Available online at www.sciencedirect.com
ScienceDirect
Journal of Ethnopharmacology 117 (2008) 362–377
Journal of ETHNO-PHARMACOLOGY
www.elsevier.com/locate/jethpharm

Ethnobotanical survey of medicinal plants at periodic markets of Honghe Prefecture in Yunnan Province, SW China

Sangwoo Lee[a,c], Chunjie Xiao[a], Shengji Pei[b,*]

[a] *School of Life Sciences, Yunnan University, Kunming 65009, Yunnan, China*
[b] *Department of Ethnobotany, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650204, Yunnan, China*
[c] *International Biological Material Research Center, Korea Research Institute of Bioscience and Biotechnology, Yusong Daejeon 305806, South Korea*

Received 4 September 2007; received in revised form 28 January 2008; accepted 2 February 2008
Available online 12 February 2008

Abstract

In China, traditional markets are considered as important places for trading of medicinal plants harvested by rural villagers, which also play a social role of exchanging traditional use of herbal medicine among different cultural and social groups at local level. Market survey is often engaged in ethnobotanical studies for documenting locally used herbal plants and associated traditional knowledge. Information collected from market survey is also useful for plant conservation in the habitat areas. However, information on the market traded medicinal plants is not well documented from traditional markets in Honghe Prefecture, Yunnan. The study aimed to look into medicinal plants that are used by local people for curing various ailments. Ethnobotanical market survey methods, interviews, Participatory Action Research (PAR) and field visits were planned to elicit information on the uses of various medicinal plants. It was found that 216 plant species are commonly used by local people for curing various diseases, of which 173 species (80.1%) are wild plants and 43 species (19.9%) are home garden plants. A total of 278 records of medical uses in 60 herbal recipes for the treatment of 16 types of common diseases were recorded. In most of the recipes recorded, digestion diseases (30.6%) were used. The rest are rheumatological diseases (13.0%), respiratory system diseases (10.4%), infectious diseases (7.9%) and surgery uses (7.9%). The knowledge about the number of medicinal plants available in that area and used by interviewees was positively correlated with the threats on medicinal plants in the wild habitats of the study area, indicating that the diversity of medicinal plants and the associated traditional knowledge trends to disappear in the area.

Keywords: Traditional market; Traditional uses; Medicinal plants; Ethnobotanical survey; Honghe; Yunnan

1. Introduction

Yunnan Province in southwestern China is well known for the richness and diversity of medicinal plants and is important for the supply of crude plant drugs for Traditional Chinese Medicine (TCM) (Pei et al., 1996; Wang, 1999; Huai, 2000). The diversity of ethnic minority medicines as those of the Dai, Hani, Lahu, Miao, Naxi, Tibetan, Yao, Yi and Zhuang nationalities, plays an important role in the treatment of human illness and health care in Yunnan. In China, traditional medicine (TM) accounts for about 40% of all health care delivered (WHO, 2002).

Over the past decade, there has been a dramatic increase in the demand for medicinal plants for use in TM and Complementary and Alternative Medicine (CAM) in both developing and developed countries. The world market for herbal remedies in 1999 was calculated to be worth US$ 19.4 billion (Hamilton, 2004), and for herbal medicines based on traditional knowledge the estimate was US$ 60 billion in 2000 (UNCTAD, 2000). However, the increased demand for medicinal plants has resulted in over-exploitation of some of these resources and has contributed to the degradation of wild plant habitat in many parts of the world. According to WHO (2001, 2002), recognition of traditional medicine is an important policy step for supporting the development of TM, including to ensure its safety and effective use, and help combat the over-collection leading to unsustainable use of medicinal plants.

* Corresponding author. Tel.: +86 871 522 3221; fax: +86 871 515 0227.
E-mail address: peishengji@mail.kib.ac.cn (S. Pei).

0378-8741/$ – see front matter © 2008 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.jep.2008.02.001

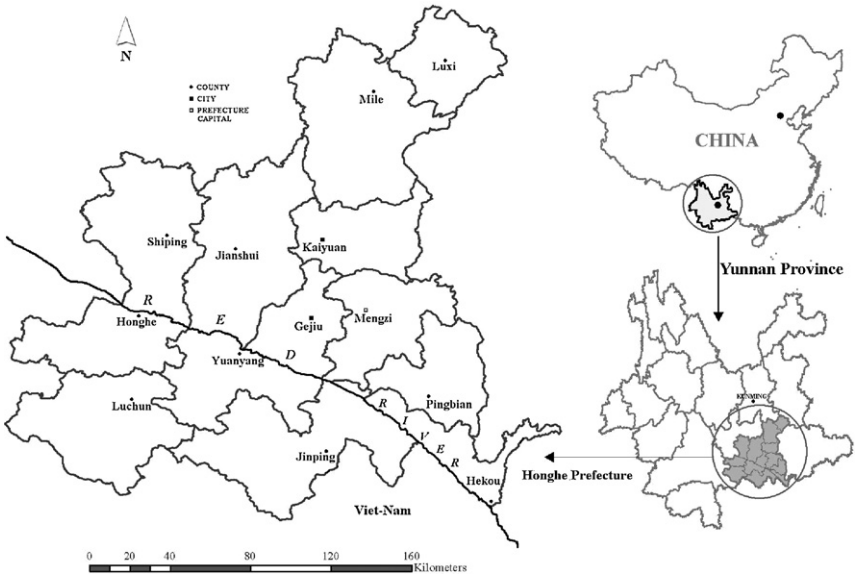

Fig. 1. Research area in Honghe Hani and Yi Nationalities Autonomous Prefecture, SE Yunnan, China.

This study aimed to look into medicinal plants that are used by local people for curing various ailments. Ethnobotanical market survey methods, interviews, Participatory Action Research and field visits were engaged in periodic market in Honghe Prefecture of Yunnan Province. Objectives of the study were: (i) to identify and document plant species used and obtain related quantitative data and (ii) to record traditional knowledge of the use of these plants, from market survey.

1.1. Cultural background of traditional market in the study area

China has officially recognized 56 ethnic groups (known as minorities), of which 26 are inhabited in Yunnan Province (Gan, 2000). In the Honghe Hani and Yi Nationalities Autonomous Prefecture (henceforth called Honghe Prefecture), there are 10 ethnic groups: Buyi, Dai, Han, Hani, Hui, Lahu, Miao, Yao, Yi and Zhuang (Honghe Prefecture, 1986; Long and Li, 2004). Each ethnic group has its own language and three of them (the Han, Dai and Zhuang) have their own scripts (that of the Zhuang has been available using the Roman alphabet since 1955) and their own written language. All ethnic groups have their own history and long periods of interaction with each other's ethnicities in this multi-nationality region (You, 1994). In general, there are different traditional market schedules at different locations in Honghe Prefecture. Most modern local markets are scheduled every Sunday, but in a few areas some schedules are set according to a 12-day lunar calendar based on 12 earthly branches (Cunningham, 2001). This cycle is known as "Xun" (one-third of a month) in ethno-astronomical term of China to calculate the cycle of social events in traditional societies. Or "Shengxiao" which is any one of the names of 12 symbolic animals associated with a 12-year cycle, often used to denote the year of a person's birth (the 12 animals are: rat, ox, tiger, hare, dragon, snake, horse, sheep, monkey, cock, dog and hog). This calendar has been in use for a long time in local area, the earliest records known so far dating back about 400 years (late Ming dynasty) (Long, 1988). And local market is called as "Gan Ji" and "Gan Chang" in standard Chinese and "Gan Gai" in the Yunnan dialect. For instance, in Jinping county the market is presently opened on Horse and Rat-day based on 12 earthly branches. Other traditional features, apparent in most medicinal plant markets, is that the medicinal plants are sold in open-air stalls placed around the periphery of markets dealing with agricultural products.

1.2. Study area and plant diversity

Honghe Prefecture lies along the border with Vietnam, at 22°26′–24°45′N and 101°48′–104°17′E (Fig. 1). It covers about 32,931 km^2, with altitudes ranging between 76.4 and 3074 m above sea level, and bordering on Vietnam to the south (Fig. 1). Its diverse topography includes a low altitude plateau with a limestone zone (Wang and Zhang, 2002). The mountainous forest environment habitats a very large number of plant species, with 5667 species of vascular plants and ferns in 1530 genera and 229 families reported (Shui, 2003). Three national natural reserves and two provincial natural reserves were established in Honghe Prefecture during the 1970s to protect nature and biodiversity. The diversity of Honghe Prefecture is a reflection of the diversity of Yunnan Province as a whole, Yunnan Province contains more than 17,200 species of vascular plants, that is more than half of the 31,142 species known from all over China (Chinese Academy of Sciences (CAS), Flora of China, 1959–2004; Kunming Institute of Botany (KIB), Flora of Yunnan 1979).

