in the Meliaceae with pinnate leaves and opposite elliptic leaflets, lilac, sweet-scented flowers and a globose drupe fruit that turns yellow upon maturity. Kam people of Gaoxiu Village use this healing tree in all seasons. They prepare a bitter medicinal tea of the bark for treating colds, rashes and itching skin. A wash is made from the bark tea and is applied to the affected areas of the body. In fall and winter, the drupe fruits are made into a curative tea that serves as a febrifuge. In spring and summer, the Kam collect the leaves of *M. azedarach* and brew a medicinal tea to treat fevers. Mabberley (1997:447) documented that the wood is utilized in construction, the bark and leaves possess natural insecticidal properties, and the fruits are used as beads. *Melia azedarach* is widely cultivated along roadsides and in villages.

Millettia pachycarpa Benth. is a native liana in the tribe Millettieae of the Fabaceae family. It has dark brown inflated legumes that are densely covered with rough pale yellow warts. The leguminous pods contain 1-5 dark brown reniform seeds. The leaves have 13-17 papery leaflets and the flowers are lilac-colored. Kam people of Caiyuan Village utilize the bark fiber of *M. pachycarpa* for making rough rope, and it is also applied to cuts and wounds. The seeds and roots are employed as a fish poison and are ground to a powder and used as an insecticide. Mabberley (1997:457-458) mentioned that many species of *Millettia* are utilized as therapeutic drugs, insecticides and ichthyotoxins and some are cultivated ornamentals with useful wood and medicinal oils. *Millettia pachycarpa* grows in evergreen broadleaved forests near Caiyuan Village along the Qingshui River.

Mussaenda esquirolii H. Lév. and *Mussaenda pubescens* W.T. Aiton are handsome shrubs in the Rubiaceae that are cultivated ornamentals and used as local medicine. *Mussaenda pubescens* (Figure 6) has papery leaves, golden



Figure 6. *Mussaenda pubescens* W.T. Aiton in Caiyuan Village. © John Amato.

yellow flowers and ellipsoid many seeded fruits that are black when mature. Kam people of Gaoxiu Village chew the fresh roots of *M. pubescens* as a preventive medicine and for a number of health purposes. The fresh roots quench one's thirst and are quite refreshing and cooling. The enlarged sepals are often strikingly bright and colorful. *Mussaenda pubescens* grows in forests of lowlands and middle elevations.

Osbeckia chinensis L. is a native herb or shrublet in the Melastomataceae with 4-sided stems, stiff papery leaves and a terminal inflorescence of pink to pale purple flowers. Its ovoid and globose capsule is purplish red, bearing numerous small curved seeds. Kam people of Gaoxiu Village use *O. chinensis* for treating kidney ailments. They prepare a tea of the entire plant, which is consumed three times daily. Kam people employ other species of *Osbeckia* to treat nyctalopia; night blindness, **pap dal laiv** [pha³⁵ ta⁵⁵ lai⁵³] (Burusphat *et al.* 2000:191, Liu & Long 1996:185). *Osbeckia chinensis* grows in grasslands on mountain slopes, open forests, and trailsides of the lowlands.

Oxalis corniculata L. is a pubescent, native herbaceous perennial in the Oxalidaceae with creeping stems, alternate leaves with 3-foliolate obcordate leaflets, yellow flowers, a long cylindrical capsule and brown to brownish red oblong seeds. Its leaflets often fold together in the evening. Kam people of Gaoxiu Village macerate the entire

plant with a knife handle. The macerated plant material is made into a haemostatic poultice, which is applied with pressure to stop bleeding. *Oxalis corniculata* grows on mountain slopes, in forests, grasslands and fields, along roadsides, riversides and disturbed areas, where it is particularly widespread.

Panax notoginseng (Burkhill) F.H. Chen ex C.H. Chow is a native herbaceous perennial in the Araliaceae with a fleshy fusiform rootstock, palmately compound leaves of 3-6 entire leaflets and a solitary terminal umbel of many flowers. The fruit is a compressed red drupe with 2 triangular-ovoid ridged seeds. Kam people of Gaoxiu Village use the leaves for healing broken bones and sprains. The leaves are placed in wine and consumed and applied as a massage, poultice and bandage or splint on the affected area. Yang Chang Jun regards *P. notoginseng* as one of the most significant medicinal plants for treating fractures and sprains. Gaoxiu Village healers cultivate *P. notoginseng*, which grows wild in forested areas.

Phragmites australis (Cav.) Trin. ex Steud., **luh jigx**, *Imperata* sp., **jal (nyangt jal)**, *Typha orientalis*, **jiang bu** or leaves of *Acorus calamus*, **xengp jox** are tied in a knot and hung with *Artemisia argyi*, **ngaih** (Burusphat *et al.* 2000:89, 135, 168, 249) beside or above the entrances to Kam homes or animal stables to prevent evil from entering. The Kam consider *Phragmites*, *Arundo*, *Imperata*

and *Typha*, which grow by water, to have mystical qualities (Geary *et al.* 2003:61). *Phragmites australis* is a robust, extensively creeping rhizomatous perennial reed in the Poaceae with tall, erect hollow culms. It is a cosmopolitan species that forms colonies in moist places along the Qingshui River by Caiyuan Village. *Phragmites* reeds aid in soil retention, provide a source of fiber for making bed mats and the rhizomes are medicinal. Reed beds are useful in the purification of water sources (Liu & Phillips 2006b:447-449).

Phyllanthus urinaria L. is a native herbaceous annual in the Euphorbiaceae with a much-branched stem at its base and alternate papery leaves. Flowers are yellowish white and axillary, the fruit is a globose capsule with reddish blotches and its seeds are triangular, light grayish brown and ridged. Gaoxiu Village Kam people prepare a medicinal tea of the entire plant for treating irritated and sore eyes, kidney ailments and venomous snakebites. *Phyllanthus urinaria* grows in dry fields, along roadsides, disturbed areas and forest margins.

Physalis alkekengi L. is a native herbaceous rhizomatous perennial in the Solanaceae with a slightly woody-based stem, ovate leaf blades and white flowers. The inflated fruiting calyx is orange or red, subleathery, ovate and rounded with a shiny orange-red globose berry whose seeds are pale yellow and reniform. Kam people of Gaoxiu Village consume the red berries of *P. alkekengi*, which are used medicinally as a febrifuge, however pregnant women must not eat the fruit of this species. *Physalis alkekengi* is cultivated in Asia and has become naturalized in other realms (Zhang *et al.* 1994b:311-312).

Pinus massoniana D. Don, **meix songc** (Burusphat *et al.* 2000:219) is an endemic evergreen coniferous tree in the Pinaceae with irregularly scaly bark, needle-like leaves and a pyramidal shaped crown. There are 2-3 slightly twisted needles per bundle and the seed cones are pendulous bearing narrowly ovoid and winged seeds. Gaoxiu Village Kam people apply *P. massoniana* needles as medicine for treating skin irritations. It is an important economic tree that is used for afforestation and its trunk is a source of resin and tannin and for the cultivation of fungi. The wood is utilized for making boats, house construction, bridges, furniture and wood pulp. Kam people of Caiyuan Village planted numerous *P. massoniana* trees in the mountain forests surrounding their village. It grows on plains, hillsides and mountains in lower to middle elevations of China (Fu *et al.* 1999b:14-15).

Piper wallichii is a native aromatic climber in the Piperaceae with ridged stems, alternate hairy and grayish papery leaves and a subglobose drupe, which is a fleshy fruit with a thin skin and a central stone containing the seed. Kam people of Caiyuan and Gaoxiu Village use *P. wallichii* as a local medicine. The fragrant stems, leaves and roots are made into a wash for relieving rheumatism, backaches

and for stimulating circulation. Kam people of Gaoxiu Village macerate the entire plant and prepare a medicinal tea that is consumed as a treatment for fevers. *Piper wallichii* is an economically important plant that grows in forests, on trees and rocks in shaded and wet areas (Cheng *et al.* 1999:126).

Pittosporum glabratum Lindl. is a native shrub in the Pittosporaceae with leathery leaves, a many flowered inflorescence and ellipsoid capsules with red subglobose seeds. It was growing along the sloping hillsides of Caiyuan Village by the Qingshui River. Kam people use the roots of *Pittosporum* medicinally as an analgesic. It grows in forests, thickets and valleys on mountain slopes and along river margins. *Pittosporum truncatum* E. Pritz. is an endemic many-branched shrub with shiny dark green hard leathery leaves and a short ellipsoid capsule with slender compressed seeds. Kam people of Gaoxiu Village employ *P. truncatum* for treating skin rash and irritations. It grows in forests, thickets and valleys along streamsides (Zhang *et al.* 2003c:6-7, 12).

Plantago asiatica L. is a wind-pollinated native perennial in the Plantaginaceae with a thick and extensive fibrous root system, a basal rosette of ovate to cordate entire leaves and small greenish white flowers. The fruit is an ovate capsule that bears small elliptic brownish black seeds. Kam people of Gaoxiu Village prepare the entire plant as a medicinal tea for treating fever, high blood pressure, coughs, colds, kidney stones and other renal ailments. Pregnant women should not drink this tea. *Plantago asiatica* is a valued medicine that is consumed when the weather is hot. Leaves and seeds possess anti-inflammatory, antiseptic, antitussive, expectorant and diuretic properties. The edible seeds are used internally in the treatment of asthma, bladder problems, bronchitis and fever. Leaves of *P. asiatica* are harvested during the growing season and used fresh or dried. Young leaves are slightly bitter and are eaten raw or lightly cooked. This plant is quite morphologically variable and invasive. It grows in well-drained soils of light woodlands and disturbed areas in lowlands and mountains.

Polygonum perfoliatum L. is a native herbaceous annual with red-brown trailing prickly stems and triangular-peltate leaf blades. The flowers are white or pinkish and the fruit is dark blue and fleshy. Kam people of Gaoxiu Village prepare a tea of the plant and apply it as a wash for treating skin irritations. They also drink the medicinal tea for this purpose and eat its edible ripe fruits. *P. perfoliatum* grows near fields, along roadsides and wetlands (Li *et al.* 2003a:311-312). *Polygonum* sp., **baiv1** [pai⁵³] (Burusphat *et al.* 2000:12) is employed as an ichthyotoxin and preventive medicine, which is also applied externally as a wash for colds and eye ailments.

Potentilla kleiniana Wight & Arn. is a native herbaceous annual, biennial or perennial in the Rosaceae with pubes-

cent flowering stems that usually root at the nodes and 5-foliolate leaf blades with leaflets. The terminal inflorescence of yellow flowers is congested and the achenes are subglobose and flattened on one side. Gaoxiu Village Kam people use the leaves of *P. kleiniana* as medicine for treating hemorrhoids. The fresh leaves are gathered and cut into small segments and placed inside a pig's anal canal and sphincter. This is then roasted over a fire and eaten for relieving hemorrhoids. *Potentilla kleiniana* grows in meadows, grasslands on mountain slopes and along field margins throughout Asia (Li *et al.* 2003b:321-322).

Pratia nummularia (Lam.) A. Braun & Asch., **du suun** is a native herbaceous perennial in the Campanulaceae with prostrate stems that root along their length and ovate or orbicular leaves. The white to pale purple bilabiate flowers are solitary and axillary and the fruit is a broadly ellipsoid or subglobose purple berry with ellipsoid compressed seeds. Kam people of Gaoxiu Village use *P. nummularia* as medicine for treating contact dermatitis, skin rash and blisters. Plant healer, Yang Chang Jun macerated the entire plant and mixed it with water, in which rice was soaked to treat a contact allergic reaction characterized by skin irritation, redness, slight swelling, itching and blisters. The

poultice was applied topically to the first author's leg two to three times daily (Figure 7) with excellent results and the blisters healed within a couple of days. *P. nummularia* is widely distributed in eastern Asia from India, Sri Lanka to China, south to Australia and Formosa in moist forests and thickets.

Prunella vulgaris L. is a slender native herbaceous perennial in the Lamiaceae with sessile spikes of purplish or white zygomorphic flowers, opposite lanceolate to ovate leaves and oblong ovate nutlets. Kam people of Gaoxiu Village make a medicinal tea of the plant for treating mastitis; inflammation of the mammary glands, high blood pressure, headaches and colds. *Prunella vulgaris* grows on open slopes, grasslands, wet streambanks, forest margins and thickets (Li and Hedge 1994:134).

Pyrrhosia lingua (Thunb.) Farw. is a native, epiphytic and epilithic fern in the Polypodiaceae with long, creeping rhizomes that are densely covered with scales. The laminae, frond blade is flatly spreading and covered with subelliptic sori, spore-producing receptacles on the underside of the fern frond. Gaoxiu Village Kam people use the entire fern as medicine for treating kidney ailments, sore throats,



Figure 7. Kam healer, Yang Chang Jun applying *Pratia nummularia* (Lam.) A. Braun & Asch., **du suun**. © John Amato.

bronchitis, asthenia; abnormal physical weakness or lack of energy, and to clear heat from the internal system. If one's tongue is blistered, *P. lingua* is eaten fresh. A medicinal tea of the plant is prepared for healing blistered feet. The tea is consumed and applied to the affected area as a wash. *Pyrrosia lingua* is employed as a diuretic, and as packing to absorb moisture from an incised wound, burn or scald. It grows in forests on tree trunks and on dry rocky outcroppings.

Reynoutria japonica Houtt. is a native herbaceous perennial in the Polygonaceae with thickened rhizomes, numerous stout and erect branched hollow stems that often possess red or purple spots and alternate simple subleathery leaves. The axillary flowers are white or greenish and the achenes are blackish brown and ovoid-elliptic. Kam people of Gaoxiu Village cook the roots and leaves of *R. japonica* with pork for treating liver disease. The broth and pork are consumed three times for healing. *Reynoutria japonica* grows in valley thickets, along field margins, and mountain slopes. It is widely cultivated and considered undesirable in other regions of the world (Li & Park 2003:319).

Rosa laevigata Michx. is a native evergreen shrub in the Rosaceae with large solitary, axillary white flowers and robust purple-brown branchlets bearing scattered prickles. Its leaves are leathery with three leaflets and the margins are acutely serrate. The rosehip is purple-brown and pyriform or obovoid and densely glandular bristly with persistent erect sepals. Kam people of Gaoxiu and Caiyuan Village gather the fresh wild fruit for consumption. It is placed in wine to impart a sweet and pleasing flavor and rose-color to the alcoholic beverage. *Rosa laevigata* fruits are high in vitamin C and bioflavonoids, and are a good medicine for strengthening the body. The roots, leaves and fruits are all used medicinally. The root bark possesses tannin, which is employed in tanning, and sugar is extracted from the rosehip, and utilized in fermenting wine. *Rosa laevigata* grows in thickets, scrub, open fields in montane areas and farmlands from 200-1600 meters (Gu & Robertson 2003:380).