2. Methodology

2.1. Ethnobotanical methods on market survey

From January 2004 to June 2006, 20 visits were made to local periodic markets, primarily to the largest markets in each of the following: Gejiu, Kaiyuan, Mengzi city, Honghe, Jinping and Mile county. Each visit began by quickly scanning the market for any outstanding fresh new medicinal plants, because the conditions of these markets can change quickly. This was followed by a more detailed investigation by interviewing vendors and healers, middleman, long distance traders and consumers. Recording techniques included use of a digital record, free-listing, semi-structured and open-ended interviews, and photography. Information collected included the vernacular names of the plants, their uses, methods of preparation, places of supply, price and information on whether cultivated or from wild habitats. Medical indications and diseases were defined locally by healers (Given and Harris, 1994; Martin, 1995; Cunningham, 2001). The names of plants were recorded in the Chinese Phonetic Alphabet. The surveys were carried out between early morning and the peak of market activity normally 11 a.m.–1 p.m. (Etkin, 1993; Martin, 1995; Cunningham, 2001).

As the investigators are from cultural background of the Han Chinese and Korean, cross-cultural communication skills and attitudes were important to hold and in collaboration with local people using local language, and develop intimate relationships with interviewees. For instance, during seven field trips to Mengzi market, good relationships established with vendors and healers at the market.

2.2. Methods for field visits

Prior to the field visits local people who are knowledgeable about use of medicinal plants in the villages were identified during the markets surveys. Subsequent visits to villages were made to observe the collection of wild medicinal plants and the cultivation of medicinal plants in home gardens. All such village fieldwork was carried out under the procedures of Participatory Action Research, and all collections of wild medicinal plants were made in consultation with knowledgeable local people (informants), such as herbal doctors and herbal plant collectors (Jain, 1987; Cunningham, 2001).

2.3. Voucher specimen collection

To ensure a thorough sampling of medicinal plants (including their fruits and flowers, liable to periodic availability only), several visits were made to the markets over the period 2004–2006. During each market survey, samples of medicinal plants were collected for voucher specimens and scientific identification. On occasion, fresh samples were planted in Kunming Botanical Garden for observation and to ensure correct identification. Voucher specimens were deposited in the Voucher Herbarium of the Department of Ethnobotany, Kunming Institute of Botany (KIB), Chinese Academy of Sciences (CAS). Scientific names of plant species were identified based on International Plant Names Index (IPNI: www.ipni.org) and w^3TROPICOS (mobot.mobot.org/W3T/Search/vast.html) (Hedberg, 1993; Martin, 1995; Cotton, 1996).

3. Results and discussion

3.1. Diversity of medicinal plants traded and medical knowledge associated at local markets

The study has totally recorded 216 medicinal plants species belonging to 194 genera in 98 families traded in the markets. Of these, 173 species (80.1%) are wild species and 43 species (19.9%) are cultivated in home gardens or semi-cultivated in wild habitats. Most of the species have Chinese vernacular names associated with Traditional Chinese Medicines (TCMs) (Cai, 1996).

The plant families with the highest number of recorded species were, in order, Asteraceae with 21 species (9.7%), Lamiaceae with 12 species (5.6%), Ranunculaceae with 9 species (4.2%), Orchidaceae with 9 species (4.2%), Leguminosae with 8 species (3.7%), Apiaceae with 7 species (3.2%), Rubiaceae with 7 species (3.2%) and Pteridophyta with 5 species (2.3%). Ninety plant families are represented by only very few species (Table 1). Of the species traded, *Musella lasiocarpa*, *Psammosilene tunicoides*, *Aconitum brachypodum*, *Coptis quinquesecta* and all species of Orchidaceae are included in the China Red List of endangered species (Wang and Xie, 2004), while *Cibotium barometz* and all orchid species are included in CITES Appendix II. According to interviews with long distance traders, *Dendrobium* spp. and *Goodyera* spp. are popular items in herbal markets in other provinces. Given the vegetation of the areas, it is quite likely that these species were collected from the nearby Natural Reserve Areas of Mt. Pingbian and Jinping Watershed Area, which is extremely rich in plant diversity but vulnerable to incursions by people (Xu et al., 2002).

It is interesting to note that local people believe that the medical effects of wild plants are better than those of cultivated species. This inevitably results in higher prices for wild medicinal plants and resulted in the degradation of their habitats. Due to the highest demand species in markets overharvesting has occurred for *Bletilla* spp. (for pneumonia), *Dendrobium* spp. (for indigestion), *Paris* spp. (for gastritis) and these are all threatened by over-collection in wild habitats in Yunnan Province (The International Seminar on NTFP, 2001). In the case of *Paris* spp., market demand has increased significantly because it is the main ingredient in "Yunnan Bai Yao" a famous Traditional Chinese Medicinal therapy in use as a hemostatic for about the last 100 years in Yunnan. During the last 20 years, *Paris polyphylla var yunnanensis* and substitute species of *Paris* genus have been seriously overexploited in most wild habitats in Yunnan Province to supply the raw materials of "Yunnan Bai Yao" for the Yunnan Bai Yao Pharmaceutical Company in Kunming. Currently, the local market price is US$ 9–15 kg^{-1}, which a lot of money for rural people in this area.

The prospect of achieving a steady income has led to some local farmers cultivating *Paris polyphylla var yunnanensis*. The Participatory Action Research undertaken in the villages

Table 1
Ethnobotanical inventory of medicinal plants traded at traditional periodic markets in Honghe Prefecture, Yunnan, China

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
Pteridophytes					
ADIANTACEAE					
Adiantum capillus-veneris L. [CYHMPM1]	zhuzongcao(H), kuzongcao(H^{MZ})	Dermatitis, cystitis	Decoction/bath	Aerial part	Wild
CYATHEACEAE					
Alsophila costularis Baker [CYHMPM2]	longgufeng(H), shua(M^{MZ}), lanmo(Z^{MZ})	Hepatitis	Decoction/oral	Stem	Wild
DICKSONIACEAE					
Cibotium barometz (L.) J. Sm. [CYHMPM3]	jinmaogen(H^{KY}), jinmaoji(H^{ML})	Hemorrhage	None or mashed/wounds	Hairs, fibrous root	Wild
EQUISETACEAE					
Equisetum intermedium Rydb. [CYHMPM4]	yiguancao(H^{KY}), mujei; biguancao(H^{MZ}), buguanchao; zadai(M^{MZ})	Dropsical legs	Decoction/bath	Aerial part	Wild
LYCOPODIACEAE					
Lycopodium japonicum Thunb. ex A. Murray. [CYHMPM5]	cuasalo(Y^{ML}), houzibeidai(H), amezadu(Hn^{JP}), bunzongkous(M^{MZ})	Pruritus	Decoction/bath	Aerial part	Wild
Palhinhaea cernua f. *sikkimensis* (Müll.Hal.) H.S. Kung. [CYHMPM6]	houzibeidai(H), bunzongkous(M^{MZ})	Pruritus	Decoction/bath	Whole plant	Wild
Phlegmariurus squarrosus (G. Forst.) A. Löve & D. Löve. [CYHMPM7]	xuetongcao(H^{JP})	Contusion	Decoction/oral	Whole plant	Wild
OPHIOGLOSSACEAE					
Ophioglossum vulgatum L. [CYHMPM8]	yizijian; shetingcao(H), bate(Hn^{JP}), loublana(M^{MZ})	Jaundice, hepatitis	Decoction/oral	Whole plant	Wild
PTERIDOPHYTA					
Drynaria fortunei (Kze.) J. Sm. [CYHMPM9]	gusuibu(H)	Lumbago	Decoction/oral	Aerial part	Wild
Lygodium flexuosum (L.) Sw. [CYHMPM10]	haijinsha(H), zis(M^{JP}), suasaodong(M^{MZ})	Gallstone, rheumatoid lumbago	Decoction/oral, bath	Aerial part	Wild
Osmundopteris lanuginosa (Wall.ex Hook. & Grev.) Nishida [CYHMPM11]	dujiji(H), duziya(Y^{MZ})	Hypertension	Decoction/oral	Aerial part	Wild
Pyrrosia lingua var. *lingua* [CYHMPM12]	shiwei(H)	Cystitis	Decoction/oral	Aerial part	Wild
Pyrrosia nuda (Giesenh.) Ching. [CYHMPM13]	hada(Hn^{JP})	Cystitis	Decoction/oral	Whole plant	Wild
SELAGINELLACEAE					
Selaginella tamariscina var. *pulvinata* (Hook. & Grev.) Alston [CYHMPM14]	quanbai; shenxianyibazhua(H), chourei(M^{MZ})	Heart disorders, gasp	Decoction/oral	Whole plant	Wild
Selaginella doederleinii Hieron. [CYHMPM15]	chuiyuncao(H), chuiyancao(H^{MZ})	Diarrhea	Decoction/oral	Whole plant	Wild
Gymnosperms					
PINACEAE					
Pinus yunnanensis Franch. [CYHMPM16]	songye(H)	Rheumatic disorders	Al-extract/oral	Young leaf and cone	Wild
Angiosperms (Monocotyledoneae)					
ACORACEAE					
Acorus tatarinowii Schott. [CYHMPM17]	shichangpu(H), changpu(H^{JP})	Indigestion	Decoction/oral	Rhizome	Cult
AMARYLLIDACEAE					
Lycoris aurea Herb. [CYHMPM18]	dushuan; dadushuan(H)	Bone fracture	Mashed/fomentation	Bulb	Cult