Sargentodoxa cuneata (Oliv.) Rehder & E.H. Wilson is a native climbing deciduous shrub in the Lardizabalaceae with longitudinally fissured bark, red-brown to brown branches and stems with red sap. A cross section of the stem reveals a stellate stele with radiate markings. The solitary inflorescence is yellow green, the fruit is dull blue and berry-like and the ovoid seeds are blackish. Kam healers of Gaoxiu Village use the stems and roots of this medicinal plant as a blood purifier and tonic for promoting general good health and wellness. *Sargentodoxa cuneata* grows in open forests on mountain slopes or in ravines (Chen & Shimizu 2001b:453-454).

Schizocapsa plantaginea Hance is a native herbaceous perennial in the Taccaceae with short, thick rhizomes, en-

tire leaf blades with an elongate base and a winged petiole. The inflorescence is a many-flowered umbel and the fruit is a subovoid capsule with numerous seeds. Kam people of Gaoxiu Village macerate the leaves of *S. plantaginea* for medicine. The macerated leaves are placed in cool water and a spoonful of the healing infusion is consumed as a treatment for vomiting and diarrhea. *Schizocapsa plantaginea* grows in forests, along rivers, valleys and trailsides (Ding & Larsen 2000:274-275).

Sedum stellariifolium Franch. is an endemic annual or biennial plant in the Crassulaceae with woody-based erect brown stems, alternate triangular to broadly triangular ovate leaf blades, 5-merous yellow flowers and brown seeds. Kam people of Gaoxiu Village apply the entire plant as a poultice for treating wounds, swelling and edematous areas of the body. *Sedum stellariifolium* grows in soil and rock crevices in valleys and on mountain slopes (Fu & Ohba 2001:223).

Selaginella delicatula (Desv. ex Poir.) Alston is an herbaceous spore-producing perennial with entire leaves and terminal strobili on leafy branchlets. Gaoxiu Village Kam people use this species for treating hepatitis and jaundiced skin and eyes. *Selaginella doederleinii* Hieron. is an herbaceous spore-producing perennial with erect stems, alternate branches and dimorphic leaves. The Kam also employ this species as a treatment for hepatitis and jaundice. *Selaginella delicatula* and *S. doederleinii* are both distributed on montane forest floors in low to middle elevations of Asia.

Selaginella tamariscina (P. Beauv.) Spring is an evergreen, perennial spore producing plant in the Selaginellaceae with scale-like leaves and stout, short stems with many branches. *Selaginella tamariscina*, as in other species of *Selaginella*, curls or rolls up when dry. *Selaginella* species possess small, simple spirally arranged leaves with single veins. Kam people of Caiyuan Village make a poultice of the astringent leaves of *S. tamariscina* for treating burns and it is applied as a haemostatic to stop bleeding. A decoction of the plant is prepared and administered for traumatic bleeding. Kam people of Gaoxiu Village brew a medicinal tea of the entire fresh or dried plant for treating hepatitis, jaundiced eyes and skin. *Selaginella tamariscina* is found in Asia on exposed rocks or hillsides. Some species of *Selaginella* are cultivated as ornamentals.

Selaginella uncinata (Desv. ex Poir.) Spring is a native herbaceous perennial forming diffuse mats composed of long creeping branched stems with delicate papery leaves. The Kam of Gaoxiu Village also employ *S. uncinata* as a medicinal tea for treating hepatitis and jaundice. *Selaginella uncinata* grows in hummocks of shaded areas along streams. It is a widely cultivated plant that is native to southern China.

Serissa japonica (Thunb.) Thunb. is a small, cultivated ornamental shrub in the Rubiaceae with foetid leaves and fragrant, edible white flowers. Kam people of Caiyuan Village eat the fresh flowers and make a medicinal tea of the stems, leaves and inflorescence for relieving itching, inflammation, wounds, cuts and infections. The healing tea is consumed and applied to the affected area of the skin. The aromatic flowers are also used as a fragrance. *Serissa japonica* was growing on mountain slopes, hillsides and along open forest margins near Caiyuan Village.

Stephania cephalantha Hayata is a medicinal, deciduous herbaceous vine in the Menispermaceae with tuberous roots and slender purplish red branchlets. It was growing in open fields and along forest edges of Caiyuan Village near the Qingshui Jiang. The papery peltate leaves of *S. cephalantha* have long petioles that are swollen at both ends. Its fruit is a broadly rotund drupe that turns red when mature. *Stephania cephalantha* is a traditional Kam medicine. It is employed in the treatment of inflammatory diseases. Mabberley (1997:683) recorded that *Stephania* species contain more than 50 types of alkaloids, of which some are applied as an ichthyotoxin. The tuberous roots are widely used traditionally as a local medicine.

Talinum paniculatum (Jacq.) Gaertn. is a medicinal herbaceous annual, perennial or subshrub in the Portulacaceae with a semi-woody, basally branched stem and a thick, branched root. Its flowers are pink or reddish purple, the capsules are papery with glossy black-brown or black seeds and the alternate leaf blades are obovate or obovate-lanceolate. Kam people of Gaoxiu Village gather the roots and cook them with meat as a tonic for promoting strength and good health. *Talinum paniculatum* was growing in Gaoxiu Village beside a stream. It is a cultivated medicinal plant that escapes to shaded wet areas and is naturalized throughout Asia (Lu & Gilbert 2003:443-444).

Tetrapanax papyrifer (Hook.) K. Koch is an endemic evergreen shrub or small tree in the Araliaceae with a large white trunk, stout branches, stellate pubescence, simple, papery or somewhat leathery palmately lobed leaves and yellowish white flowers. Its globose fruit is dark purple at maturity. Caiyuan Village Kam people make a tea of the root and soft white pith of the stem to treat urinary and other eliminatory problems. *Tetrapanax papyrifer* grows in mixed thickets near Caiyuan Village and is economically important and widely cultivated in China for fine rice paper, medicine and as an ornamental plant.

Teucrium quadrifarium Buch.-Ham. ex D. Don is a tall pubescent native subshrub in the Lamiaceae with erect stems, ovate to oblong-ovate sessile leaves, reddish campanulate flowers and nutlets that are dark brown and netted (Li & Hedge 1994d:59, 134-135). Kam people of Gaoxiu Village employ *T. quadrifarium* as a valued medicine for treating fever in children. A healing tea is prepared of the leaves and roots and a half bowl is consumed as

a febrifuge to reduce the child's body temperature. The Kam regard *T. quadrifarium* as a highly effective medicine for children's fever. It grows on open slopes, forests and thickets in Asia.

Toricellia angulata Oliv. is an endemic deciduous shrub or tree in the Toricelliaceae with gray bark, alternate broadly cordate to nearly orbicular papery leaves with palmate venation and an ovoid drupe-like purple red or black fruit bearing linear seeds. Kam people of Gaoxiu Village make a tincture of the root or bark with alcohol to treat rheumatism, injuries, cerebrovascular accident, hemiplegia; paralysis of one side of the body, and high blood pressure. The leaves are prepared as a medicinal tea that is taken internally and applied as a wash to the affected area of the body. A hot compress of the dried or fresh leaves is used for stroke victims. Xiang & Boufford (2005:233-234) mentioned that the roots or bark are macerated into a paste, which is placed on the wounds of injured livestock. *Toricellia angulata* grows along forest margins and stream-sides between 900-2000 meters.

Toxicodendron succedaneum (L.) Kuntze is a poisonous deciduous tree or shrub in the Anacardiaceae whose stems exude natural lacquer. It has yellowish green flowers and papery or leathery leaflets. The resinous sap turns black upon exposure to air and causes severe dermatitis in some sensitized individuals through repeated or long term exposure to the plant. The skin irritation is caused by toxic compounds. Kam people of Caiyuan Village utilize *T. succedaneum* to relieve inflammation. They make a resinous poultice of the fresh leaves, stems and roots, which is applied directly to the inflamed area. The hardened resin of this tree is economically important as lacquer for the production of traditional lacquerware. Mabberley (1997:616) noted that *T. succedaneum* produces dyes and tannins and from the fruits, a wax is extracted for making varnishes and polish. This species is cultivated for its wax, which is a substitute for beeswax, an ingredient in polish. *Toxicodendron succedaneum* grows on hillsides in limestone soils.

Trichosanthes rosthornii Harms is a climbing herbaceous endemic plant in the Cucurbitaceae with grooved stems, deeply lobed leaf blades, tendrils and a smooth globose or oblong orange-yellow edible fruit, **demh mious** (Burusphat *et al.* 2000:45). It possesses numerous small ovate oblong compressed seeds that are embedded in pulp. Kam people of Gaoxiu Village use the roots and fruits as medicine for treating coughs. Mabberley (1997:723) recorded that some species of *Trichosanthes* are applied as an abortifacient, the roots are a source of starch and the dried fruit is a soap substitute. *Trichosanthes rosthornii* grows in dense forests along valleys, brush woodlands and grasslands on mountain slopes.

Uncaria rhynchophylla (Miq.) Miq. ex Havil. is a native evergreen liana in the Rubiaceae with slightly angular

branchlets that possess paired compressed and arched hooks at each node. Its thick membranaceous ovate or elliptic leaves are opposite and the axillary inflorescence is a singular globular head of greenish white flowers that produce elliptic winged seeds. Kam people of Gaoxiu Village use *U. rhynchophylla* for treating hypertension. They prepare a medicinal tea of the stems and hooks, which is also effective as a hepatic, and for spasms, convulsions, dizziness and headaches. For best results, the healing decoction should not be overcooked. Branchlets and hooks are collected and sold as a traditional medicine. Gaoxiu Village plant healer, Yang Chang Jun and the first author gathered *U. rhynchophylla* on a mountain slope and forest edge overlooking a rice paddy. The hollow stem of this curative species is also used as a siphon or straw. *Uncaria rhynchophylla* grows in moist soils of light woodlands and evergreen forests.

Urtica laetevirens Maxim. is an herbaceous perennial in the Urticaceae with opposite dentate leaves, stinging hairs and woody rhizomes. The boiled young shoots are eaten as a vegetable and Kam people of Caiyuan Village make a poultice and tea of the leaves for treating rheumatism and other inflammatory aches and pains. Stem fibers of *Urtica* sp., **biuds bangh** (Burusphat *et al.* 2000:27) are employed in making rope, the leaves are used as fodder and the young shoots are prepared as a seasoning. *Urtica laetevirens* was growing in moist forests and thickets along streams and the bank of the Qingshui Jiang.

Veronicastrum stenostachyum (Hemsl.) T. Yamaz. subsp. *plukenetii* (T. Yamaz.) D.Y. Hong, is an herbaceous perennial with alternate, narrowly ovate to ovate-lanceolate leaves and short, horizontal rhizomes (Hong *et al.* 1998: 57-59). This Kam medicinal plant in the Scrophulariaceae was growing along forest edges near Caiyuan Village in Guizhou Province. Zhang Zheng Rong, a knowledgeable local plant expert of Caiyuan Village indicated that Kam people use *Veronicastrum* as medicine for women's health.

Vitex negundo is a shrub or small ornamental tree in the Verbenaceae with purplish flowers, opposite, palmately compound leaves and black globose fruits. This fragrant plant was found in mixed thickets on mountains slopes and along the path to Caiyuan and Gaoxiu Village. Kam people of Caiyuan Village apply the leaves as a poultice for itching skin and pruritus, which is a symptom of various ailments. The leaves have haemostatic properties and are placed in the nostrils to prevent nosebleed as a result of dilated nasal blood vessels when ambient temperatures are high and the sun is strong. For the Kam, wearing medicine is often used to treat illness and disease. Liu & Long (1996:184) indicated that children who are suffering from malnutrition wear seven pieces of *V. negundo* for restoring health. Kam plant healers of Gaoxiu Village prescribe *V. negundo* for treating children who have colds and fevers. Its remedial properties work synergistically with other pre-

scribed medicinal plants. Mabberley (1997:749) noted that *Vitex* species are administered in the treatment of flu, colds and sore eyes and are of economic importance for their gum, oil, tannin and wood.

Xanthium sp. is a native coarse herbaceous annual in the Asteraceae with erect branched stems and spirally arranged dentate leaves. The seeds, which are produced by sexual reproduction, are borne in a chambered bur with stiff hooked spines that adhere to fur and clothing and may be quite difficult to remove. *Xanthium* is widely distributed internationally because of its successful seed dispersal mechanism. Kam people of Caiyuan Village employ this plant as a local medicine for treating rhinorrhoea; runny nose, nasal discharge or excess mucus. The fruits are mashed into a poultice and applied to the nasal cavity. Acrid and bitter tasting *Xanthium* has been prescribed for problems associated with the lungs, colds, headaches and itching skin. Children play with the spiny burs that stick to clothing. A yellow dye is produced from this plant, which was growing near Caiyuan Village in disturbed areas along the Qingshui Jiang.

Yua austro-orientalis (F.P. Metcalf) C.L. Li is an endemic woody liana in the Vitaceae with brownish branchlets that have many lenticels, 2-branched tendrils and subleathery palmately 5-foliolate leaves. Its fruit is a dark reddish purple sweet and sour globose berry and its seeds are slightly flattened and pyriform. Kam people of Gaoxiu Village prepare a medicinal tea of the leaves and stems of *Y. austro-orientalis* to treat cerebrovascular accidents, cerebral hemorrhage, paralysis and rheumatism. The tea, which has a pleasant flavor, is taken internally three times daily and is applied as a wash to the body. Gaoxiu plant healer, Wu Shun Jun regards this plant as an extremely important medicine and stated that he has been successful in curing hundreds of people with it. *Yua austro-orientalis* grows in forests or shrublands in valleys and on open mountain slopes.