Table 1 (*Continued*)

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
ARACEAE					
Epipremnum pinnatum (L.) Engl.[CYHMPM19]	guoshanlong; guozianglong(H)	Rheumatic disorders	Decoction/oral	Stem	Wild
Pothos scandens L. [CYHMPM20]	dieduanqiao(H)	Diarrhea	Decoction/oral	Whole plant	Wild
ARECACEAE					
Caryota rumphiana Mart. [CYHMPM21]	chuifongguo(H^{MZ}), zuipongguo(H^{KY})	Rheumatic disorders, pruritus	Al-extract/apply to skin	Fruit	Wild
ASPARAGACEAE					
Asparagus lycopodineus (Baker) F.T. Wang & Ts. Tang [CYHMPM22]	erduomoku(H)	Phthisis	Cook with pork/oral	Tuber	Wild
CONVALLARIACEAE					
Polygonatum kingianum Collett & Hemsl. [CYHMPM23]	huangjing; jiejiegao(H), hobudani(Hn^{HH}), haoganzou(M^{MZ})	Hepatitis, Losing appetite; infant	Decoction/oral	Rhizome	Wild
Polygonatum officinale All.[CYHMPM24]	yuzhu(H), megegnzoa; gogongzou; gaoganzou(M^{MZ})	Bronchitis, gallstone	Decoction/oral	Rhizome	Wild
Rohdea chinensis (Baker) Yamashita & M.N. Tamura [CYHMPM25]	xinbugan(H)	Influenza	Decoction/oral	Root, leaf	Wild
CYPERACEAE					
Carex baccans Nees [CYHMPM26]	yegaoliang(H), hongmi(H^{MZ}), kouba(Z^{MZ})	Hypertension, fever	Decoction/oral	Seed	Wild
DIOSCOREACEAE					
Dioscorea bulbifera L. [CYHMPM27]	huangyaozi; daliwang(H)	Pneumonia	Decoction/oral	Tuber	Wild
HYPOXIDACEAE					
Curculigo orchiodes Gaertn. [CYHMPM28]	xianmao; xiaozhonggen(H), mingzongu(M^{MZ})	Anemia, hypertension	Decoction/oral	Root	Wild
IRIDACEAE					
Eleutherine plicata Klatt [CYHMPM29]	guanyincao(H^{MZ})	Dizziness, rheumatic disorders	Decoction/oral	Bulb	Cult
Gladiolus × *gandavensis* Van Houtte [CYHMPM30]	shanbiqi(H^{ML}), yebiqi; jinbiqi(H^{MZ})	Stomach pain	Decoction/oral	Bulb	Cult
LILIACEAE					
Cardiocrinum giganteum Makino [CYHMPM31]	shanboluogen(H)	Cough	Decoction/oral	Bulb	Wild
Lilium brownii F.E. Brown ex Spae [CYHMPM32]	baihe(H), bagei(M^{MZ})	Phthisis	Decoction/oral	Bulb	Wild
Reineckia carnea Kunth [CYHMPM33]	jixiangcao(H)	Rheumatoid lumbago	Decoction/oral	Whole plant	Wild
MUSACEAE					
Musella lasiocarpa (Franch.) H.W. Li [CYHMPM34]	jinbajiao(H), dimujin(H^{ML}), nize(Y^{ML}), zabazao; banzou(M^{JP})	Heart disorders	Cook with pig heart/oral	Inflor	Cult
ORCHIDACEAE					
Anthogonium gracile Wall. [CYHMPM35]	dabaiji; xuebaiji(H)	Pneumonia	Decoction/oral	Bulb	Wild
Bletilla formosana Schltr. [CYHMPM36]	xiaobaiji(H), ziyamo(Y^{ML}), biyamo(Y^{ML}), gaigla(M^{ML})	Pneumonia	Decoction/oral	Bulb	Wild
Dendrobium aphyllum C.E.C. Fisch. [CYHMPM37]	shihu; huangcao(H)	Indigestion	Decoction/oral	Stem	Wild
Dendrobium capillipes Rchb.f. [CYHMPM38]	shihu; huangcao(H)	Indigestion	Decoction/oral	Stem	Wild
Dendrobium wardianum Warner [CYHMPM39]	shihu; huangcao(H)	Indigestion	Decoction/oral	Stem	Wild
Goodyera procera Hook. [CYHMPM40]	xiaobajiao(H), jinxiancao(H^{MZ}), azela(Hn^{JP})	Cough, hypertension	Decoction/oral	Whole plant	Wild
Goodyera schlechtendaliana Rchb.f. [CYHMPM41]	jinxiancao(H)	Hypertension	Decoction/oral	Whole plant	Wild
Pleione yunnanensis Rolfe [CYHMPM42]	baiji; dusuanlan(H)	Phthisis	Decoction/oral	Bulb	Wild
Thunia alba Rchb.f. [CYHMPM43]	shizhu(H), songbaula; nuzu(M^{MZ}), dokoumu; bio(Z^{MZ})	Bone fracture	Mashed/fomentation	Aerial part	Wild

POACEAE					
Coix lacryma-jobi L. [CYHMPM44]	lugumi(H^{ML})	Intestinal worm	Soup, decoction/oral	Fruit	Cult
Cymbopogon distans (Nees ex Steud.) Will. Watson [CYHMPM45]	xiangmao(H), sakzaoe(D^{JP}), ziagan(Ya^{JP}), sangbamao(M^{MZ})	Stomachache, indigestion	Soup/oral	Leaf	Cult
ROXBURGHIACEAE					
Stemona tuberosa Lour. [CYHMPM46]	baibu; erduomuku(H)	Phthisis	Cook with pork/oral	Tuber	Wild
TRILLIACEAE					
Paris polyphylla Smith. var. *yunnanensis* (Franch.) Hand.-Mazz. [CYHMPM47]	cholnglou(H), dujiaolian(H^{KY}), guazou; guazua(M^{MZ}), kaopang(Y^{GJ})	Stomachache	Decoction/oral	Root	Wild
Paris vietnamensis (Takht.) H. Li [CYHMPM48]	cholnglou(H), qilagodu(Hn^{JP})	Gastritis	Decoction/oral	Root	Wild
ZINGIBERACEAE					
Amomum tsao-ko Crevost & Lemarie [CYHMPM49]	caoguo(H)	Indigestion	Decoction, spice/oral	Fruit	Cult
Curcuma longa L. [CYHMPM50]	huangjiang(H)	Rheumatic disorders, head pain	Decoction/oral	Tuber	Cult
Angiosperms (Dicotyledoneae)					
ACANTHACEAE					
Baphicacanthus cusia (Nees) Bremek. [CYHMPM51]	landing; banlangen(H), zar(Ya^{JP}), behoam(D^{JP}), gan(M^{MZ})	Cold	Decoction/oral	Leaf, root	Cult
Ecbolium procumbens (L.) Kuntze [CYHMPM52]	juechuangcao(H^{ML}), xiaoqingcao(H^{MZ}), pakzaozam(Z^{MZ})	Urination trouble, heart disorders	Decoction/oral	Aerial part	Wild
AMARANTHACEAE					
Iresine diffusa f. *herbstii* (Hook.) Pedersen [CYHMPM53]	hongniuxi(H^{MZ}), bohola(M^{MZ}), pakziling(Z^{MZ})	Anemia	Decoction/oral	Aerial part	Cult
ANACARDIACEAE					
Rhus javanica L. var. *chinensis* (Mill.) T. Yamaz. [CYHMPM54]	wubeizi(H), zuaqi(M^{MZ})	Cough	Decoction/oral	Gall	Wild
APIACEAE					
Angelica sinensis (Oliv.) Diels [CYHMPM55]	danggui(H)	Anemia	Decoction/oral	Root	Cult
Centella asiatica (L.) Urb. [CYHMPM56]	maticai(H), paklok(D^{JP}), dego(Hn^{JP}), rouleneng(M^{MZ}), muchoge(Y^{JP})	Hepatitis	Decoction, soup/oral	Whole plant	Cult
Heracleum scabridum Franch. [CYHMPM57]	shangbaizhi(H)	Rheumatic disorders, hepatitis	Decoction/oral	Root	Wild
Ligusticum chuanxiong S.H. Qiu, Y.Q. Zeng, K.Y. Pan, Y.C. Tang & J.M. Xu [CYHMPM58]	chuanxiong(H)	Dizziness	Decoction/oral	Root	Cult
Pimpinella candolleana Wight & Arn. [CYHMPM59]	fangfwng(H)	Rheumatic disorders	Decoction/oral	Root	Wild
Sanicula henryi H. Wolff [CYHMPM60]	xiaoheiyao(H)	Pneumonia	Decoction/oral	Root	Wild
Seseli mairei H. Wolff [CYHMPM61]	zhuyefangfeng(H), zizugansao(Y^{MZ})	Cold, influenza	Decoction/oral	Root	Wild
APOCYNACEAE					
Alstonia scholaris var. *scholaris* (L.) R. Br. [CYHMPM62]	dengtaishu(H)	Stomachache, bronchitis	Decoction/oral	Leaf	Wild
Alstonia yunnanensis Diels [CYHMPM63]	jiguchangshang(H)	High fever	Decoction/oral	Whole plant	Wild
Rauvolfia verticillata Baill. [CYHMPM64]	luofumu(H)	Hypertension, hepatitis	Decoction/oral	Stem, root	Wild
ARALIACEAE					
Hedera nepalensis var. *sinensis* (Tobler) Rehder [CYHMPM65]	sanjiaofeng(H), pakzamkau(Z^{MZ})	Rheumatic disorders	Decoction/oral	Aerial part	Wild
Panax notoginseng (Burkill) Chen ex Yunnan Inst.Bot. [CYHMPM66]	sanqi(H)	Hypertension, anemia	Decoction, cook/oral	Root, inflor	Cult
Panax stipuleanatus Tsai & Feng [CYHMPM67]	yesanqi(H)	Anemia	Decoction, cook/oral	Root	Wild
Tetrapanax papyrifer (Hook.) K. Koch [CYHMPM68]	datongcao(H), meidokon(Z^{MZ}), tonghoa(M^{MZ})	Urination trouble	Decoction/oral	Aerial part	Wild

Table 1 (*Continued*)

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
ARISTOLOCHIACEAE					
Asarum caudigerum Hance [CYHMPM69]	puxingcao(H^{JP}), longzai; lozouzai(M^{MZ})	Cold, throat pain after cough	Decoction/oral	Whole plant	Wild
ASCLEPIADACEAE					
Periploca forrestii Schltr. [CYHMPM70]	hongqingli(H^{ML}), guasidao(M^{MZ}), koudam; lakonoum; lakbinou(Z^{MZ})	Lumbago, rheumatic disorders	Decoction/bath	Aerial part	Wild
ASTERACEAE					
Ainsliaea pertyoides Franch. var. *albo-tomentosa* Beauverd [CYHMPM71]	yexiahua(H)	Bone fracture, rheumatic disorders	Mashed/fomentation	Y-leaf, root	Wild
Arctium lappa L. [CYHMPM72]	niubanzi(H)	Pneumonia	Decoction/oral	Root	Cult
Aucklandia costus Falc. [CYHMPM73]	muxiang(H)	Stomachache	Decoction/oral	Root	Cult
Bidens pilosa L. var. *pilosa* [CYHMPM74]	guizhencao; zelan(H)	Rheumatic disorders	Decoction/oral	Whole plant	Wild
Carthamus tinctorius L. [CYHMPM75]	honghua(H)	Wounds	Decoction/oral	Flower	Cult
Centipeda minima (L.) A. Braun & Asch. [CYHMPM76]	shihusui(H), ubqihao(Z^{MZ})	Toothache	Decoction/oral	Whole plant	Wild
Crepis lignea (Vaniot) Babcock [CYHMPM77]	wanzhangshen(H)	Cough	Cook with chicken/oral	Root	Wild
Cyathocline purpurea Kuntze [CYHMPM78]	honghaozhi(H)	Cold	Decoction/oral	Whole plant	Wild
Dichrocephala chrysanthemifolia (Blume) DC. [CYHMPM79]	yuyancao(H)	Indigestion of infant	Decoction/oral	Whole plant	Wild
Duhaldea pterocaula (Franch.) Anderb. [CYHMPM80]	daheiyao(H)	Insomnia, dizziness	Cook with pork/oral	Root	Wild
Eclipta prostrata (L.) L. [CYHMPM81]	hanlian(H)	Alopecia	Decoction/oral	Whole plant	Wild
Elephantopus scaber L. [CYHMPM82]	digudan; didancao(H^{MZ})	Diabetes, enteritis	Decoction/oral	Whole plant	Wild
Emilia sonchifolia (L.) DC. [CYHMPM83]	yidianhong(H)	Diarrhea	Decoction/oral	Whole plant	Wild
Erigeron breviscapus (Vaniot) Hand.-Mazz. [CYHMPM84]	dengzhanhua(H), banggongchou; chuaganlou(M^{MZ})	Diarrhea, heart pain	Decoction/oral	Whole plant	Wild
Gnaphalium affine D. Don [CYHMPM85]	shuqucao(H)	Cold	Boil with rice/oral	Flower	Cult
Gynura japonica (Thunb.) Juel [CYHMPM86]	tusanqi(H)	Bone fracture, tonsillitis	Decoction/fomentation	Whole plant	Wild
Laggera pterodonta Sch. Bip. ex Oliver [CYHMPM87]	choulingdan(H)	Cold, high fever	Decoction/oral	Whole plant	Wild
Piloselloides hirsuta (Forssk.) C. Jeffrey ex Cufod. [CYHMPM88]	baitouweng(H), bodao(M^{MZ}), liakyadi(Z^{MZ})	Pneumonia	Decoction/oral	Whole plant	Wild
Senecio scandens Buch.-Ham. ex D. Don [CYHMPM89]	qianliguang(H)	Pruritus	Decoction/oral	Aerial part	Wild
Spilanthes callimorpha A.H. Moore [CYHMPM90]	bancangong(M^{MZ})	Dermatitis	Decoction/oral	Aerial part	Wild
Xanthium strumarium L. subsp. *sibiricum* (Widder) Greuter [CYHMPM91]	cangerzi(H)	Cold	Decoction/oral	Fruit	Cult
BASELLACEAE					
Basella rubra L. [CYHMPM92]	tusanqi(H), handi(Ya^{JP})	Stomachache	Decoction, cook/oral	Fresh leaf, bulblet	Wild
BERBERIDACEAE					
Berberis flavida (C.K. Schneid.) J.E. Laferrière [CYHMPM93]	shidagonglao(H), longgaidan(M^{MZ})	Diarrhea	Decoction/oral	Stem	Wild
Dysosma pleiantha Woodson [CYHMPM94]	bagufeng(H), behahaba(Hn^{JP}), liza(Ya^{JP})	Cough	Decoction/oral	Whole plant	Wild

BIGNONIACEAE					
Oroxylum indicum (L.) Kurz [CYHMPM95]	qianzhangzhi(H), dongdan(M^{MZ})	Hepatitis, lumbago	Decoction/oral	Seed, Bark	Wild
BOMBACACEAE					
Bombax malabaricum DC. [CYHMPM96]	panzhihua(H), abuchala(Hn^{HH})	Gastritis, enteritis	Decoction/oral	Flower	Wild
BORAGINACEAE					
Onosma paniculata Bureau & Franch. [CYHMPM97]	zicao(H)	Constipation, furuncles	Decoction/oral	Root	Wild
BUDDLEJACEAE					
Buddleja asiatica Lour. [CYHMPM98]	qilixiang(H), yangbiyang(Ya^{JP}), nuakpanpi(Z^{MZ})	Cystitis, cold	Decoction/oral	Flower	Wild
Buddleja officinalis Maxim. [CYHMPM99]	aqiabu(Y^{JP}), husiuHn^{HH}), egoye(Hn^{JP}), bancao(M^{JP}), lopan(Z^{MZ})	Hepatitis, weak-eyed	Cook with sticky rice/oral	Flower	Wild
CAMPANULACEAE					
Lobelia seguinii H. Lév. & Vaniot [CYHMPM100]	mabolo(H), daziuzia(M^{JP}), loinguo(M^{MZ})	Rheumatic disorders	Decoction/oral	Whole plant	Wild
Pratia nummularia A. Braun & Aschers. [CYHMPM101]	yudaicao(H)	Rheumatic disorders, bone fracture	Mashed/fomentation	Whole plant	Wild
Wahlenbergia marginata (Thunb.) A.DC. [CYHMPM102]	lanhuashen(H)	Losing appetite	Decoction/oral	Root	Wild
CANNABACEAE					
Cannabis sativa L. [CYHMPM103]	damazi(H), zmo(Y^{GJ})	Constipation	Decoction/oral	Seed	Cult
CAPPARACEAE					
Capparis masakai H. Lév. [CYHMPM104]	shuibinglang(H)	Urination trouble	Decoction/oral	Fresh fruit	Wild
CAPRIFOLIACEAE					
Lonicera japonica Thunb. [CYHMPM105]	jinyinhua(H), yecanbi(Y^{ML})	Cold-fever	Decoction/oral	Fl, vine	Wild
Sambucus adnata Wall. [CYHMPM106]	xuemancao(H), ximancao(H^{GJ})	Rheumatic disorders, pruritus	Decoction/bath, Fome	Aerial part	Wild
Sambucus williamsii Hance [CYHMPM107]	jiegumu(H)	Bone fracture	Decoction/bath, Fome	Whole plant	Wild
CARYOPHYLLACEAE					
Drymaria cordata Willd. ex Schult. subsp. *diandra* (Blume) J.A. Duke [CYHMPM108]	yewandoucao(H^{KY})	Stomachache	Decoction/oral	Whole plant	Wild
Psammosilene tunicoides W.C. Wu & C.Y. Wu [CYHMPM109]	dudingzi(H)	Knife wounds	Mashed/bandage	Root	Wild
Stellaria yunnanensis Franch. [CYHMPM110]	wanxiancao(H), daziazin(Y^{MZ})	Losing appetite, dizziness	Decoction/oral	Root	Wild
CHLORANTHACEAE					
Chloranthus holostegius (Hand.-Mazz.) P'ei & San [CYHMPM111]	sikuaiwa(H), chouhujiacao(H^{GJ}), brolanblon(M^{MZ})	Lumbago, stomachache	Decoction/oral	Whole plant	Wild
CLUSIACEAE					
Hypericum japonicum Thunb. [CYHMPM112]	maicao(H), meisong; bausong(M^{MZ})	Pruritus	Mashed/fomentation	Whole plant	Wild
Hypericum kingdonii N. Robson [CYHMPM113]	meila(M^{MZ})	Pruritus	Mashed/fomentation	Whole plant	Wild
COMMELINACEAE					
Cyanotis arachnoidea C.B. Clarke [CYHMPM114]	zhenzoulushuicao(H)	Phthisis	Decoction/oral	Whole plant	Wild
Tradescantia pendula (Schnizl.) D.R. Hunt [CYHMPM115]	diaozhucao(H), lozola(M^{MZ})	Gastritis	Decoction/oral	Aerial part	Cult