Kam people of Gaoxiu Village use several endemic species of *Zanthoxylum* in the Rutaceae as medicine. *Zanthoxylum echinocarpum* Hemsl. is a liana with 4-merous flowers, pubescent branchlets, alternate odd-pinnate leaves and thick leathery leaflets. The branches, leaves and follicle have sharp prickles. *Zanthoxylum nitidum* (Roxb.) DC. is an erect shrub or liana with prickly branches and stems, a winged trunk, opposite leathery leaflets, a beaked follicle and beadlike seeds. *Zanthoxylum dissitum* Hemsl. is a liana with a grayish white stem, branches with brownish red prickles and thick papery to leathery leaflets. Flowers are yellowish green and the fruits of the infructescence are densely pressed together. All species of *Zanthoxylum* have follicles, dry fruits that open on one side to release the seeds. The follicles have a red exocarp, the outer layer of the pericarp of the fruit that has oil glands. Kam people of Gaoxiu Village chew the aromatic bark, which produces a tingling and numbing effect, to re-

lieve stomachaches and toothaches. They prepare a tea of the bark to treat stomach and liver cancer.

Zea mays L., **oux xul** (Burusphat *et al.* 2000:190) is an annual in the Poaceae with erect and robust culms and large glabrous, broadly linear leaf blades. The female inflorescence is an axillary cylindrical cob with rows of spikelets and the terminal male inflorescence is a tassel of digitate racemes. The mature caryopses are plump and edible. Kam plant healers of Gaoxiu Village use the corn silk as medicine for treating pulmonary tuberculosis. The corn silk is cooked with a pork bone and the broth is consumed. A medicinal tea is prepared from the corn silk for treating edematous swelling of the hands, feet and the abdominal region. *Zea mays* originated in America and is widely cultivated in China. The plant was first domesticated in Central America approximately 7000 years ago and is one of the most important crops in the world (Chen & Phillips 2006c:650).

Agriculture

The Kam live in mountainous areas where many of their villages have been established along riverbanks and meandering streams. Kam people are mainly engaged in agriculture, pisciculture and agroforestry. Some households raise cows, water buffalo, pigs, chickens, ducks and geese. The Kam are productive farmers whose major crops include vegetables, glutinous rice, large-grained rice, rapeseed, wheat, maize, soybean, sweet potatoes and tobacco. *Gossypium*; cotton, **mi-inc1** [mjɪn²¹²] in the Malvaceae is grown in nearby fields for spinning and weaving cloth that is dyed blue-black with *Indigofera tinctoria* L., **denh2, jenc (lanc)** [lam²¹²] (Burusphat *et al.* 2000:45, 116, 152, Gordon 2005, Rossi & Lau 1990:IX, 29, 64), in the Fabaceae (Figure 8).

Caiyuan Village mountain slopes are planted with paddy rice, and vegetables are grown in terraced gardens on hill-sides.

Poncirus trifoliata (L.) Raf. is a small and spiny, cultivated ornamental deciduous tree in the Rutaceae with 3-foliolate leaves. It is planted by the Kam as a hedge along agricultural fields in Jinping County, and serves as a living fence. Mabberley (1997:578) wrote that *P. trifoliata* citrus



Figure 8. Kam elder in indigo clothing making a net of cotton. © John Amato.

fruits are fragrant, acidic and have little flesh. They are edible and made into marmalade.

In the past, *Oryza sativa*, glutinous rice, **oux lail (oux jos)** in the Poaceae was the staff of life of the Kam people. It is referred to as Kam rice or good rice and is distinguished from another cultivar of *O. sativa*, which is Han (Chinese) rice, **oux gax** (Burusphat *et al.* 2000:189). *Oryza sativa* has erect culms and leaf sheaths that are slightly inflated below. Its panicle is loosely contracted and nodding at maturity and the rice spikelets are oblong to oblong-lanceolate. The rice caryopsis is ovate or elliptic to cylindrical. *O. sativa* is cultivated primarily in flooded fields throughout most of China and was domesticated in Southeast Asia. It is the staple cereal rice that is widely grown in tropical and warm-temperate regions of the world, with many different cultivated races (Liu & Phillips 2006a:182-184).

Glutinous rice is still preferred by Kam people today. Han rice culms are rather brittle when dry but glutinous rice culms are strong and can be used for making bed mats, brooms, straw sandals and rope. There are more than forty types of glutinous rice cultivated in the southern Kam region including red, purple, black and fragrant glutinous rice, from which the best wine is made. Kam people eat sweet glutinous rice cakes when new plants are sprouting. These cakes are fried and consumed with oil tea, which is also shared. According to the code of ethics of the Kam, where there is rice, eat together with the people and share. The Kam have been cultivating paddy rice for approximately five thousand years thus Kam culture and life are inextricably centered on rice (Burusphat *et al.* 2000:XI, 189, Edmondson & Solnit 1990:11, Geary *et al.* 2003:96-100, 124, 140, 149, 168, Norman Geary, personal communication, 17 October 2006).

For the New Rice Festival, **oux meik** (Yang, Tongyin, personal communication, 17 November 2006), when the growing rice begins to produce the first seeds of the season, glutinous rice stems are tied together and placed as an offering to the ancestors in gratitude. Rice is also employed in divination, and rice wine is an extremely important constituent in Kam ritual offerings, festivals, medicinal preparations, for therapeutic massage and other applica-



Figure 9. Ceremonial long-stemmed glutinous rice in Gaoxiu. © John Amato.

tions. On the Festival For the New Drum Tower in Gaoxiu Village, dry long-stemmed glutinous rice stalks are hung from the rafters (Figure 9).

In the northern Kam area there is a story of a great flood. When the flood subsided there was no rice seed anywhere. A dog volunteered to go east traversing a large river to bring back rice seeds from grain stores. The dog slipped into a heavily guarded grain storehouse and rolled in the rice so that the seeds clung to its fur. On the way home, upon swimming across the river, the dog held its tail high. Thus the dog arrived home safely with rice seeds clinging to its tail, enabling the Kam to once again grow paddy rice (Geary *et al.* 2003:96).

In the spring, about two weeks before plowing, water buffalo manure and green leaf compost are spread on the rice paddy fields. After plowing, the fields are harrowed with the help of water buffaloes. During harrowing, women and children gather to fish, as the fish come to the surface for air and are easy to catch. Harrowing prepares the soil for planting. In the harrowed field, a stick with a straw knot attached to it indicates that the field has been prepared for sowing, **dogl gas** [tok⁵⁵ ka²³] (Burusphat *et al.* 2000:51) or planting and it warns people not to enter and trample the earth. Before seeds are sown, every Kam family holds a special ceremony in honor of the seedling spirit. Dried rice culms are gathered into a pile, upon which food of-

ferings are placed. The head of the household asks the seedling spirit to keep the buffaloes healthy and to ensure a good harvest. For the Kam, as in Hmong mountain villages, the call of the cuckoo indicates that it is time to sow. Between the time rice seeds are sown and the time when seedlings are transplanted, no one plays the **lusheng, lenc3**, (Burusphat *et al.* 2000:120), which is a bamboo musical instrument, and no one fans him or herself. Playing the **lusheng** might attract an insect plague and fanning might cause a windstorm. The sound of the red bayberry insect signals the time for weeding. When the glutinous rice begins to produce florets, the water in the paddies is drained and the fish flow out of it through the irrigation ditches. There are around one hundred days from the first grains to the harvest. At harvest time, the task of collecting glutinous rice is painstaking and each sheaf must be individually cut. Kam people often work in the fields all day reaping the harvest, and this is an occasion for eating fish, which are barbecued on sticks or wrapped in vegetation and roasted over a fire. The fish are eaten with glutinous rice and rice wine. The full moon in autumn signifies that it is time to harvest pumpkins, beans and sunflower seeds. Every family works the land and both men and women are heavily engaged in farming (Figure 10). At busy times during the agricultural cycle, such as in the seasons of plowing, transplanting or weeding, families often take turns helping each other (Geary *et al.* 2003:62-63, 95-97, 108, 149, 152).



Figure 10. Kam woman of Gaoxiu Village carrying fodder for her animals. © John Amato.

Kam people of Gaoxiu Village stated that there is a particular cultivar of glutinous rice that is not extensively eaten by field mice because of its chemistry, and thick growth habit, which forms a physical barrier. In addition, the Kam deter mice from entering rice paddies by planting *Vigna radiata* (L.) R. Wilczek along the periphery of the fields. *Vigna radiata* is an erect, tall herbaceous annual in the Fabaceae with brown stems, trifoliate leaves and pale brown, linear hairy pods. The leaflets are ovate and the edible and medicinal seeds are greenish or yellow brown. Kam people feed the leaves to fish and livestock. *Vigna radiata* is widely cultivated throughout tropical and subtropical regions of China. *Vigna angularis* (Willd.) Ohwi & H. Ohashi is an herbaceous annual that is also planted along the margins of the paddies by the Kam to deter mice from entering the rice fields. Its flowers are yellow and the edible and medicinal seeds are reddish and oblong. *V. angularis* is extensively grown in China. *Vigna unguiculata* (L.) Walp. is an herbaceous annual or perennial with trifoliate leaves and dark seeds whose leaves are fed to fish and livestock. *Vigna unguiculata* is edible and commonly cultivated in China.

Alisma plantago-aquatica L. is a native herbaceous aquatic plant in the Alismataceae with tubers, aerial petiole leaves, white or purplish white flowers and laterally compressed achenes. Gaoxiu Village Kam gather *A. plantago-aquatica* from the rice fields and transfer it to the fishponds as feed for the developing fish. This plant is a natural fertilizer for the growing rice and a nutrient-rich food for fish in the rice paddies. *Alisma plantago-aquatica* grows along lake margins, ponds, marshes, water channels, and slow moving rivers and streams.

Arachis hypogaea L., **doh magx** [to³³ mak³¹] (Burusphat *et al.* 2000:49) is an herbaceous annual in the Fabaceae with 4 obovate or elliptical leaflets, yellow solitary axillary flowers and subovoid edible seeds. Kam people of Gaoxiu Village feed the leaves to fish and livestock. *Arachis hypogaea* is a valued crop for its edible seeds, which produce peanut oil. It is widely cultivated throughout the world in tropical and subtropical climatic zones. Plants in the Fabaceae often have nitrogen-fixing bacteria in their root nodules; therefore they are an excellent natural fertilizer for the soil ecosystem and crops.

Camellia oleifera, **meix yuc** (Burusphat *et al.* 2000:148) is an endemic evergreen shrub or tree in the Theaceae with leathery leaf blades, globose to ellipsoid woody capsules and wingless brown to reddish brown seeds, which possess oil, **juc xac** (Burusphat *et al.* 2000:102) that is extracted and used primarily in cooking, Kam medicine and therapeutic massage. *Camellia oleifera* has been cultivated extensively as an oil seed. This important economic woody plant is the hardiest species of *Camellia* with the northernmost range. *Camellia oleifera* has the longest history of cultivation and utilization in China. It grows in forest

thickets and has a strong wood that is fashioned into large hooks for hanging objects.

Canna indica L., in the Cannaceae is a robust, herbaceous perennial with stout erect stems, large, alternate spirally arranged leaves and tuberous rhizomes. Its corolla tube is apricot yellow and showy and the fruit is a broadly ovoid capsule with many globose seeds. *Canna indica* is cultivated as an ornamental, and for its starch. The Kam feed the stems and petioles to their pigs. *Canna indica* is native to tropical America and is grown throughout the tropics (Wu & Kress 2000a:378).

Colocasia esculenta (L.) Schott, **moc jil** [mo²¹² tj⁵⁵] (Burusphat *et al.* 2000:154) is an evergreen herbaceous perennial in the Araceae with a thick underground tuberous corm, several asymmetrically peltate leaves, sheathing petioles and a green berry bearing few seeds. The Kam cultivate *C. esculenta* in wet fields for its edible corms, petioles, inflorescences and leaves, which are fed to fish in the fishponds. The corms are used medicinally for treating swellings, abscesses, and snake and insect bites. *Colocasia esculenta* grows in wet broad-leaved forests, valleys, watersides, swamps and disturbed areas, and is often planted near farmhouses in flooded fields. It is a highly variable species that is native to tropical Asia and is cultivated throughout China.

Commelina benghalensis is a native herbaceous perennial in the Commelinaceae with creeping stems, numerous pubescent branches and alternate ovate leaves. It has zygomorphic blue flowers and an ellipsoid capsule with cylindrical or semicylindrical black seeds. Kam people of Gaoxiu Village prepare a tea of the entire plant for regulating menses. *Commelina benghalensis* is a traditional medicine with anti-inflammatory, febrifugal and diuretic properties that is gathered by the Kam as fodder for animals and food for developing fish in the fishponds. It grows in moist and shaded places in the lowlands (Hong & DeFilippes 2000:37).

Cucumis sativus L., **gueel2** [kwe⁵⁵] (Burusphat *et al.* 2000:77) is a cultivated herbaceous annual in the Cucurbitaceae with a white pubescent stem and branches, slender simple tendrils, broadly ovate-cordate leaf blades and yellowish white flowers. The fruit is large, yellow green, oblong or cylindrical and the seeds are small and narrowly ovate. Kam people of Gaoxiu Village cultivate *C. sativus* for its edible fruit, which is eaten fresh, pickled or cooked, and the leaves are fed to water buffalo, cows, and fish in the fishponds. *Cucumis sativus* is commonly cultivated in tropical, subtropical and temperate regions of the world.

Eichhornia crassipes (Mart.) Solms is a floating, herbaceous aquatic plant in the Pontederiaceae with many long fibrous roots, a very short stem and swollen yellowish green to greenish spongy leaf petioles. Its flowers are purplish blue and the capsule bears numerous longitudinally

winged seeds. The Kam of Gaoxiu Village use the entire plant as fodder for their animals, feed for the fish in the rice fields and fishponds and as green manure for developing rice in the paddies. The young leaves and petioles are sometimes eaten as a vegetable. *Eichhornia crassipes* has become naturalized and grows gregariously in ponds, ditches and paddy fields (Wu & Horn 2000a:41-42).

Glycine max (L.) Merr., **doh songc** [to³³ son²¹²] (Burusphat *et al.* 2000:49) is an endemic, tall and erect annual in the Fabaceae with reddish brown hairs, trifoliate leaves, ovate-elliptic leaflets and a white, pink or violet corolla. *Glycine max* is regularly cultivated in China for its edible seeds that produce soybean oil. Kam people feed the leaves to fish and livestock.

Lactuca sativa L., **mal uh** [ma⁵⁵ u³³] (Burusphat *et al.* 2000:138) is a lactiferous, herbaceous annual or biennial in the Asteraceae with a solitary erect stem and numerous terminal flower heads of yellow florets. The achenes are beaked, pale brown, oblanceolate and compressed. Kam people of Gaoxiu Village cultivate *L. sativa* and cook the leaves and stems for human consumption. They also feed the fresh plant to fish in the fishponds. *Lactuca sativa* is widely cultivated throughout China as a vegetable. The leaves are nutritious and can be eaten as a salad and the thick stem is consumed and pickled. There are many cultivars of *L. sativa* that are usually treated as varieties.