Table 1 (*Continued*)

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
CONVOLVULACEAE					
Cuscuta reflexa Roxb. [CYHMPM116]	Huangtengzi(H), wugencao(H^{ML}), wuyangteng(H^{MZ}), zguozusei(M^{MZ})	Rheumatic disorders, hypertension	Decoction/bath	Aerial part	Wild
CORNACEAE					
Toricellia angulata var. *intermedia* (Harms ex Diels) Hu [CYHMPM117]	dajiegudan(H), zodou(M^{MZ})	Bone fracture	Mashed/fomentation	Root bark, leaf	Wild
CRASSULACEAE					
Kalanchoe pinnata (Lam.) Pers. [CYHMPM118]	dabusi(H)	Bone fracture	Mashed/fomentation	Fresh leaf	Cult
DIPSACACEAE					
Dipsacus asper Wall. [CYHMPM119]	xuduan(H)	Lumbago	Decoction/oral	Root	Wild
DROSERACEAE					
Drosera peltata var. *lunata* C.B. Clarke [CYHMPM120]	dihujia(H)	Lumbago	Alcohol extract/oral	Whole plant	Wild
ERICACEAE					
Gaultheria leucocarpa Blume var. *crenulata* (Kurz) T.Z. Hsu [CYHMPM121]	tougucao(H), meza(Y^{ML}), zincaica(Ya^{JP}), langadu(Z^{MZ})	Arthralgia, rheumatic disorders	Decoction/bath	Aerial part	Wild
Pyrola decorata Andres [CYHMPM122]	luhancao(H)	Eye trouble	Cook with pork/oral	Whole plant	Wild
EUCOMMIACEAE					
Eucommia ulmoides Oliver [CYHMPM123]	duzhong(H)	Bone fracture	Mashed/fomentation	Bark	Cult
EUPHORBIACEAE					
Phyllanthus emblica L. [CYHMPM124]	ganlan(H)	Cold-fever	Decoction/oral	Fruit	Wild
FABACEAE					
Pueraria lobata var. *lobata* (Willd.) Ohwi [CYHMPM125]	gegen(H), masiong(M^{MZ})	Diarrhea, cold, alcoholism	Decoction/oral	Tuber	Wild
GENTIANACEAE					
Gentiana crassa Kurz subsp. *rigescens* (Franch. ex Hemsl.) Halda [CYHMPM126]	longdan; daqingyedan(H), guocezai(M^{MZ})	Hepatitis	Decoction/oral	Root	Wild
Metagentiana rhodantha (Franch.) T.N. Ho & S.W. Liu [CYHMPM127]	qingyedan(H), hongqingyedan(H^{KY}), xuelimei(H^{MI})	Hepatitis, pneumonia	Decoction/oral	Whole plant	Wild
Swertia angustifolia Buch.-Ham. ex D. Don [CYHMPM128]	xiaoqingyedan(H), baihuaqingyedan(H^{MZ})	Hepatitis, urethritis	Decoction/oral	Whole plant	Wild
GERANIACEAE					
Geranium strictipes Knuth [CYHMPM129]	wubeicao; wubucao; wubangcao(H^{MZ}), pakfuzei(Z^{MZ})	Diarrhea	Decoction/oral	Whole plant	Wild
GESNERIACEAE					
Corallodiscus flabellatus (Craib) B.L. Burtt [CYHMPM130]	shihua(H), dahuixincao(H^{JP})	Wounds, headache	Alcohol extract/oral	Whole plant	Wild
HAMAMELIDACEAE					
Liquidambar formosana Hance [CYHMPM131]	lulutong(H)	Rheumatic disorders	Decoction/oral	Fruit	Wild
HELWINGIACEAE					
Helwingia chinensis Batalin [CYHMPM132]	yeshanghua(H), adudadu(Hn^{JP}), leilu(M^{MZ}), maidokua; meizakua(Z^{MZ})	Bone fracture, arthralgia	Mashed/fomentation	Leaf	Wild

LAMIACEAE					
Ajuga bracteosa Benth [CYHMPM133]	jingucao(H), feilancao(H^{MZ})	Cough, diarrhea	Decoction, powder/oral	Whole plant	Wild
Clerodendranthus spicatus (Thunb.) C.Y. Wu [CYHMPM134]	maoxucao(H)	Kidney stone	Decoction, powder/oral	Aerial part	Wild
Clerodendrum bungei var. *megacalyx* C.Y. Wu ex S.L. Chen [CYHMPM135]	choumudan(H), molihua(H^{GJ}), encouzui(M^{MZ})	Dizziness	Decoction/oral	Inflorescence	Wild
Elsholtzia blanda H. Keng [CYHMPM136]	jiganshan(H), lopunzua; loznzou(M^{MZ})	Hepatitis	Decoction/oral	Aerial part	Wild
Elsholtzia bodinieri Vaniot [CYHMPM137]	shancha(H), songmaocao(H^{ML}), zihalapi; lake(Hn^{HH})	Indigestion, cold	Decoction/oral	Aerial part	Cult
Elsholtzia penduliflora W.W. Sm. [CYHMPM138]	dahuangyao; yehaohuangyao(H), cuohoan(M^{MZ})	Bronchitis	Decoction/oral	Aerial part	Wild
Elsholtzia rugulosa Hemsl. [CYHMPM139]	guishangcao(H), couloz(M^{MZ})	Cold	Decoction/oral	Aerial part	Wild
Leonurus japonicus Houtt. [CYHMPM140]	yimucao(H)	Kidney disorders	Decoction/oral	Aerial part	Wild
Leucas ciliata Benth. [CYHMPM141]	yiliangcao(H^{MZ}), zuanbanghua(Hn^{JP})	Rheumatic disorders	Decoction/oral	Aerial part	Wild
Prunella vulgaris L. [CYHMPM142]	xiakucao(H), covlonza; guablonza(M^{MZ})	Cystitis	Decoction/oral	Aerial part	Wild
Salvia yunnanensis C.H. Wright [CYHMPM143]	zidanshen(H)	Lumbago	Decoction/oral	Root	Cult
Scutellaria orthocalyx Hand.-Mazz. [CYHMPM144]	banzhilian(H)	Hepatitis	Decoction/oral	Whole plant	Wild
LAURACEAE					
Cinnamomum cassia Siebold [CYHMPM145]	rougui; guipi(H)	Indigestion, belly ache	Decoction/oral	Bark	Cult
Litsea cubeba Pers. [CYHMPM146]	mujiangzi(H), sebi(Hn^{HH}), mugazigao; zgao(M^{MZ}), scouma(Y^{MZ})	Indigestion	Pickle/oral	Fruit	Wild
LEGUMINOSAE					
Bauhinia variegata L. [CYHMPM147]	yangtijia(H), moban(D^{JP}), peitaomo(Y^{GJ})	Indigestion	Cook/oral	Flower	Wild
Caesalpinia sappan L. [CYHMPM148]	sumu(H), ze(Hn^{JP})	Lumbago	Decoction/oral	Heart wood	Cult
Callerya bonatiana (Pamp.) P.K. Lôc [CYHMPM149]	dafahan(H), aulongcu(M^{KY})	Rheumatic disorders	Decoction/oral	Root, stem	Wild
Crotalaria albida Heyne ex Roth [CYHMPM150]	xianglingdou(H)	Hepatitis	Decoction/oral	Whole plant	Wild
Desmodium macrophyllum Desv. & Desv. [CYHMPM151]	banjiuwo(H)	Cold-fever	Decoction/oral	Whole plant	Wild
Erythrina arborescens Roxb. [CYHMPM152]	citong(H), can(M^{MZ})	Bone facture	Mashed/fomentation	Branch	Wild
Gleditsia japonica var. *delavayi* (Franch.) L.C. Li [CYHMPM153]	tianding(H), zzaogu(M^{MZ})	Stomach troubles	Decoction/oral	Thorn	Wild
Spatholobus suberectus Dunn [CYHMPM154]	daxueteng; jixueteng(H)	Anemia	Decoction/oral	Voluble stem	Wild
LOGANIACEAE					
Gelsemium elegans (Gardner & Champ.) Benth. [CYHMPM155]	duanchangcao(H), sese(Hn^{JP})	Arthritis	Mashed/fomentation	Aerial part	Wild
MELIACEAE					
Melia toosendan Siebold & Zucc. [CYHMPM156]	kulianzi; lianzi(H)	Skin troubles	Al-extract/apply to skin	Fruit, bark	Wild
Munronia henryi Harms [CYHMPM157]	aituotuo(H^{GJ})	Rheumatic disorders	Decoction/oral	Whole plant	Wild
MENISPERMACEAE					
Stephania delavayi Diels [CYHMPM158]	diburong; shanwugui(H)	Stomachache	Decoction/oral	Tuber	Wild
Tinospora sagittata Gagnep. [CYHMPM159]	shancigu(H)	Stomachache	Decoction/oral	Tuber	Wild
Tinospora sinensis (Lour.) Merr. [CYHMPM160]	ruanjinteng(H^{JP})	Bone fracture, knee joint pain	Mashed/fomentation	Aerial part	Wild

Table 1 (*Continued*)

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
MORACEAE					
Ficus ti-koua Bureau [CYHMPM161]	dishiliu; dibanteng(H), mazluodei(M^{MZ})	Diarrhea	Decoction/oral	Whole plant	Wild
Morus alba L. [CYHMPM162]	sangshu(H), domulogan(M^{MZ})	Head itch	Ash lye/wash hairs	Root bark	Cult
MYRICACEAE					
Morella nana (A. Chev.) J. Herb. [CYHMPM163]	yangmei(H)	Enteritis	Decoction/oral	Bark	Wild
MYRSINACEAE					
Ardisia crenata Sims [CYHMPM164]	shandougen(H)	Lumbago	Decoction/oral	Whole plant	Wild
Ardisia mamillata Hance [CYHMPM165]	shandougen; erduoduo(H)	Stomach pain, diarrhea	Decoction/oral	Whole plant	Wild
MYRTACEAE					
Eucalyptus globulus Labill. [CYHMPM166]	anshuguo(H)	Fever, cough	Decoction/oral	Fruit	Cult
Psidium guajava L. [CYHMPM167]	fanshiliu(H)	Indigestion	Fresh/oral	Fruit	Cult
NYCTAGINACEAE					
Mirabilis jalapa L. [CYHMPM168]	dingxianghua(H)	Constipation	Decoction/oral	Root	Cult
PAPAVERACEAE					
Dactylicapnos scandens Hutchinson [CYHMPM169]	yewandougen(H^{MZ})	Hypertension	Decoction/oral	Root	Wild
Papaver somniferum L. [CYHMPM170]	yingsu(H)	Cough	None/oral	Seed	Cult
PASSIFLORACEAE					
Passiflora wilsonii Hemsl. [CYHMPM171]	gochuanteng; xifanlian(H)	Stomachache	Decoction/oral	Aerial part	Wild
PIPERACEAE					
Peperomia heyneana Miq. [CYHMPM172]	sanxuedan(H), sanxidan(H^{MZ})	Bone fracture	Mashed/fomentation	Whole plant	Wild
Peperomia tetraphylla (G. Forst.) W.R.B. Oliv. [CYHMPM173]	xiaohuaxidan(H^{MZ})	Bone fracture, rheumatic disorders	Al-extract/apply to wounds	Whole plant	Wild
PLANTAGINACEAE					
Plantago asiatica L. subsp. *erosa* (Wall.) Z. Yu Li [CYHMPM174]	cheqiancao(H), kapaeca(Hn^{HH}), lahemako(M^{MZ})	Cough	Decoction/oral	Aerial part	Wild
PLUMBAGINACEAE					
Plumbago zeylanica L. [CYHMPM175]	baihuadan(H), kangpihua(H^{MZ})	Bone fracture	Al-extract/fomentation	Whole plant	Cult
POLYGALACEAE					
Polygala japonica Houtt. [CYHMPM176]	zihuadiding(H), lanhuadiding; diding(H^{MZ})	Influenza	Decoction/oral	Whole plant	Wild
POLYGONACEAE					
Fallopia multiflora (Thunb. ex Murray) Czerep. [CYHMPM177]	heshouwu(H), buti(M^{JP}), gaolula; gaoluleM^{MZ})	Phthisis	Decoction/oral	Root	Wild
Polygonum orientale L. [CYHMPM178]	suanlangan(H), zito(Y^{JP}), cenbeiladu(Hn^{HH}), cebi(Hn^{JP}), zetu(Y^{JP})	Diarrhea	Fresh with salt/oral	Stem	Wild
PORTULACACEAE					
Talinum patens (Ehrh.) Willd. [CYHMPM179]	turenshen(H)	Frequent urination	Decoction/oral	Root	Cult
PRIMULACEAE					
Lysimachia christinae Hance [CYHMPM180]	minongdualaglang; cucenzui; longzualu(M^{MZ}), zeticao(Y^{MZ})	Urination trouble	Decoction/oral	Aerial part	Wild
PUNICACEAE					
Punica granatum L. [CYHMPM181]	shiliupi(H)	Diarrhea	Decoction/oral	Pericarp	Cult

RANUNCULACEAE					
Aconitum brachypodum Diels [CYHMPM182]	xueshangyizhihao(H)	Rheumatic disorders	Al-extract/only external	Tuber	Cult
Aconitum vilmorinianum Kom. [CYHMPM183]	caowu; dacaowu; huangcaowu(H)	Rheumatic disorders, prevent cold, flu	Cook with pork/oral	Tuber	Cult
Anemone hupehensis Hort. ex Boynton [CYHMPM184]	yemianhua(H)	Stomachache	Decoction/oral	Root	Wild
Anemone rivularis Buch.-Ham. ex DC. [CYHMPM185]	huzhangcao(H), pakmantien(Z^{MZ})	Toothache, indigestion	Decoction/oral	Root	Wild
Clematis armandii Franch. [CYHMPM186]	fengtingcao(H), wanggi(M^{MZ}), aduba; koudak(Z^{MZ})	Rheumatic disorders	Decoction/oral, bath	Aerial part	Wild
Clematis leschenaultiana var. *rubifolia* (C.H. Wright) W.T. Wang [CYHMPM187]	maomutong(H)	Rheumatic disorders	Decoction/oral	Aerial part	Wild
Coptis quinquesecta W.T. Wang [CYHMPM188]	huanglian; jizhuahuanglian(H)	Diarrhea	Decoction/oral	Root	Wild
Delphinium yunnanense Franch. [CYHMPM189]	xiaocaowu(H)	Rheumatic disorders, stomachache	Decoction/oral	Tuber	Wild
Thalictrum reticulatum Franch. [CYHMPM190]	maweilian; maweihuanglian(H)	Diarrhea, enteritis	Decoction/oral	Root	Wild
RHAMNACEAE					
Hovenia acerba Lindl. var. *acerba* [CYHMPM191]	guaizao(H)	Indigestion	Decoction/oral	Fresh fruit	Cult
ROSACEAE					
Docynia delavayi C.K. Schneid. [CYHMPM192]	duoyi(H), sice; spi(Hn^{HH})	Diarrhea	Fresh/oral	Fresh fruit	Wild
Duchesnea indica (Andrews) Focke [CYHMPM193]	shemei(H)	Diarrhea	Decoction/oral	Whole plant	Wild
Geum japonicum Thunb. var. chinensis F. Bolle. [CYHMPM194]	shuiyangmei(H)	Diarrhea	Decoction/oral	Whole plant	Wild
Potentilla fulgens Wall. ex Hook. [CYHMPM195]	banbailian(H), huangbaiye(H^{ML})	Diarrhea	Decoction/oral	Aerial part	Wild
RUBIACEAE					
Gardenia jasminoides Ellis [CYHMPM196]	zhizi(H)	Jaundice	Decoction/oral	Fruit	Cult
Hedyotis corymbosa (L.) Lam. [CYHMPM197]	shuixiancao(H)	Hepatitis	Decoction/oral	Whole plant	Wild
Hedyotis diffusa Willd. [CYHMPM198]	baihuasheshecao(H), ehohamaHn^{JP}), cuakagan(M^{MZ}), pakbadi(Z^{MZ})	Toothache, cancer	Decoction/oral	Aerial part	Wild
Knoxia valerianoides Thorel ex Pit. [CYHMPM199]	hongwawa(H)	Contusion	Al-extract/oral	Root	Wild
Luculia intermedia Hutchinson [CYHMPM200]	dingxiang; diandingxiang(H)	Bronchitis	Decoction/oral	Fl, root bark	Wild
Rubia yunnanensis Diels [CYHMPM201]	qiancao(H), mizosneng(M^{MZ})	Constipation	Decoction/oral	Root	Wild
Uncaria lancifolia Hutchinson [CYHMPM202]	shuanggouteng(H^{GJ}), duanguajigu(H^{JP}), datongqi(H^{MZ}), zougusang(M^{MZ})	Rheumatic disorders	Decoction/oral	Whole plant	Wild
RUTACEAE					
Boenninghausenia sessilicarpa H.Lév. [CYHMPM203]	shijiaocao(H), guszai(M^{MZ})	Influenza, tonsillitis	Decoction/oral	Whole plant	Wild
Murraya tetramera Huang [CYHMPM204]	qianzhiyan(H), mazabzu(Z^{MZ})	Cold-fever	Decoction/bath	Leaf, root bark	Wild
SANTALACEAE					
Thesium himalense Royle [CYHMPM205]	shanbaizhi(H), siabaiz(P^{MZ})	Hepatitis, infant pneumonia	Decoction/oral	Whole plant	Wild
SAURURACEAE					
Houttuynia cordata Thunb. [CYHMPM206]	asalaya(Y^{JP}),siaksaniHn^{HH}), ohalosa(Hn^{JP}), lokzou(M^{MZ})	Bronchitis, dermatitis	Salad, decoction/oral	Whole plant	Cult
SAXIFRAGACEAE					
Astilbe rivularis Buch.-Ham. [CYHMPM207]	yegaoliang(H), dahohua(Y^{ML})	Lumbago	Al-extract/oral	Whole plant	Wild