Lagenaria siceraria (Molina) Standl., **mal buc** [ma⁵⁵ pu²¹²] (Burusphat *et al.* 2000:137) is an herbaceous annual in the Cucurbitaceae with soft pubescence, tendrils and solitary 5-merous white flowers. Its leaf blades are ovate-cordate to reniform and the polymorphic fruits of various sizes and shapes are woody when mature. Within the fruit are numerous white obovate or triangular compressed seeds. The Kam of Gaoxiu Village use the woody gourds as vessels for carrying liquids such as alcohol, oil and water. The fruit is eaten as a vegetable when young, and the seeds are saved and planted. The attractive vessels are decorated with braided yarns and given as gifts or sold. Southern Kam people gave us decorative gourds and recounted a traditional story, which expresses the significance of the vessels. We were told that if children carry the gourds across the river as in the story, they would not drown. *Lagenaria siceraria* is commonly cultivated in China and in warm climatic zones of the world.

Monochoria vaginalis (Burm. f.) C. Presl is an herbaceous aquatic plant in the Pontederiaceae with erect stems, broad sheathed leaves, purplish flowers, ovoid to ellipsoid capsules and winged seeds. Gaoxiu Village Kam people gather the leaves and stems as a vegetable, fodder and feed for fish. *Monochoria vaginalis* grows in rice fields, ditches, ponds and swamps in lower elevations (Wu & Horn 2000b:40-41).

Murdannia triquetra (Wall. ex C.B. Clarke) G. Brückn. is a native herbaceous perennial in the Commelinaceae with fibrous roots, elongate horizontal rhizomes and creeping branched stems. Its leaf blade is spreading or slightly folded, the flowers are pink, purple-red or bluish-purple and the ovoid-globose capsule has reddish gray seeds. The Kam of Gaoxiu Village use this plant with a high protein content as forage for their animals, and as a vegetable. It is also gathered and fed to fish in the fishponds, and is employed medicinally as a febrifuge and diuretic. *Murdannia triquetra* grows along rice fields and wet areas in lower elevations (Hong & DeFilippis 2000b:27).

Musa basjoo Siebold & Zucc., **biags** [pjak³²³] (Burusphat *et al.* 2000:21) is a robust herbaceous perennial in the Musaceae with bright green leaves, pendulous flowers and fruits bearing numerous black seeds. The Kam feed the pseudostems and petioles to their pigs. *Musa basjoo* is a cultivated ornamental and medicinal plant (Wu & Kress 2000b:314-317).

Musella lasiocarpa (Franch.) C.Y. Wu (Figure 11) is an endemic, herbaceous perennial in the Musaceae with horizontal rhizomes and large narrowly elliptic and bilaterally symmetrical leaf blades. The inflorescences are erect, conical and dense and the flowers are arranged in 2 rows per bract, which are persistent and yellow to yellow-orange. The fruits are hairy ovoid berries with numerous brown to black-brown seeds. A few Kam people of Gaoxiu Village cultivate *M. lasiocarpa* as an interesting and striking ornamental plant that grows wild on mountain slopes. It is also used medicinally, and as feed for pigs (Wu & Kress 2000c:315).

Myrica rubra (Lour.) Siebold & Zucc., **lagx saiv** [lak³¹ sai⁵³] (Burusphat *et al.* 2000:206) is an evergreen tree in the Myricaceae with simple leathery leaves and dark red or purple-red globose drupes. This tree is commonly cultivated for its edible fruit, which is sweet and tart. In Caiyuan Village, Kam people collect the fresh fruits and place them in rice wine, which imparts a beautiful red color and tangy flavor. Some species of *Myrica* are planted for land reclamation, and produce a source of medicine, wax, dye and natural insecticide (Lu & Bornstein 1999:275-276, Maberley 1997:473).

Nicotiana tabacum L., **yeenl** [jen⁵⁵] (Burusphat *et al.* 2000:264) is an introduced, viscid herbaceous annual or short-lived perennial in the Solanaceae with extensive glandular hairs. The inflorescences possess many tubular or tubular-campanulate flowers that are yellowish, greenish, red or pinkish and the capsules contain numerous minute rounded brown seeds. Its leaves are sticky and the petioles and stems are winged. Kam people of Gaoxiu Village cultivate *N. tabacum* and men often smoke the glandular leaves in a traditional tobacco pipe, **dongc yeenl** (Burusphat *et al.* 2000:53) composed of bamboo and a glazed clay bowl. *Nicotiana tabacum* is native to



Figure 11. Examining *Musella lasiocarpa* (Franch.) C.Y. Wu in Gaoxiu Village. © John Amato.

South America and is widely cultivated throughout China. It is applied as an insecticide and is also employed medicinally as a diaphoretic; to induce perspiration, and as an emetic; to induce vomiting (Zhang *et al.* 1994a:331-332).

Perilla frutescens (L.) Britton is a pubescent and erect aromatic herbaceous annual in the Lamiaceae with dentate leaves that is cultivated by the Kam of Caiyuan Village. Its stems are green or purple, flowers are white to purplish red and its netted nutlets are grayish brown or tawny. The Kam use the leaves and flower clusters as a condiment for flavoring food, or they are salted and eaten. *Perilla* seeds are a source of drying oil that is used in waterproofing paper, lacquer varnishes, ink and paint. It is widely cultivated in China and grows in disturbed areas of Asia (Li & Hedge 1994b:241-242).

Phaseolus vulgaris L. is an introduced, herbaceous annual in the Fabaceae with white, yellow, violet or red flowers. Kam people of Gaoxiu Village grow this plant as a vegetable and feed its trifoliolate leaves to fish and domestic animals. *Phaseolus vulgaris* is native to America and is widely grown throughout China.

Phyllostachys meyeri McClure is an endemic, arborescent bamboo in the tribe Bambuseae of the Poaceae family that is extensively cultivated by the Kam. *Phyllostachys*

species are perhaps one of the most economically important bamboos in China. They are grown as an ornamental, for channeling water to fishponds and rice paddies, and as supports for building, flooring, furniture, umbrellas, containers and papermaking, and the young fresh shoots are edible (Wang & Stapleton 2006b:163-168). Kam people of Gaoxiu Village also employ *P. meyeri* culms as covering for fish nests in the fishponds. It is found in open forests and is grown in many provinces of China.

Sagittaria pygmaea Miq., **kiut** [khiu¹³] (Burusphat *et al.* 2000:108) is a native herbaceous aquatic stoloniferous plant in the Alismataceae with aerial, floating or submerged linear or subspatulate leaves. *Sagittaria trifolia* L. possesses aerial sagittate, sheathed leaves and winged achenes that have an apical beak. Both species grow in paddy fields, ponds, lakes, marshes and channels within the Kam cultural landscape. *Sagittaria pygmaea* and *S. trifolia* provide nutrient-rich food for fish in the paddy fields, and the fish excrement is a natural fertilizer that aids in the successful growth and development of rice. Kam agriculturists collect and transfer *Sagittaria* plants to the fishponds for raising and breeding fish. Unfortunately, pesticides are applied in the paddy fields, which severely affects the balance of a sustainable agricultural system.

Vicia faba L. is an herbaceous annual in the Fabaceae with strong erect stems and oblong or obovate leaves. Its flowers are white with purple venation and the pods are large and tomentose. The Kam of Gaoxiu Village feed *V. faba* leaves to fish and domestic animals. It is frequently grown in China for its large edible seeds.

Zea mays, **oux xul** (Burusphat *et al.* 2000:190) is an annual in the Poaceae with erect and robust culms and large glabrous broadly linear leaf blades. The female inflorescence is an axillary cylindrical cob with rows of spikelets and the terminal male inflorescence is a tassel of digitate racemes. The mature caryopses are plump and edible. Kam agriculturists and pisciculturists of Gaoxiu Village cut the stalks, leaves and husks of the corn plant and place this in the fishponds as food for developing fish. *Zea mays* originated in America and is widely cultivated in China. It was first domesticated in Central America approximately 7000 years ago and is one of the most important crops in the world (Chen & Phillips 2006c:650).

Zingiber officinale, **xingp1** (Burusphat *et al.* 2000:250) is a sterile, yellow-flowered herbaceous perennial with thickened, fleshy and branched rhizomes that are strongly aromatic. Its leaves are sessile and arranged alternately in two opposite, vertical rows. *Zingiber officinale* is widely cultivated for medicine, spice and cosmetics and is often prescribed for motion sickness (Mabberley 1997:767, Wu & Larsen 2000: 325, 332). This *Zingiber* species is grown and consumed by Kam people of Caiyuan and Gaoxiu Village.

Pisciculture

In Kam mountain villages, water is diverted to the paddy rice fields, often over long distances through bamboo or wood irrigation channels, which are judiciously and collectively maintained. Paddy fields are often inundated with water all year round, which inhibits the growth of weeds and keeps the earth from hardening. Paddy fields also serve as fishponds (Rossi & Lau 1990:33), therefore drying them abruptly would directly impact fish habitat. In 1949, the cultivation of winter wheat, *Triticum*, **oux megx** (Burusphat *et al.* 2000:189) was introduced into some Kam areas however it has not been strongly adopted because fields must be dried before wheat is planted, which could adversely affect rice yields (Geary *et al.* 2003:95-96).

Kam agriculturists and pisciculturists gather aquatic vegetation growing in rivers and streams, and carry this to the fishponds, **daeml2** (Burusphat *et al.* 2000:35) to feed and provide shelter for the developing fish. Bundles of diverse aquatic vegetation are employed to divert flowing waters to the fishponds. Some aquatic plants are also collected as forage for pigs, cows and water buffalo.

Azolla imbricata (Roxb. ex Griff.) Nakai is a small, floating aquatic fern in the Azollaceae with branched slender stems, simple deciduous chlorophyllous roots and alternate, sessile imbricate leaves that turn reddish when under stress such as from poor nutrition, salinity or temperature changes. *Azolla imbricata* possesses colonies of the cyanobacteria, *Anabaena azollae* Strasb., that is responsible for nitrogen fixation (Mabberley 1997:70, Raven *et al.* 1986:172). Kam people utilize *A. imbricata* for green manure and forage. It is an economically important plant for agriculture and horticulture that lives in rice fields, fishponds and ditches. Kam people of Gaoxiu Village apply the entire plant to relieve insect bites and stings, and as a haemostatic, to stop bleeding.

Eichhornia crassipes is a floating herbaceous aquatic plant in the Pontederiaceae with many long fibrous roots, a very short stem and swollen yellowish green to greenish spongy leaf petioles. Its flowers are purplish blue and the capsule bears numerous winged seeds. The Kam of Gaoxiu Village use the entire plant as fodder for their animals, feed for the fish in the rice fields and fishponds, and as green manure for developing rice in the paddies. The young leaves and petioles are sometimes eaten as a vegetable. *Eichhornia crassipes* has become naturalized and grows gregariously in ponds, ditches and paddy fields (Wu & Horn 2000a:41-42).

Lemna minor L., **neit (ngeit)** (Burusphat *et al.* 2000:162) is a minute, herbaceous free-floating aquatic perennial plant in the Lemnaceae with a single root that has small shiny green bodies called fronds, which correspond partly to leaf and partly to stem. Daughter fronds are connected to mother fronds by a thin white stipe. *Lemna minor* is a gregarious plant that multiplies quite rapidly and possesses winged fruits that open by bursting. Kam agriculturists and pisciculturists use the fronds as high quality fodder for domestic animals, fish and fowl. It grows with other aquatic species and water ferns in rice paddies, lakesides, ponds, ditches and slow-flowing streams in regions with cool to moderate temperate climates.

Gaoxiu Village of Sanjiang Dong Autonomous Prefecture of Guangxi Province has numerous fishponds jointly owned by families or clans of the village. Since the ponds are deep, Kam people raise carp that are greater than a kilogram in weight, and at festival times they are caught and shared. The fishponds have an outlet and a constant supply of fresh water from a bamboo or wood irrigation channel, ditch or spring flowing into the ponds. In the spring, *Lycopodium*, **sem1 bal** or **jaol bal** [pa⁵⁵], in the Lycopodiaceae is placed in the fishponds for collecting fish roe, **geiv bal** (Burusphat *et al.* 2000:7, 70). *Lycopodium* is a wild plant with long creeping, trailing stems. Fish lay their roe upon the fine, linear leaves of this club-moss. The fish roe effectively adheres to the leaves of *Lycopodium*'s strong horizontal stems, which are then removed and transferred to the paddy fields. At harvest time in some ar-

eas, fish in the paddies can weigh up to 250 grams. Tall-stemmed glutinous rice paddy fields usually contain fish. During the so-called Cultural Revolution when food was in short supply, Kam agriculturists were ordered to deliver baskets of fish from their fields to Han officials in the nearby towns (Geary *et al.* 2003:104-105, Yang Tongyin, personal communication, 18 October 2006).

Marsilea quadrifolia is a small native fern in the Marsileaceae with slender and creeping branched rhizomes that have brownish hairs, and nodes bearing several leaves. The leaves possess 4 obtriangular leaflets with distinct venation. The reproductive structure is a long, elliptic deep brown and woody sporocarp that produces dimorphic spores. The entire plant is used as a forage, and food for fish in the paddy fields and fishponds. *Marsilea quadrifolia* is applied externally for treating insect bites and stings, snakebites and skin injuries. The entire plant is used as a haemostatic to stop bleeding. This fern of tropical and temperate climatic zones grows in shallow silt and rice fields, along ditches and ponds where it floats on the water surface or extends beyond it.

Najas sp. are small submerged herbaceous annuals of fresh or brackish water in the Najadaceae. They are delicate aquatic plants with slender branched stems, small linear leaves and minute flowers. The fruit is an elliptic oblong achene with a hard, brittle and pitted seed coat. *Najas* is a cosmopolitan genus that usually grows in slow-moving water, rice fields, channels and fishponds. Fish feed on species of *Najas* in the paddy fields and their excrement provides natural nutrient-rich fertilizer for the developing rice.