Table 1 (*Continued*)

Botanical name [Voucher Number]	Vernacular name[a]	Medical uses	Mode of use	Parts used	Habitat
Saxifraga mengtzeana Engl. & Irmsch. [CYHMPM208]	fangbeihong(H^{MZ}), bakhaidai; souzuzou(M^{MZ})	Pruritus	Mashed/apply to skin	Whole plant	Wild
Saxifraga stolonifera Meerb. [CYHMPM209]	fangbeihong(H^{MZ}), bakhaidai(M^{MZ})	Pruritus	Mashed/apply to skin	Whole plant	Cult
SCROPHULARIACEAE					
Hemiphragma heterophyllum Wall. [CYHMPM210]	dingzucao(H)	Rheumatic disorders	Al-extract/oral	Whole plant	Wild
SOLANACEAE					
Anisodus luridus Link & Otto [CYHMPM211]	sanfensan(H)	Rheumatic disorders	Decoction/oral	Root	Cult
Solanum verbascifolium L. [CYHMPM212]	xiwanye(H), pakbadeb(Z^{MZ})	Stomachache	Decoction/oral	Fruit, leaf	Wild
THYMELAEACEAE					
Stellera chamaejasme L. [CYHMPM213]	dalangdu(H)	Intestinal worm	Al-extract/oral	Root	Wild
VALERIANACEAE					
Valeriana jatamansi Jones [CYHMPM214]	jishicao; matixiang(H), izozopu(Hn^{HH}), penok; pakmanqi(Z^{MZ})	Indigestion	Decoction, powder/oral	Root	Wild
VERBENACEAE					
Verbena officinalis L. [CYHMPM215]	mabiancao(H)	Cold-fever, hepatitis, enteritis	Decoction/oral	Aerial part	Wild
VISCACEAE					
Viscum articulatum Burm.f. [CYHMPM216]	jisheng(H), ce(Y^{MZ})	Articular rheumatism	Decoction/oral	Whole plant	Wild

Note 1: GJ (Gejiu City), HH (Honghe County), JP (Jinping County), KY (Kaiyuan City), ML (Mile County), MZ (Mengzi County). *Note 2*: Vernacular name is written in Chinese Phonetic Alphabet. *Note 3*: Cult, Cultivated; Inflor, inflorescence; Fl, flower; Fome, fomentation; Al-extract, alcoholic extract; Y-leaf, Young leaf.

[a] D^{JP} (Dai people language in Jinping), H (widely known Han people language in every county), H^{GJ} (Han people dialect in Gejiu), H^{KY} (Han people dialect in Kaiyuan), H^{ML} (Han people dialect in Mile), H^{MZ} (Han people dialect in Mengzi), Hn^{HH} (Hani people language in Honghe), Hn^{JP} (Hani people language in Jinping), M^{JP} (Miao language in Jinping), M^{KY} (Miao language in Kaiyuan), M^{MZ} (Miao language in Mengzi), Y^{GJ} (Yi people language in Gejiu City), Y^{JP} (Yi people language in Jinping), Y^{ML} (Yi people language in Mile), Y^{MZ} (Yi people language in Mengzi), Ya^{JP} (Yao people language in Jinping), Z^{MZ} (Zhuang people language in Mengzi).

revealed that several wild species of medicinal plants have been transported from the wild into home gardens (e.g. *Asarum caudigerum*, *Dendrobium* spp., *Paris polyphylla* var. *yunnanensis* and *Saxifraga mengtzeana*).

From this study, total of 156 herbal vendors and village medical healers in six periodic markets were interviewed on the medical uses of the plants. They belong to seven ethnic groups (Dai, Han, Hani, Miao, Yao, Yi and Zhuang), and 278 diseases were mentioned as being treated with these plants. More than 60 different herbal recipes were recorded. The conditions and diseases treated fell into 16 broad categories, with the greatest number of the digestive system, followed by rheumatic diseases and then others (Table 2). To give a glimpse of the diversity of medicinal uses as recorded in these markets, for instance, *Clematis armandii*, *Lycopodium japonicum*, *Lygodium flexuosum*, *Gaultheria leucocarpa* are all used in baths for the treatment of skin and rheumatic diseases, and used for the purpose, *Elsholtzia bodinieri* is commonly drunk to aid digestion, and *Centella asiatica* is popular for treating hepatitis. In this way, many plant species have been used for personal health care in the daily life of ethnic groups in Honghe Prefecture.

3.2. Two cases of substitution noted in the markets

Disease prevention is an important part of traditional medicine. There is a folk remedy popular in Gejiu city that increases immunity against rheumatological diseases and cold using detoxified *aconite* tubers (*monkshood*; *Aconitum vilmorinianum*), taking medicine during late autumn and beginning of winter. According to biochemical studies, prepared *aconite* tuber acts similarly to the adrenocortical hormone, which regulates the immune functions through a neuro-humoral mechanism (Xie, 1995). Although *aconite* is very toxic and can be fatal, many local people believe in its medical effects.

Young wild *aconite* tubers (*Aconitum vilmorinianum*) are sold in the markets which are propagated in home gardens or in cultivated areas. Wild collection of *Aconitum* may lead to serious destruction of wild *Aconitum* habitats and to the degradation of the germplasm of *Aconitum vilmorinianum* in local areas. During the surveys, over-collection in wild habitats was apparent because it was difficult to find wild *aconite* in the markets, creating a ripple effect, where overexploitation of one species results in a shift to the harvest of others (Cunningham, 2001). In this case, local people are using *larkspur* (*Delphinium yunnanense*) as a substitute for *aconite*, even though it is medically not so effective according to healers at local markets. Notwithstanding, the market demand for *larkspur* has increased in recent years. Through the author's survey in Gejiu and Kaiyuan markets, *larkspur* (*Delphinium yunnanense*) has been used as an alternative species for *aconite* in recent years. It is said according to traditional healers interviewed, the advantage of *larkspur* is that it is "not as toxic as *aconite*". Though symptoms of poisoning, such as stomach upset, nervous symptoms and even death can result from taking excessive quantities (Lewis and Elvin-Lewis, 1977).

In another example, *Coptis quinquesecta* (a threatened wild endemic Chinese species) is traded in local markets as a substitute for *goldthread* (*Coptis chinensis*; Huanglian), which is a well-known in TCM, usually used for the cure of gastrointestinal problems and diarrhea (Xie, 1995). However, *Coptis quinquesecta* is originally very rare in some local habitats and its medical effect was not better, in local hearlers' opinion, this species is thought to be not as good as *Coptis chinensis* in traditional medical practice. Hence, healers prefer to use cultivated *goldthread* (*Coptis chinensis*) imported from other parts of China and sold for a higher price than *Coptis quinquesecta* from local wild habitat. In addition, *meadow rue* (*Thalictrum reticulatum*; Mawei Huanglian) is sometimes also substituted for *Coptis*. The rhizomes of *T. reticulatum* and *Coptis* spp. are in the same family of Ranunculaceae and similar morphologically and they share a bitter taste.

Table 2
Number of diseases treated using herbal medicine in markets of Honghe Prefecture, grouped into 16 major categories and with the number of plant families used for each category indicated

Major disease category	Number of diseases noted per major disease category	Percentage	No. of plant families used
Cardiovascular diseases	13	4.7	12
Diseases of ductless glands	1	0.4	1
Disease of hematopoietic system	6	2.2	5
Disease of nervous system and psychosis	19	6.8	17
Diseases of oral cavity	3	1.1	3
Diseases of respiratory system	29	10.4	22
Diseases of the digestive system	85	30.6	53
Diseases of urogenital system	13	4.7	11
Infectious diseases	22	7.9	15
Ophthalmic diseases	2	0.7	2
Rheumatological diseases	36	12.9	28
Skin diseases	15	5.4	11
Surgery uses	22	7.9	18
Throat diseases	2	0.7	2
Tumors	1	0.4	1
Others	9	3.2	8
Total	278	100	98

If the exploitation of wild medicinal plants is to continue, then management strategies need to be devised for species in high demand, based on a detailed understanding of their population ecology. This is a necessary step for the restoration of damaged or lost species in wild habitats.

4. Conclusions

The study area, Honghe Prefecture in south Yunnan of China is well known for its exceptionally rich medicinal plants which serve as important supplies of crude drugs of plant origins for Traditional Chinese Medicine (TCM). Traditionally, being socio-economical organizations, various periodic markets in the area function as centers for trading of agro-products and wild plant products including medicinal plants in fresh and dried forms and exchange of information concerning plant products that are being traded between the Han Chinese and the minority groups in the area over hundreds of years. Periodic markets are much localized trading places in terms of their socio-cultural functions and plant origins. Trading of medicinal plants at markets involve active interactions between plants and human cultures, market survey is employed as an important research method in areas with rich ethnobotanical knowledge for ethnobotanical studies of medicinal plants. The study recorded 216 medicinal plants traded in the markets of which wild medicinal plants making up 80.1% (173 spp.) and 19.9% (43 spp.) from cultivated land, which shows the rich plant diversity and abundant local knowledge in the area. Furthermore, the study also made records on local uses of medicinal plants from ethnobotanical interviews with 156 herbal plant traders and village medical healers during the research period, resulting in the record of 60 different herbal recipes for treatment of 278 human diseases in the study area, which display the very rich in ethnomedical knowledge among local ethnic groups. On the other hand, the survey revealed that the high demand in market for some wild medicinal plants resulted in declining of wild resources in natural habitats which is linked with community income generation and local people believe that the medicinal effects of wild plants are better than those of cultivated species; the high demand in the market for some high value medicinal plants is a result of substitution of some herbal medicines, as in the case of aconite substitution by larkspur and alternative species for goldthread both are important local medicines in the area. The substitution issue is interesting to study further in the future in order to ensure its impact on local medical systems and biodiversity.

Finally, the authors suggest that being traditional socio-economic centers of periodic markets can be used as an indicator for monitoring of medicinal plant diversity in the specific settlings, from which one can obtain information and data on the dynamic changes on availability of medicinal plants in local environment and status of maintaining traditional medical knowledge among local people, and provide the information and data to policy makers, resource managers and conservation institutions for sustainable utilization and conservation of medicinal plants and medical traditions.

Acknowledgements

The authors are very grateful to all the informants of the research area for sharing their precious knowledge. And would like to thank Dr. Alan Hamilton, Dr. Chun-Lin Long, Dr. Roy Turkington, Dr. Xue-Fei Yang for helping us to edit this paper. Many thanks to Professor Su-Gong Wu, Dr. Xia-Hua Jin and Dr. En-De Liu of the Herbarium of the Kunming Institute of Botany (KUN), Chinese Academy of Sciences, for identification of some of the plant specimens.

References

Cai, Y.M., 1996. Chinese Medicinal Nomenclature Dictionary. Chinese Medical & Medicinal Publishing House.

Chinese Academy of Sciences (CAS), Flora of China Editorial Committee, 1959–2004. Flora of China (Chinese version), Science Press.

Cotton, C.M., 1996. Ethnobotany: Principles and Application. John Wiley and Sons Ltd., Baffins Lane.

Cunningham, A.B., 2001. Applied Ethnobotany, People, Wild Plant Use & Conservation. Earthscan Publicaton Ltd., London.

Etkin, N.L., 1993. Anthropological methods in ethnopharmacology. Journal of Ethnopharmacology 38, 93–104.

Gan, X.C., 2000. The Yunnan Ethnic Groups and their Cultures. Yunnan People Publishing House, Kunming.

Given, D.R., Harris, W., 1994. Techniques and Methods of Ethnobotany: As An Aid to the Study, Evaluation, Conservation and Sustainable Use of Biodiversity. The Commonwealth Secretariat, Lincoln.

Hamilton, A.C., 2004. Medicinal plants, conservation and livelihoods. Biodiversity and Conservation 13, 1477–1517.

Hedberg, I., 1993. Botanical methods in ethnopharmacology and the need for conservation of medicinal plants. Journal of Ethnopharmacology 38, 121–128.

Honghe Prefecture, 1986. General situation of Honghe Hani and Yi Nationalities Autonomous Prefecture. Yunnan Nationality Publishing House, Kunming.

Huai, H.Y., 2000. Medical ethnobotany of Lahu people in Zhemi of Jinping Miao, Yao and Dai Nationality Autonomous county, Yunnan Province, China. Ph.D. Dissertation. Kunming Institute of Botany, Chinese Academy of Sciences (CAS), Kunming.

Jain, S.K., 1987. A Manual of Ethnobotany. Scientific Publishers, Jodhpur, India, pp. 33–41.

Kunming Institute of Botany, 1979. Flora Yunnanica. Kunming Institute of Botany, Chinese Academy of Sciences (CAS).

Lewis, W.H., Elvin-Lewis, M.P.F., 1977. Medical Botany: Plants affecting Man's Health. John Wiley & Sons Inc., New York.

Long, C.L., Li, R., 2004. Ethnobotanical studies on medicinal plants used by the Red-headed Yao People in Jinping, Yunnan Province, China. Journal of Ethnopharmacology 90, 389–395.

Long, J.M., 1988. The Origin of Market. Yunnan People Publishing House, Kunming.

Martin, G.J., 1995. Ethnobotany: A People and Plants Conservation Manual. Chapman & Hall, London.

Pei, S.J., Su, Y.G., Long, C.L., Marr, K., Posey, D.A., 1996. The challenges of ethnobiology in the 21st century. In: Proceeding o f the second International Congress of Ethnobiology, Yunnan Science and Technology Press, Kunming, pp. 150–169.

Shui, Y.M., 2003. Seed Plants of Honghe Region in SE Yunnan, China. Yunnan Science & Technology Press.

The International Seminar on NTFP (China Yunnan, Laos, Vietnam), 2001. The International Seminar on Non-Timber Forest Product. Yunnan University Press, Kunming.

United Nations Conference on Trade And Development (UNCTAD), 2000. Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices, Background note by the UNCTAD secretariat, Geneva.

Wang, S., Xie, Y., 2004. China Species Red List, vol. 1. Red List, Higher Education Press, Beijing.

Wang, S.Y., Zhang, W., 2002. Yunnan Geography. Yunnan nationality Publishing House, Kunming.

Wang, Y.H., 1999. Sustainable management of medicinal plant resource in northwest of Yunnan: a case study on Ludian Administrative village in Lijiang county. Ph.D. Dissertation. Kunming Institute of Botany, Chinese Academy of Sciences (CAS), Kunming.

World Health Organization, 2001. Legal status of traditional medicine and complementary/alternative medicine: a worldwide review.

World Health Organization, 2002. WHO Traditional Medicine Strategy 2002–2005. WHO, Geneva.

Xie, Z.F., 1995. Best of Traditional Chinese Medicine. New World Press, Beijing.

Xu, J.C., Yang, Y.P., Zhou, Z.K., Wu, S.G., Huang, T.G., Pei, S.J., Pu, Y.D., Chen, S.Y., 2002. Synthesis Scientific Investigation Report Collection of Fenshui Mountain Natural Reserve in Jinping, Yunnan. Yunnan Science and Technology Press, Kunming.

You, Z., 1994. Yunnan Ethnic History. Yunnan University Press, Kunming.