Nymphoides peltata (S.G. Gmel.) Kuntze is a floating aquatic plant in the Menyanthaceae that carpets the surface of fishponds, lakes and other bodies of standing water and thereby provides shade and shelter for fish. It has long, unbranched floating stems, short horizontal rhizomes and ovate-orbicular to orbicular leaf blades with palmate veins. The 5-merous rotate and glandular golden yellow flowers are clustered at nodes and the capsule is elliptic bearing compressed brown ciliate seeds (Ho & Ornduff 1995:140-142). Kam people of Gaoxiu Village utilize *N. peltata* as an effective shade and shelter plant for fish in the fishponds. Its densely glandular leaves and showy golden yellow flowers attract insects, which provide food for developing fish. Mabberley (1997:495) noted that there are species of *Nymphoides*, which are medicinal, others produce edible tubers, and some have seeds that are dispersed by ants.

Potamogeton sp. are herbaceous annual or perennial aquatic plants of fresh or brackish water in the Potamogetonaceae. They may be completely submerged or have floating, leathery dimorphic leaves and nitrogen-fixing bacteria in the rhizosphere (Mabberley 1997:581). *Potamogeton* produce spikes with several whorls of op-

positely arranged 4-merous flowers and the drupe fruit is obovoid and laterally compressed. *Potamogeton* species are a useful natural fertilizer in Kam fishponds and paddy fields, and provide nutrients for the growing rice and fish.

Salvinia natans (L.) All. is a small and delicate, native annual free-floating aquatic fern in the Salviniaceae with slender water-repellent pubescent stems and three whorled leaves. The upper leaf surface has small projections and the sporocarp, which is the reproductive organ, is globose and whitish yellow. *S. natans* is widely distributed in valley rice paddies, fishponds, ditches and slow-moving standing water in the lowlands (Mabberley 1997:635). It grows rapidly if there are sufficient nutrients and ample sunlight. Fish in the rice fields and fishponds coexist with this fern, which is a useful natural fertilizer. However it may become invasive where phosphate levels have been increased due to the application of chemical fertilizers. *Salvinia natans* is a medicinal fern that is used by Kam people of Gaoxiu Village as a haemostatic, to stop bleeding. The entire plant is boiled and eaten for consumptive disease and eczema, and is applied topically for insect bites, skin inflammation, redness and burns.

Agroforestry

The mountainsides surrounding Kam villages are densely forested and some of the trees are harvested, tied together as a raft (Figure 12), and floated by river to market. Before 1949, the Kam of Guangxi Province practiced a widespread tradition whereby on the first day of spring, fathers brought their sons to the hillsides to plant ten *Cunninghamia lanceolata*, **meix beens**² (Burusphat *et al.* 2000:XI-XII, 17, 146) saplings each. After the rains, more saplings were planted. In the Kam areas of Jinping County in Qian Dongnan Autonomous Prefecture of southeastern Guizhou Province, when a Kam baby is born, each family in the village goes to the mountainside to plant a tree.

In 1980, ninety-five percent of the forests in this prefecture were administered by forest cooperatives. Since 1981, private ownership of forest areas ceased to exist, however some forest zones are still maintained as cooperatives. Others are overseen by government forestry administration centers throughout the Kam region and many are served by hundreds of workers. Prefectures, counties and rural areas all have their own forestry administration centers while other forest zones are rented to individuals by the government under contract, which allows individuals the right to sell trees grown on borrowed land (Geary *et al.* 2003:119-120).

Caiyuan Village of Jinping County is approximately 460 meters above sea level and is situated alongside the Qingshui River in southeastern Guizhou Province. The area, inhabited by the Kam ethnic community possesses unique geomorphology and rich historical and cultural sites. Caiyuan Village is accessible by crossing the river



Figure 12. Kam agroforesters of Caiyuan Village gathering and tying logs. © John Amato.

in long, narrow wooden boats. Kam boatmen ferry people and goods across the river to Caiyuan Village daily. In 2006, the Qingshui River was dammed approximately 1.4 kilometers downstream from Caiyuan Village. Kam ancient and sacred trees, significant holy sites, earth shrines, historical stone tablets, 300 year-old bridges, dwellings, extensive fishponds, agricultural lands, grazing lands, the Caiyuan Village Primary School and Infirmary were submerged under water along with the traditional agroforestry livelihood of floating logs downriver to Jinping for market.

Before 1949, all logs were transported by rivers. Since 1949, most logs are moved by road or rail after a short trip downriver. The agroforesters of Caiyuan Village used to wait for the rains and the rivers to rise in spring or early summer. They accompanied the logs downriver by log raft to Jinping. When logs are sold in Jinping, they may be tied together into large rafts and sent down to Hongjiang, Hunan Province, and on to Wuhan and Shanghai. Over the past fifty years, timber from the Kam region has been requisitioned by the state. After 1983, machinery or food could no longer be used in exchange for timber. Since that time, money has mainly been employed for the sale of logs. Today, Kam agroforesters of Caiyuan sell approximately two hundred logs to the Jinping local government for a set price of 20 to 40 yuan per log and in turn, the Jinping local government sells the logs to the lumber com-

panies for a higher price. Kam foresters in the rural areas expressed discontentment with the current situation. In some areas, for every cubic meter of wood sold from the trees that the Kam people grow and tend, they receive 150 yuan. The forestry administration centers receive 130 yuan and the state receives 220 yuan. Agroforesters lamented that this arrangement is unfair. For many Kam foresters, trees are what all their financial resources are invested in and that which they use to support their children's college education. Under the present situation, forest resources are being depleted, overlogging is rampant and Kam agroforesters are on the verge of bankruptcy. By law, the Kam are not permitted to sell the trees they have tended, to individuals or to companies other than the forestry administration centers (Geary *et al.* 2003:120-121). There is extensive clear-cutting of forests on some of the mountain slopes surrounding Gaoxiu Village in Guangxi Province.

In the past, the government provided a small sum of money to rural village agroforesters; for every tree that was not cut, 5 Rmb was issued. The government no longer provides small subsidies for rural village agroforestry. Today, the money formerly provided to small village agroforesters, is retained by the government. As a consequence, it is very difficult to make ends meet as a local agroforester, and in some areas agroforestry has become an

unsustainable livelihood. More Kam people are leaving their rural villages for work in the cities because they cannot sustain their livelihoods and adequately provide for their children's education. Agroforesters stated that they need a better price for their forest resources. Children and young adults need financial assistance in order to complete their education. In July 2006, Kam foresters of Caiyuan Village indicated that the damming of the Qingshui Jiang would obstruct their sale of timber because they are no longer able to transport their logs by water. However, they are able to haul them by truck on the newly constructed dirt road for an additional expense, which exacerbates an already tenuous livelihood.

The winding dirt road, which is extremely precarious in the rainy season, now links the village of Caiyuan with Jinping. Road development on the precipitous mountain slope of Caiyuan Village caused significant environmental impact to Kam rice paddies and denudation of the steep hillside, leaving it severely depauperate of vegetation. Rock and landslides have spilled onto Kam cultivated fields and destroyed local crops. Rockslides dammed a stream alongside a culturally significant 300-year-old historical rock bridge. At the entrance to the bridge stood several stone tablets that were erected for the health and wellbeing of children so that they would not cry and will sleep peacefully. The village of Caiyuan is more than 300 years old.

Numerous Kam holy sites, ancient and sacred trees, fishponds, agricultural fields and grazing lands have been completely covered by water by the damming of the Qingshui River. More than 90 percent of the people of Caiyuan Village did not want the Qingshui Jiang to be dammed, which directly impacts the agroforestry livelihood of the Kam people. The last log raft down the Qingshui River to Jinping was accompanied by Kam agroforesters of Caiyuan Village in September 2006. It signified the end of an era and 300-year-old tradition.

Forests of *Cunninghamia lanceolata*, **meix beens²** and broad-leaved forests surround the small riverine village of Caiyuan with its wooden houses. *Cunninghamia lanceolata* is a variable species with evergreen leaves that are deep green, glossy and narrowly linear-lanceolate. The seed cones are terminal with dark brown and narrowly winged seeds. *Cunninghamia lanceolata* is the most important fast-growing timber tree that is propagated sexually by seed and vegetatively by cuttings or suckers. Kam people use the bark (Figure 13) as a roofing material. In Gaoxiu Village it is employed as a covering for fish nests in the fishponds. The wood is quite rot-resistant, not extensively eaten by termites, and is easily worked. Logs of *C. lanceolata* from Caiyuan and its surrounding forests have been bound together into rafts and floated downriver to Jinping to be sold. Kam carpenters utilize *C. lan-*



Figure 13. Kam men carrying *Cunninghamia* bark, **meix beens pi**. © John Amato.

ceolata to build houses, drum towers, wind-rain bridges and other wooden structures in Kam villages, without the use of nails. This indispensable tree is widely employed in constructing buildings, bridges, ships, lampposts, furniture, and for its wood fiber. *Cunninghamia lanceolata* grows in mixed broad-leaved forests or pure stands on rocky hillsides and along roadsides. Its native distribution is uncertain due to widespread planting and logging (Fu *et al.* 1999e:54-55). Kam drum towers, **beengc2** resemble *Cunninghamia* trees, which are highly significant to the Kam people (Rossi & Lau 1990:75).

Pinus massoniana, **meix songc** is an endemic evergreen coniferous tree in the Pinaceae with irregularly scaly bark, needle-like leaves and a pyramidal shaped crown. There are 2-3 slightly twisted needles per bundle and the seed cones are pendulous bearing narrowly ovoid and winged seeds. The Kam of Gaoxiu Village apply *P. massoniana* needles as medicine for treating skin irritations. It is an important economic tree that is used in afforestation and its trunk is a source of resin and tannin, and is a substrate for the cultivation of fungi. The wood is utilized in constructing boats, bridges and furniture, and the production of quality pulp. Kam people of Caiyuan Village planted numerous *P. massoniana* trees in the mountain forests surrounding their village. **Meix songc** grows on plains, hillsides and mountains in lower to middle elevations of China (Fu *et al.* 1999b:14-15).

Cryptomeria japonica (Thunb. ex L.f.) D. Don, **meix beens nos** (Yang Tongyin, personal communication, 07 January 2007) is a native evergreen tree in the Taxodiaceae with a pyramidal crown, persistent leaves, sessile seed cones and a straight trunk. Its bark is reddish brown, fibrous and peels off into long strips. Kam people of Caiyuan Village use the bark as knee protectors. *Cryptomeria japonica* is cultivated as an ornamental and planted for its wood, which is strongly rot-resistant, easily worked and used for constructing buildings, bridges, ships, lamp posts, furniture, utensils and for paper making. It is a fast-growing tree on deep well-drained soils in montane areas of warm, moist climatic zones and is intolerant of poor soils and cold environments (Fu *et al.* 1999d:56-57).

The wood of *Toona sinensis* (A. Juss.) Roem., **yaemx** (Burusphat *et al.* 2000:259) in the Meliaceae family is of very high quality and is resistant to warping, cracking and moisture. When used in house construction, Kam people believe that it will provide the family with good luck and protection to prevent evil from entering the home (Geary *et al.* 2003:42, 149). *Toona sinensis* is a deciduous tree with reddish brown bark. The young tender buds and pinnate leaves are gathered, cooked and eaten in early spring and some are dried and stored. The bark, root bark, petioles and leaves are medicinal. Peng and Edmonds (2008:111-115) noted that the bark is an astringent and depurative and the shoots and carminative leaves are rich in carotene, amino acids and vitamins. *Toona sinensis* is planted

for forestation to prevent erosion and landslides. It grows in mountain forests, on steep hillsides and open slopes, in ravines, near streams and disturbed areas.

Ancient and Sacred Trees

The southern Kam worship female deities in villages throughout the southern Kam region. Among them is the guardian spirit of peace and prosperity, the female progenitor or ancestral grandmother goddess, Sax Mags or Sax Sui, for whom many villages have erected temples in her honor. Kam people form a procession to the altar of Sax Sui wearing a garland of *Populus* tree leaves in their hair. At the altar, they make offerings of tea and the *Poplar* leaves that are in their hair, by placing them on the altar (Burusphat *et al.* 2000:VI, XIV, Geary *et al.* 2003:160, Geary & Pan 2003:284-285, Rossi & Lau 1990:48).

Local Kam people revere ancient and sacred trees. The trees are believed to embody spirits and their leaves have healing properties, as does the rainwater that collects on branches. The tree's spirit will ensure the peace and safety of the Kam village. If the trees are healthy and strong, the more prosperous and harmonious the village and its residents will be. In many areas, ceremonies and homage are paid to the spirits of ancient trees. Climbing such trees is forbidden and if one is found to have damaged a sacred tree, misfortune will befall the village, and the culpable person will be rebuked publicly. The guilty person must endure shame for committing such an act, surrounded by other villagers while a gong is played. He or she is then charged with caring for the tree for a specific period of time. A pig is usually slaughtered as a sacrificial offering to the spirit of a damaged tree (Geary *et al.* 2003:39, 82). If one kills a sacred tree, the person must sacrifice an ox and the wood of the tree may only be used to construct a drum tower. The wood scraps are to fuel the fire within the drum tower and are not for personal utilization in one's home (Rossi & Lau 1990:89).

There are large, ancient and sacred *Liquidambar formosana* Hance, **meix yaop** (Burusphat *et al.* 2000:148) trees in Caiyuan Village of Guizhou Province. *Liquidambar* is a beautiful deciduous tree in the Hamamelidaceae with alternate, palmately 3-lobed and 3-veined leaves and a globose infructescence. **Meix yaop** grows in sunny locations near villages, and in montane forests between 500-800 meters (Zhang *et al.* 2003a:18-22).

There are ancient and sacred *Cinnamomum camphora*, **meix gungl**, (Burusphat *et al.* 2000:147) trees in Caiyuan Village. *Cinnamomum camphora* is a large, evergreen camphor-scented tree in the Lauraceae with medicinal properties. The leaves are alternate and ovate-elliptic and the fruit is ovoid or subglobose and purple-black. This aromatic tree is the source of camphor, which is derived from the stem, root, branches and leaves. Camphor is used medicinally as a stimulant, antispasmodic, antiseptic and

rubefacient. The ancient and sacred camphor trees were growing along the Qingshui River and mountain slopes of Caiyuan Village. The damming of the Qingshui Jiang destroyed these holy trees of the Caiyuan Kam community.

Ancient evergreen trees are often growing beside or within Kam villages. The longer a tree lives, the more likely that spirits will inhabit the tree to protect the village and to help in healing sick children. Kam residents offer sacrifices by these ancient trees (Geary *et al.* 2003:139). In Gaoxiu Village of Guangxi Province, there is an ancient yew tree, *Taxus wallichiana* Zucc., **meix beens nuos** (Yang Tongyin, personal communication, 20 October 2006) in the Taxaceae with evergreen, linear to lanceolate leaves. This tree is highly significant to the Kam people who tie multiple bamboo and wire wands covered with decoratively fringed red and white material, around its trunk (Figure 14). When a Kam child is born, a wand is tied to the trunk for the benefit of the child's health, wellbeing and prosperity. Gaoxiu Village leader, Yang Changsheng explained that because **meix beens nuos** is of great value for people as a medicinal species and there are very few *Taxus* trees, placing a wand on the trunk of this important and sacred tree will ensure that the child will grow up to be an important and quality person of high integrity who is a valued, contributing member of society. Kam people of Gaoxiu carry the red or orange arils of this sacred tree to protect them on their way. Some have used the leaves and bark of *T. wallichiana*, **meix beens nuos** as a wash. Fu *et al.* (1999c:89-91) recorded that this tree is employed in afforestation and the wood is an excellent building material. Its leaves possess a compound that was isolated, which is an efficacious anti-tumor agent. The Kam of Gaoxiu Village will not sacrifice or sell their ancient and sacred **meix beens nuos**. *Taxus wallichiana* grows in broad-leaved coniferous and mixed forests, thickets and on open mountain slopes.

In Caiyuan Village, there was a magnificent ancient and sacred maple tree, *Acer laevigatum* G. Nicholson, **meix yaop**, **meiyao** (Shi Lin, personal communication, 01 January 2007), growing on a stream bank beside a bridge with a Kam earth shrine at its entrance. This wonderful tree in the Aceraceae had slender branchlets, simple and persistent, leathery lanceolate to oblong-lanceolate leaves and a spreading double winged samara. *Acer laevigatum*, whose fruits are brownish yellow when mature, grows in forests of the region. There are 60 endemic species of *Acer* in China. This maple was highly significant to the Kam people of Caiyuan Vil-

lage. Because of the damming of the Qingshui River, this beloved maple was killed. The rising waters covered Kam sacred and ceremonial sites, which represent the history and cultural patrimony of the Kam community.

From 1958–1960, Kam people were conscripted into the “Great Leap Forward”, which was unfortunately detached from realistic goals. Farmers had to leave their fields for the great steel-making initiative, while China's national slogan was, “Surpass Britain and Overtake America”. The Kam were ordered to make steel in their villages. Coal was not produced in the Kam areas, except around Tianzhu, Guizhou Province; thus many trees were cut down, including the ancient trees that the Kam revered as hosts to benevolent spirits. The trees were used to fuel the furnaces to refine ore, however temperatures from burning timber were not sufficient to run the furnaces and by the time this was realized, many trees had already been destroyed. This was a great leap backward that brought with



Figure 14. *Taxus wallichiana*, **meix beens nuos**. © John Amato.

it tremendous suffering in the Kam areas and throughout China (Geary *et al.* 2003:18).

There is a Kam story, which recounts that once there was a singing banyan tree, *Ficus microcarpa* L. f., **meix liongc xuh**, on the edge of a Kam village. Its figs were eaten by birds, to whom the gift of song was imparted. This banyan tree became a generator of beautiful music and its songs spread far and wide reverberating in the mountain valleys where the Kam reside (Burusphat *et al.* 2000:131, 259, Geary *et al.* 2003:204). In Caiyuan Village of Guizhou Province, there is a *Ficus henryi* Warb. ex Diels tree with edible figs that are axillary, erect, solitary and reddish orange when mature (Wu *et al.* 2003c:50-53). This tree in the Moraceae was growing on a mountain slope beside a stream above the Qingshui Jiang. *Ficus abelii* Miq. is a climbing shrub with milky latex, whose branchlets and petioles are densely covered with short, thick grayish white hairs. Its narrowly elliptical to oblanceolate papery leaves have entire margins and the bark is dark gray. *Ficus abelii* produces axillary and solitary pear-shaped figs that are purplish black to brownish red when mature (Wu *et al.* 2003a:60). Kam teachers in Jinping County of Guizhou Province would like to promote the planting of this native species along the Qingshui River for soil erosion control.

Pterocarya stenoptera C. DC. is a native deciduous tree in the Juglandaceae with pinnate leaves and elliptic to elliptic-lanceolate leaflets. It has an elongate, pendulous inflorescence and fruiting spike, and long ellipsoid nutlets with two linear wings. This beautiful tree was growing in Caiyuan Village along the Qingshui River near Kam fishponds, which were flooded by the damming of the river. *Pterocarya stenoptera* grows in forests on mountain slopes or riverbanks and is widely cultivated as a shade tree (Lu *et al.* 1999:280-282).

Salix babylonica L. is a native, ornamental deciduous tree in the Salicaceae with grayish black irregularly furrowed bark, pendulous branches, catkins, and narrowly lanceolate or linear lanceolate leaf blades with serrate margins. Kam people planted this handsome tree at the Gaoxiu Village Primary School. *Salix babylonica* is widespread throughout China and is used for its wood, weaving wicker baskets and for reforestation (Fang *et al.* 1999:186-187).

Wild Food Plants

Kam people gather a diversity of wild plants for human consumption. Young men and women collect *Celastrus orbiculatus* Thunb., **jaol dangl**, "vine of sugar" or "sweet vine", which is a deciduous twining shrub in the Celastraceae that grows in thickets on grassy slopes in the lowlands and mountains. *Celastrus orbiculatus* is crushed to produce a sweet juice, in which rice is soaked, beaten into paste and formed into cakes. The juice has an unpleasant smell but tastes very sweet (Long Yu Xiao, personal communication, 17 October 2006). The cakes are fried and

consumed with oil tea, which is shared together with people. Kam people eat sweet glutinous rice cakes when new plants are sprouting (Edmondson & Solnit 1990:11, Geary *et al.* 2003:168, Norman Geary, personal communication, 17 October 2006).

Acorus gramineus is an endemic, medicinal herbaceous perennial with fragrant linear leaves and densely branched, short creeping aromatic rhizomes. It produces numerous yellow green flowers and yellow ovoid globose capsules with seeds that are hairy at the base. The Kam of Gaoxiu Village use the leaves of *A. gramineus* as an important ingredient for flavoring **bal taot** (Yang Tongyin, personal communication, 17 November 2006), the traditional Kam raw fish dish. *Acorus gramineus* grows in Asia on moist rocky outcrops and along streams below 1800 meters in elevation.

Actinidia chinensis Planch. is a large, climbing deciduous shrub in the Actinidiaceae with reddish branchlets and orange-yellow flowers. The Kam of Caiyuan and Gaoxiu Village consume its edible subglobose kiwi fruits, which are sweet, nutritious and economically important. *Actinidia chinensis* is an endemic species that originated in central China. It grows in tall grassy thickets on low mountain slopes, in sparse secondary forests and mountain forest thickets. It is widely cultivated in China and other countries for its edible fruits. There are 42 endemic species of *Actinidia* in China.

Agastache rugosa (Fisch. & C.A. Mey.) Kuntze is a tall, herbaceous native perennial plant in the Lamiaceae with finely pubescent and erect branched stems, serrate leaves and a terminal, compact spike of many purplish blue flowers. Kam people of Guangxi and Hunan Provinces collect *A. rugosa* and add this fresh aromatic plant to **bal taot** (Yang Tongyin, personal communication, 17 November 2006), a traditional Kam raw fish dish that contains other fragrant and flavorful herbs, cornmeal and peanuts, *Arachis hypogaea*, **doh magx** [to³³ mak³¹] (Burusphat *et al.* 2000:49). *Agastache rugosa* is widely distributed and cultivated as a medicinal plant in China. It is used for abdominal pain and is a source of a fragrant essential oil (Li & Hedge 1994a:106).

Capsella bursa-pastoris (L.) Medik. is a pubescent, herbaceous annual or biennial in the Brassicaceae with erect, simple or branched stems, a many flowered raceme of white, rarely pink or yellow flowers and strongly flattened fruits. It is a cosmopolitan species that is found in gardens, fields, disturbed areas, and on mountain slopes throughout China. *Capsella bursa-pastoris* is used by the Kam as a vegetable and is boiled with eggs. Zhou *et al.* (2001:43) documented that this species is medicine for treating eye diseases and dysentery. *Capsella bursa-pastoris* is one of the most common naturalized weeds on earth. Before 1945, it was widely consumed as a famine food in China.

Castanea mollissima Bl. is a deciduous tree in the Fagaceae with spirally arranged leaves and furrowed bark that is cultivated or grows wild on mountain slopes. It is planted extensively for its edible nuts and some species have durable wood. The cupule is densely covered with pubescent spine-like bracts and there are usually 2-3 nuts per cupule (Huang *et al.* 1999:315-317). **Meix yint** is the Kam name for *Castanea*, the chestnut tree (Burusphat *et al.* 2000:266) whose nuts are consumed by Kam people.

Cryptotaenia japonica Hassk. is a native, herbaceous perennial in the Apiaceae with a small and tuberous rootstock, purplish branched stems, and sheathed leaves with doubly serrate margins. The inflorescence is a compound umbel of white flowers and the fruit is elongate and slightly compressed. *Cryptotaenia japonica* is an edible, wild plant that grows in damp forests, ravines and ditches. It is eaten by Kam people and is considered a tonic for strengthening the body. *Cryptotaenia japonica* is widespread and exhibits considerable variation of its leaves and floral morphology (Pan & Watson 2005:80).

Houttuynia cordata Thunb., **wadc** [wat²²] (Burusphat *et al.* 2000:233) is an aromatic, native herbaceous perennial in the Saururaceae with thin creeping rhizomes, jointed ridged stems, alternate simple papery leaves and small white flowers. Kam people gather *H. cordata* and eat the fresh, fragrant shoots as a vegetable, and its leaves are used medicinally. It can be mixed with other seasonings and spices to make **bal semt**, traditional Kam sour fish (Huang Xiao Yu, personal communication, 20 December 2006, Yang Tongyin, personal communication, 21 December 2006). This plant grows in ravines, forests, wet meadows, mountain slopes, thickets, and along streams, trails, roadsides, field margins and ditch banks (Xia & Brach 1999:109).

The apiculate globose fruits of *Litsea pungens* Hemsl., **lagx sangl** [lak³¹ san⁵⁵] (Burusphat *et al.* 2000:115) and *Litsea euosma* W.W. Sm. in the Lauraceae turn black upon maturity and are used in Kam culinary preparations. *Litsea pungens* is a small deciduous tree with young pubescent branchlets. Its leaves are alternate and lanceolate or obovate-lanceolate and the flowers appear before the leaves develop. This tree grows along streams, weed-tree forests or forest edges on sunny slopes. *Litsea euosma* is a deciduous tree that grows in moist places in broad-leaved forests. The fruits of *Litsea* species have a refreshing citrus-like flavor. The branches, leaves and fruits possess aromatic oils whose main chemical constituents are citral and geraniol, which are used as food flavorings, cosmetics, and spices. The seed oil is utilized in industry and its fruits are employed as medicine for treating colds, as an anodyne and antiemetic, and for regulating the flow of vital energy.

Lonicera japonica Thunb. ex Murray, **nugs jemi**, **nugs nyaenc** (Bei ya/Yang Xiu Chun, personal communica-

tion, 17 November 2006) is a perennial trailing or climbing woody vine in the Caprifoliaceae with opposite, entire evergreen leaves and reddish brown to light brown stems. The fragrant flowers are borne in pairs, which are supported by leaf-like bracts. *Lonicera japonica* produces black globose berries with 2-3 seeds. Kam people of Gaoxiu Village make a tea of its sweet-scented flowers and leaves. They finely grind the fresh leaves and young stems of *L. japonica* with uncooked rice, to which boiling water is added. This mixture is cooled and fermentation occurs, which produces yeast, an essential ingredient for making wine. The yeast is dried and stored for later use. *Lonicera japonica* is a valued medicinal herb that helps to maintain vascular homeostasis. The flower buds combined with other plants have antibiotic and antiviral effects. This shade and drought tolerant native of East Asia with underground rhizomes is highly invasive due to its successful seed dispersal mechanism and rapid growth rate. It invades fields, forest edges and open and disturbed wooded areas where it may engulf small trees and shrubs. *Lonicera japonica* thrives most vigorously in full sun and rich soil.

The young, tender leaves of *Polygonum* sp., **suum**, in the Polygonaceae are collected, eaten fresh and are a fragrant ingredient of **bal taot** (Yang Tongyin, personal communication, 21 December 2006), the traditional Kam raw fish dish. *Polygonum* is an herbaceous plant with simple, entire alternate leaves, and stems with conspicuous swollen nodes. It grows along fields and roadsides of Gaoxiu Village. Mabberley (1997:576) noted that some species of *Polygonum* are employed as a medicinal tea to treat asthma. Gaoxiu villagers use other pungent *Polygonum* species, **baiv1** [pai⁵³] (Burusphat *et al.* 2000:12) as an ichthyotoxin. *Polygonum perfoliatum* is a native, herbaceous annual with red-brown trailing prickly stems and triangular-peltate leaf blades. The flowers are white or pinkish and the edible fruit is dark blue and fleshy. The Kam of Gaoxiu Village eat the pleasant-tasting ripe fruits of this species. *Polygonum perfoliatum* grows near fields, along roadsides and wetlands (Li *et al.* 2003:311-312).

The creeping rhizomes of *Pteridium aquilinum* (L.) Kuhn var. *latiusculum* (Desv.) L. Underw. ex A. Heller, in the Dennstaedtiaceae, are formed into black cakes and eaten by Kam people of Jinping in Guizhou Province. The tender stems and croziers, **mal ius** (Yang Tongyin, personal communication, 11 October 2006), which exhibit circinate vernation, are also widely consumed as a vegetable. The sori are located along the margins of the frond blades, which are rolled back over them (Raven *et al.* 1986:327). *Pteridium* species are the most common ferns consumed in China. Bracken fern rhizome starch, **mieengc2** [mjen²¹²] (Burusphat *et al.* 2000:151) is a food source that is substituted for grain or flour and is used in the process of brewing wine (Yang *et al.* 1996:105). The rhizome starch of *P. aquilinum* has been eaten as a famine food. Bracken fern possesses thiaminase and other toxins, and its carcino-

genicity is well documented. Young fronds contain mutagenic shikimic acid, which is known to promote stomach cancer (Mabberley 1997:595, Yang 1996:342). Bracken fern is one of the more cosmopolitan species of vascular plants in our world.

Rubus rosifolius Sm. is a native shrub in the Rosaceae that has prickly branchlets, petioles and pedicels with single white flowers. Kam people of Caiyuan Village eat its fresh, sweet aggregate fruits that are sometimes dried. *Rubus rosifolius* grows in mixed forests, on grassy mountain slopes, along roadsides and in landslides. *Rubus tephrodes* Hance is a densely gray and tomentose, deciduous climbing shrub with curved prickles and long glandular hairs. It has simple suborbicular leaves, many white flowers and globose, purplish black aggregate fruits. Caiyuan Village Kam people eat the fresh sweet fruits, which are often dried. The fruits of some species of *Rubus* are made into juices, jams, candy, wine and vinegar and the dried fruits and leaves are used for tea. The stems and roots of some *Rubus* species are a source of tannin. *Rubus tephrodes* grows in mountainous regions, foothills, along slopes and roadsides and in thickets and valleys (Lu & Boufford 2003:227-228, 248-249). The Kam name for any of several species of *Rubus* is **demh al** (Burusphat *et al.* 2000:44).

Vaccinium bracteatum Thunb. is a native evergreen shrub or small tree in the Ericaceae with many branches, scattered thinly leathery leaves, numerous white flowers and dark purple pubescent berries. The Kam use the fruits of *V. bracteatum* to impart a pleasing fragrance, to enhance the flavor of, and to stain rice black. *Vaccinium bracteatum* is a medicinal plant that grows in forests, thickets, grassy areas, and along roadsides (Fang & Stevens 2005:487-488).

The Kam of Jinping County in Guizhou Province utilize the purplish red exocarp of the fruits of *Zanthoxylum armatum* DC. and *Zanthoxylum bungeanum* Maxim., **siul hongc** (Burusphat *et al.* 2000:217) in the Rutaceae, as a condiment that is cooked and eaten with vegetables and meat. The fruits of both native, deciduous tree species have spreading oil glands, aromatic bark and opposite leaflet blades. *Zanthoxylum armatum* branchlets have rust colored pubescence and the seeds are blackish brown. It is found in many diverse habitats below 3100 meters. *Zanthoxylum bungeanum* has prickly stems, branches and winged rachises. It grows in many natural environments below 3200 meters.

Zingiber mioga (Thunb.) Roscoe is a wild, herbaceous perennial in the Zingiberaceae with yellow, aromatic rhizomes and erect, leafy pseudostems. The immature flowers are collected, cooked with oil and consumed. This species of *Zingiber* grows in moist places in mountain valleys and is rarely cultivated. It is a medicinal and edible plant whose rhizomes are used as a condiment and spice

by the northern Kam of Caiyuan Village. *Zingiber mioga* has been employed as an antimalarial, vermifuge and for treating insect bites.

Fiber Plants

The Kam people employ a number of useful plants with strong and pliant fibers as binding and weaving material for everyday use in agriculture, pisciculture, agroforestry, ritual and construction. *Oryza sativa*, glutinous rice, **oux lail (oux jos)** (Burusphat *et al.* 2000:189) is a cultivated, aquatic annual in the Poaceae with erect culms and leaf sheaths that are slightly inflated below. Its panicle is loosely contracted and nodding at maturity and the rice spikelets are oblong to oblong-lanceolate. Han rice culms are rather brittle when dry but glutinous rice culms are strong and can be used for making bed mats, brooms, guangl sedl, rice straw, **guangl1** [kwan⁵⁵], sandals and rope, **lamh** [lam³³] (Burusphat *et al.* 2000:76 116). Men soak the rice culms in water, which are then pounded with a wooden rod to render them soft and malleable for working. Glutinous rice was the staff of life of the Kam Ethnic Minority and is still preferred by Kam people today. For the New Rice Festival, **oux meik** (Yang Tongyin, personal communication, 17 November 2006), when the growing rice begins to produce the first seeds of the season, glutinous rice stems are tied together and placed as an offering to the ancestors in gratitude. *Oryza sativa* is cultivated primarily in flooded fields throughout most of China and was domesticated in Southeast Asia (Liu & Phillips 2006a:182-184).

Gossypium cotton, **miinc1** [mjⁱⁿ212] is grown in nearby fields for spinning and weaving cloth that is dyed blue-black with *Indigofera tinctoria*, **denh2, jenc (lanc)** [lam²¹²] (Burusphat *et al.* 2000:45). *Gossypium* species are dotted with dark oil glands and possess large solitary white or yellow flowers with five petals. The dehiscent capsule contains globose seeds. There are no wild species of *Gossypium* in China however there are four introduced species, which are widely cultivated in tropical and warm temperate regions for cotton and cottonseed oil that are quite economically important (Tang *et al.* 2007:264).

The Kam name for various tall tropical grasses in the Poaceae of the genus *Imperata* is **jal (nyangt jal)** (Burusphat *et al.* 2000:89). *Imperata cylindrica* (L.) Raeusch. is a widespread, noxious rhizomatous perennial grass of disturbed and cultivated areas that spreads vigorously. It flourishes in burned grasslands and is quite difficult to eradicate. The young shoots provide fiber, fodder and medicine (Chen & Phillips 2006b:583-584). In certain areas, *Imperata* culms are harvested several times a year as a weaving material. The roots of *I. cylindrica*, cogon grass or thatch grass are rolled together, tied into a knot and left in a specific location as an indicator. The act of creating an indicator is termed placing a sign. There are hunting signs, tree felling signs, rice seedling bed signs and house en-

trance signs, which have their respective purpose. When people observe signs, they understand that they must not go beyond the boundary indicated by the signs because doing so may be dangerous. When men are felling trees, a marker is placed on the path before the area where the dangerous work is being performed. A marker may also be hung over the door of a room where a person is seriously ill with an infectious disease. A reed, *Phragmites australis*, **luh jigx**, *Imperata* grass, **jal (nyangt jal)**, *Typha orientalis*, **jiang bu** or leaves of *Acorus calamus*, **xengp jox**, are tied in a knot and hung with *Artemisia argyi*, **ngaih**, beside or above the entrances to Kam homes or animal stables to prevent evil from entering and harm from befalling the animals. The Kam consider *Phragmites*, *Arundo*, *Imperata* and *Typha*, which grow by water, to have spiritual qualities (Burusphat *et al.* 2000:135, 168, 249, Geary *et al.* 2003:61, 173).

Phragmites australis, **luh jigx** is a robust, extensively creeping rhizomatous perennial reed in the Poaceae with tall, erect hollow culms. It is a cosmopolitan species that forms colonies in moist places along the Qingshui River in Caiyuan Village. *Phragmites* reeds aid in soil retention, provide a source of fiber for making bed mats and the rhizomes are medicinal. Reed beds are useful in the purification of water sources (Liu & Phillips 2006b:447-449).

Typha orientalis, **jiang bu** is a marsh or aquatic, herbaceous perennial in the Typhaceae with creeping rhizomes and stout stems. The leaves are alternate, erect and linear and the fruit is elliptical. *Typha orientalis* grows in lakes, ponds, channels, swamps and slow moving rivers. It has starchy rhizomes and carbohydrate-rich pollen that is eaten. The leaves are fashioned into mats and chair seating. Some species of *Typha* are used in paper making and dried flower arrangements.

Acorus calamus, **xengp jox** (Burusphat *et al.* 2000:249) is a marsh or emergent, herbaceous aquatic perennial in the Acoraceae with a stout pinkish, aromatic horizontal rhizome and linear leaves. Its leaves have a distinct midrib on both sides and its flowers are yellowish. The fruit is an oblong red berry with few seeds. *Acorus* rhizomes, rice and tea leaves are often placed in a cloth bag and hung around a Kam child's neck to prevent the child's soul from fleeing when she/he is frightened (Geary *et al.* 2003:148-149). In Gaoxiu Village, *A. calamus* is given to Kam children to wear for protection, and it is hung with a woody plant above the door of Kam homes to keep ghosts out. Mabberley (1997:8) indicated that *A. calamus* rhizomes are employed as a tonic, to treat toothaches and dysentery, and have been hung at night to keep evil spirits from children. It is also utilized as an effective natural insecticide because of its terpenes. *Acorus calamus* is cultivated and found throughout China.

Artemisia argyi, **ngaih** (Burusphat *et al.* 2000:168) is a tall, pubescent, strongly aromatic and medicinal, herba-

ceous perennial or subshrub in the Asteraceae with numerous lateral roots and oblong or ovoid oblong achenes. It grows in disturbed areas, along roadsides, on mountain slopes and hillsides in lower elevations.

Akebia trifoliata (Thunb.) Koidz. is a native woody climber in the Lardizabalaceae with alternate, palmately compound leaf blades and a fleshy fruit containing numerous ovoid and slightly compressed seeds that are arranged in several rows and embedded within pulp. *Akebia trifoliata* grows along semideciduous forest margins and open forests along hillsides, valleys and streams (Chen & Shimizu 2001a:440-442). It has a twining stem whose fibers are fashioned into cordage, which is extremely useful for agroforestry in Caiyuan Village. The roots, stems and fruits are utilized as medicine.

Bauhinia championii (Benth.) Benth. is a large and beautiful woody liana in the Fabaceae with showy yellowish white flowers and simple, deeply lobed leaves. Kam agroforesters of Caiyuan Village use its strong woody stem as cordage to tie logs into log rafts, which are floated downstream to Jinping for market. *Bauhinia championii* grows in forests and thickets at lower elevations. Mabberley (1997:79) noted that some *Bauhinia* species (Figure 15) are cultivated ornamentals and possess edible leaves and pods, protein-rich seed oil, medicinal bark, fiber, dyes, gums and tannins used in tanning. Buddhists revere some *Bauhinia* species as sacred. Kam people employ *Bauhinia* with horse hoof-shaped leaves for treating intestinal diseases (Liu & Long 1996:185).

Ficus pandurata Hance is a native shrub in the Moraceae with reddish brown branchlets and papery leaf blades that are often obovate or violin-shaped, constricted in the middle. Its figs are axillary, paired and ellipsoid to globose and red when mature. The Kam of Caiyuan Village use the strong stem fibers of *F. pandurata* for making rope. This species is planted to prevent soil erosion along the Qingshui River and it grows in forests or scrub in mountainous areas (Wu *et al.* 2003a:59).

Indocalamus longiauritus Hand.-Mazz. is a shrubby bamboo in the tribe Bambuseae of the Poaceae family whose rhizome has a running underground stem. Its fruit is a small dark brown, dry oblong caryopsis and its leaves are large. Kam people collect the large leaves and dry them for wrapping cooked glutinous rice. Species of *Indocalamus* are employed for making chopsticks and penholders, and the leaves are woven into bamboo hats (Wang & Stapleton 2006a:135-139). *Indocalamus longiauritus* was growing on mountain slopes, hillsides and along the trail in Caiyuan Village.

Maclura tricuspidata Carrière is a small, deciduous tree or shrub in the Moraceae with reddish brown winter buds and latex. It was growing along open forest margins and mountain slopes of Caiyuan Village. In some areas, the



Figure 15. *Bauhinia* L. leaves in Caiyuan Village. © John Amato.

bark fibers are utilized for making paper and its leaves are fed to silkworms (Wu *et al.* 2003b:36). The Kam gather and consume the globose, orange red syncarp fruits and the bark is used as medicine.

Millettia pachycarpa is a native liana in the tribe Millettieae of the Fabaceae, which has dark brown inflated legumes that are densely covered with rough, pale yellow warts. The leaves have 13-17 papery leaflets and the flowers are lilac-colored. Kam people of Caiyuan Village utilize the bark fiber of *M. pachycarpa* for making rough rope and it is also applied to cuts and wounds. Mabberley (1997:457-458) documented that many species of *Millettia* are employed as healing drugs, insecticides and ichthyotoxins, and some are cultivated ornamentals with useful wood and medicinal oils. *Millettia pachycarpa* grows in evergreen broadleaved forests near Caiyuan Village along the Qingshui River.

Morus australis Poir., **meix aos** (Burusphat *et al.* 2000:146) is a small, deciduous tree or shrub in the Moraceae with latex. It grows in limestone soils, along forest edges, mountain slopes and fallowed land. The bark fi-

bers are used in papermaking and the short cylindrical syncarp fruit is edible and red to dark purple when mature. In some regions of China, the leaves are fed to silkworms (Wu *et al.* 2003c:25-26). Kam people of Caiyuan Village gather and consume the ripened fruits.

Phyllostachys meyeri is an endemic, arborescent bamboo in the tribe Bambuseae of the Poaceae family that is extensively cultivated in China. Kam agroforesters of Caiyuan Village use the culm fiber to tie logs together when transporting them by log raft to market. *Phyllostachys* species are perhaps one of the most economically important bamboos in China. *Phyllostachys meyeri* is found in open forests and is grown as an ornamental, for channeling water to fishponds and rice paddies, and as supports for building, flooring, furniture, umbrellas, containers and papermaking, and the young fresh shoots are edible (Wang & Stapleton 2006b:163-168).

Pueraria lobata (Willd.) Ohwi, **nyingv** (Burusphat *et al.* 2000:183) is a robust climber in the Fabaceae with pinately trifoliate leaves, 3-lobed leaflets, yellow pubescent stems and starchy tuberous roots. It possesses purple,

fragrant flowers and long-elliptic pods. *Pueraria lobata* is often placed beneath a Kam child's bed mat to prevent the child's soul from fleeing (Geary *et al.* 2003:148-149). The Kam use the stem as a binding material for making brooms. It is a fodder and cover crop with edible starchy tubers that is planted for erosion control. Its fibers are used in the production of textiles and cordage. *Pueraria lobata*, **nyingv** grows in mountain forests and thickets throughout many areas of China and Formosa.

Stauntonia elliptica Hemsl. is a native, evergreen woody climber in the Lardizabalaceae with alternate, pinnately 3-foliolate entire papery leaflets, pale green to whitish flowers in a raceme and many-seeded fleshy pale brown fruits. The shiny blackish subtriangular and slightly compressed seeds are embedded in the fruit pulp (Chen & Shimizu 2001c:440-449). The Kam of Caiyuan Village use the strong, woody stem fiber for making rope. *Stauntonia elliptica* grows in open forests on mountain slopes along the Qingshui Jiang near Caiyuan Village. Some *Stauntonia* species are cultivated ornamentals with fragrant flowers and edible fruits (Mabberley 1997:680).

Trachycarpus fortunei (Hook.) H. Wendl., **meix sip** (Burusphat *et al.* 2000:147) is a native tree in the Arecaceae with a solitary, cylindrical trunk that is covered by persistent, mature leaf bases, which produce a netlike fiber. The trunk fiber is used for making cord and palm fiber rain-capes, and the palmate leaves are fashioned into fans and straw hats. *Trachycarpus fortunei* produces robust inflorescences and broad kidney-shaped fruits. Its flower buds are edible and the palm fiber and petiole are applied as a haemostatic, to stop bleeding. The fruits, leaves, flowers and roots are medicinal. Kam agroforesters of Caiyuan utilize the palm fibers of this species for making rope. *Trachycarpus fortunei* grows in secondary forests up to 2000 meters in elevation in southern China.

Kam men use bamboo, **baenl** and rattan, **jaol2** (Burusphat *et al.* 2000:10, 93) to create diverse wickerwork. Large bamboo baskets are employed for carrying manure, fish, chickens, rice, sieves and mats for drying rice. In Kam villages, there are usually several artisans who are engaged as excellent basket makers when they are not working the land. To make baskets, bamboo canes are held over a fire until malleable and then pulled into the desired shape. Bamboo hats, mats, food boxes, birdcages and chairs are produced. Durable and flexible bamboo bed mats have been woven for hundreds of years and can be folded without incurring any damage. Rattan is made into food boxes, baskets and chairs. It is usually boiled or sometimes roasted over a fire to make it more durable before removing its epidermis, scraping it smooth and drying it in the sun. A local red mineral from the hillsides is pulverized and dissolved in water. The sediment is then mixed with varnish to paint wickerwork red, which makes it attractive, shiny and waterproof. The Kam produce black

colored wickerwork by using ashes that are mixed with varnish (Geary *et al.* 2003:125).

Yua austro-orientalis is an endemic woody liana in the Vitaceae with brownish branchlets that have many lenticels, 2-branched tendrils and subleathery palmately 5-foliolate leaves. Its fruit is a dark reddish purple sweet and sour globose berry and its seeds are slightly flattened and pyriform. Kam people of Caiyuan and Gaoxiu Village utilize the strong, flexible and durable stems of this woody vine as rope, cord or binding material. Metal wire is often not readily available in remote areas of China therefore Kam people use various woody lianas for tying objects. Woody stems of numerous lianas are twisted in order to increase their strength and durability as a binding material, and some have been used for many years and effectively maintain their integrity. *Yua austro-orientalis* grows in forests or shrublands in valleys and on open mountain slopes.

Tinder

Synotis nagensium (C.B. Clarke) C. Jeffrey & Y.L. Chen, **baengx** (Burusphat *et al.* 2000:11) is a native subshrub or herbaceous rhizomatous perennial in the Asteraceae with densely white tomentose erect stems and densely tomentose papery leaves with reddish brown hairs. Its numerous ray and disk florets are yellow and the cylindrical achenes bear a white pappus; tufts of hairs on each seed that assist in wind dispersal. Kam people of Gaoxiu Village gather *S. nagensium* as tinder (Figure 16), which is used to light their pipes, cigarettes and fires. When dried, the crumbled plant parts are added to the pipe bowl after the tobacco has been tamped into place. **Baengx** is very helpful for lighting the tobacco and promoting its even burning. *Synotis nagensium* is light and smooth tasting and does not impart an unpleasant flavor. It is a valuable tinder plant that grows in wooded areas, thickets and meadows.

Conclusion

Our collaborative research with Kam people of China contributes to the study of traditional Kam integrative agriculture, pisciculture, agroforestry, medicine and the creation of a comprehensive photodocumentary Kam local knowledge inventory and database (www.pbase.com/jamato8). We recorded social and environmental changes within the Kam cultural landscape with the objective of increasing international awareness of Kam traditional knowledge and to promote sustainable management of Kam cultural and natural resources in close cooperation with the Kam Ethnic Minority community and relevant ministries responsible for ethnic development.

There are many other traditional knowledge resources of the Kam people (Figure 17) that were not documented in



Figure 16. Gaoxiu elder carrying tinder, *Synotis nagensium* (C.B. Clarke) C. Jeffrey & Y.L. Chen, **baengx**. © John Amato.

this pilot study. Our research conclusion is an attempt to reveal the investigation in its full perspective. Kam local indigenous knowledge, land and resource rights, cultural heritage protection, and respect and regard for ceremonial places and practices in the study all concern the ethical question of human rights. For sound planning, sustainable development and good governance, it is requisite that decision-makers and land managers have a clear and sophisticated understanding of the development projects and the cultural and biophysical landscape in which the undertaking will become a part (Howitt & Jackson 2000:269).

Social and Environmental Impacts and Needs Assessment

During the Cultural Revolution, which seriously impacted ethnic minority cultures of China, significant Kam relics disappeared; drum towers were damaged and temples were destroyed. Preservation of Kam drum towers and wind rain bridges is crucial because they are culturally significant to the Kam people and represent the unique cultural heritage of the Kam community. In the city of Jinping in Qian Dongnan Autonomous Minority Prefecture of Guizhou Province, Fei Shan Kam Temple artifacts were severely ravaged during the Cultural Revolution. Large

engraved stone tablets bearing the names of historical contributors and members were cast into a trash heap. A great carved, stone lintel was buried beneath rubbish. Devastation of Kam cultural artifacts was documented in this study. Kam elders, teachers and local government officials were contacted to examine the destruction. UNESCO, UNDESA and the UN Permanent Forum on Indigenous Issues were alerted to the desecration, which undermines the cultural patrimony of the Kam people. Immediate reparation measures are required to protect and preserve significant, historical cultural resources of the Kam Ethnic Minority of China.

Other critical concerns of the Kam people that were identified in this project include a great need for environmental protection, and assistance in establishing springs, places to drink fresh water and to protect the water. Sound sanitation and sustainable garbage management were emphasized. Village leaders indicated that their rural communities are in need of restroom facilities. Improvement of the dangerous and treacherous dirt road to Gaoxiu Village is an urgent priority that needs immediate attention. The road was built in 1980 and was to be paved in 2005, however the local government misappropriated funds that were designated for rural development. As a consequence, the road was not constructed properly or paved.



Figure 17. Kam man cleaning his pipe stem with fern in Gaoxiu Village. © John Amato.

There are many serious accidents on this unimproved road, which is often impassable during the rainy season.

Local governments in the Kam regions are not implementing effective sanitation management in the rural reaches of Gaoxiu Village in Sanjiang Dong Autonomous Prefecture of Guangxi Province and Caiyuan Village of Jinping County in Qian Dongnan Autonomous Minority Prefecture of Guizhou Province. Kam residents regularly dump their garbage into the rivers that flow through the villages of Gaoxiu and Caiyuan. In addition, the Qingshui Jiang flows from the cities of Kali and Duyun, where there are numerous industrial factories, before it reaches Jinping. Kam people of Caiyuan Village lamented that the Qingshui River used to be quite clear in their region. Local governments need to urgently execute sound sanitation measures in Gaoxiu and Caiyuan Villages to ensure that Kam water resources are carefully safeguarded and maintained. Water and good sanitation are a basic human right. More equitable governance policy for conserving indigenous natural resources and sustainable development are vital (UNESCO 2006:7, 22). Healthy living ecosystems are more valuable and life supporting than those that are degraded (Posey 1996:7).

The Kam of Gaoxiu Village would like to develop a Gaoxiu Women's House, an Elders Activity Center, and play-

ground for their children. Our project provided some financial assistance for these worthy community improvements. Gaoxiu healer, Wu Shun Jun hopes to create a Teaching and Healing Center for Kam Medicine in his village. His grandfather taught him Kam medicine and he is teaching this very specialized intergenerational knowledge to his son. We hope that our study contributes to this aspiration.

The Kam strongly desire to enhance their agricultural technology and to develop and preserve their glutinous rice cultivars. Kam community leaders conveyed the importance of conserving Kam cultural traditions and livelihoods; enhancement and support for sustainable agriculture, pisciculture, agroforestry, Kam local medicine, economic improvement and educational assistance. Gaoxiu Village leaders, local government officials of Sanjiang Dong Autonomous Prefecture of Guangxi Province, and Caiyuan Village leaders and local government officials of Jinping County in Qian Dongnan Autonomous Minority Prefecture of Guizhou Province were consulted to discuss the needs of their rural Kam communities. The desired outcome of negotiated quality consultation between the Kam Ethnic Community and government agencies is a stable and lasting productive partnership, which requires mutual respect, shared power and means for sustaining an ongoing long-term relationship. Such an alliance can

be established through mutual trust, a common foundation of understanding and knowledge, and the conception and implementation of a cultural and natural resource management and monitoring plan (Stoffle 2000:212-213).

Agroforesters expressed that they need a better price for their forest resources so that their children and young adults can complete their education. More Kam people are leaving their rural villages to seek work because they cannot sustain their livelihoods and adequately provide for their offspring's education. Children and young adults require financial assistance in order to accomplish this goal. Kam agroforesters of Caiyuan Village sell approximately two hundred logs to the Jinping local government for 20 to 40 yuan per log and in turn, the Jinping local government sells the logs to the lumber companies for a higher price. Kam foresters in the rural areas are discontented with the current situation and stated that this arrangement is unjust. For many Kam agroforesters, trees are what all their financial resources are invested in and that which they use to support their children's college education. Under the present situation, forest resources are being depleted, overlogging is rampant and Kam foresters are on the verge of bankruptcy. There is extensive clear-cutting of forests on some of the mountain slopes surrounding Gaoxiu Village in Guangxi Province. Geary *et al.* (2003:120-121) documented that by law, the Kam are not permitted to sell the trees they have tended to individuals or to companies other than the forestry administration centers.

In the past, the government provided a small sum of money to rural village agroforesters; for every tree that was not cut, 5 Rmb was issued. The government no longer provides small subsidies for rural village agroforestry. Today, the money that was formerly provided to small village agroforesters is retained by the government. As a consequence, it is very difficult to make ends meet as an agroforester and in some areas agroforestry has become an unsustainable livelihood. Kam foresters of Caiyuan Village alleged that the damming of the Qingshui River is significantly affecting their sale of timber because they are no longer able to transport their logs by water. They now require hauling logs by truck on the newly constructed dirt road for an additional expense, which exacerbates an already tenuous livelihood. Today, the winding mountain road links the village of Caiyuan with Jinping. Road development on the precipitous mountain slope in Caiyuan Village is causing significant environmental impact to rice paddies and denudation of the steep hillside, leaving it severely depauperate of vegetation. Rock and landslides have spilled onto Kam cultivated fields and destroyed local crops. Rockslides dammed a stream alongside a culturally significant 300-year-old historical stone bridge with Kam shrines, artifacts and stone tablets.

The village of Caiyuan is more than 300 years old. Many Kam holy sites, ancient and sacred trees, expansive fishponds, agricultural fields and grazing lands were com-

pletely covered by water as a consequence of the damming of the Qingshui Jiang. More than 90 percent of the people of Caiyuan Village did not want the Qingshui River to be dammed, which directly impacts the agroforestry livelihood of the Kam people. The last log raft down the Qingshui Jiang to Jinping was accompanied by Kam agroforesters of Caiyuan Village in September 2006. It signified the end of an era and 300-year-old tradition.

Kam people of Caiyuan Village want to protect their significant historical and ceremonial objects that were situated in various places beside the village trail along the Qingshui River. Our project provided some financial assistance to the Kam people of Caiyuan Village for relocating their historical stone tablets and other culturally significant objects to higher ground to prevent them from being submerged underwater by the damming of the Qingshui River.

Caiyuan Village agroforesters voiced grave concerns about the damming of the Qingshui Jiang and its effects on their agroforestry livelihood and significant resources. The area inhabited by the Kam community possesses unique historical and cultural sites. The Qingshui River was dammed approximately 1.4 kilometers downstream from Caiyuan Village. Kam ancient and sacred trees were killed, significant holy sites, earth shrines, commemorative historical stone tablets, dwellings, historical bridges, extensive fishponds, agricultural lands, and the Caiyuan Village Primary School and Infirmary were submerged under water along with the traditional agroforestry livelihood of floating logs down the river to Jinping for market.

The Wuling Corporation Construction Company that built the dam is not adequately protecting and regarding significant agricultural lands, fishponds, grazing lands, sacred and ceremonial sites and cultural relics of the Caiyuan Kam Ethnic Community. Compensation is clearly inadequate for these tremendous permanent losses and the upheaval and environmental transformation that are currently befalling Caiyuan Village. A Kam law professor of Guizhou Province stated that the so-called "Cultural Revolution" destroyed almost all cultures of China including traditions, morality and virtues. Now, there is a great "Development Revolution" in China, which in all its effort is destroying myriad valuable resources needed for real sustainable development. He added that this latter revolution is by no means less vigorous or less destructive than the former.

It is essential that the tensions, which exist between Kam livelihood priorities and government development imperatives, be addressed symmetrically and with cultural sensitivity and respect. The Kam regions of Guizhou and Guangxi Provinces are rich in social, economic and cultural activity and are a complex living cultural landscape with a long history. Development within the Kam cultural landscape without adequate consultation with the Kam

people affects their quality of life experiences and future aspirations. Compensation for damage and loss of cultural and natural resources has not been fully addressed by government planners and decision-makers. Kam people clearly experience great hardship, distress and disturbance in accepting the disruption and damage of their traditional cultural and natural properties, while government agencies have not adequately assumed responsibility for these significant and life-altering impacts. Caiyuan Village agroforesters and Gaoxiu Village agriculturists hope for positive changes in forest policy and agricultural improvement. Kam people have made important suggestions however they informed us that their recommendations are ignored.

Effective conservation and monitoring of cultural and natural resources involves commitment and empowerment of Kam communities to respond to issues as they arise, while their reported concerns must be heard, considered and valued by regional authorities. Our responsibility as collaborating researchers is to document and clearly articulate Kam community concerns. It is critical that Kam perspectives become part of the information base for decision-making, mitigation, monitoring and influencing land management and forest management legislation within their traditional landscape. Relations between government agencies and Kam people have a long history that is often recounted as asymmetrical. It is important that there be respectful and constructive communication and power sharing between Kam communities and government authorities.

The Kam are highly knowledgeable about their traditional properties, and because of their proximity and intimacy, specialized knowledge and daily experiences, they are acutely aware of factors that have adverse or positive impacts on their resources and livelihoods. The Kam people are directly dependent upon the sustainable use of their natural and cultural properties. Respect for Kam local knowledge and traditional practices contribute to sustainable and equitable development and proper management of the environment. According to the World Commission on Environment and Development (1987:44, 65, 348), the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. A proposed legal principle is that all people have the fundamental right to an environment that will sustain their health and wellbeing. "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." It necessitates meeting the basic needs of all and extending and ensuring to all equitable opportunities to satisfy their aspirations for a better life.

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