

RESEARCH

Open Access



A study of the plant folk nomenclature of the Yi people in Xiaoliangshan, Yunnan Province, China, and the implications for protecting biodiversity

Yi-Won Addi^{1,2†}, Yu Zhang^{1†}, Xiao-Yong Ding^{1,2}, Chang-An Guo^{1,2} and Yu-Hua Wang^{1*}

Abstract

Background: Folk plant nomenclature is a part of knowledge of indigenous people often used to distinguish plant species. This study aimed to document the folk botanical nomenclature of the Yi people in Xiaoliangshan, Yunnan Province, which has not been systematically investigated to date. The results of this study will assist in conserving biodiversity and the language of the Yi people and will promote the transmission of ethnobotanical knowledge.

Methods: An ethnobotanical survey of plants used by the Yi people in Xiaoliangshan, Yunnan Province, was conducted from September 2019 to August 2021. Semi-structured interviews and key informant interviews were conducted to collect and document ethnobotanical information, which was then used to analyse the folk botanical nomenclature of the Yi people. In addition, the folk names of plants used by the Xiaoliangshan Yi community were compared with those of the Yi people living in the Daliangshan, where the environment is considerably different.

Results: In this study, 266 informants were interviewed, and the names of 228 indigenous plants were extracted from 3088 use reports. The nomenclature used by the local Yi people is based on plant characteristics, plant habitat, plant use, and the local culture. By comparing the folk plant names of the Yi people in Xiaoliangshan with those of the Yi people in Daliangshan, we found that the plant names of the two places have some similarities and also with their own unique characters. The important folk plant names of the Yi people in Xiaoliangshan usually have a monosyllable "Y"

non-binomial structure or have and "divine attributes" in their names.

Conclusions: The Yi people in Xiaoliangshan have a rich and diverse knowledge of plant naming determined by cultural, and environmental factors. The botanical nomenclature of the Yi people has distinct rules and characteristics, and the plant naming directly includes important plants that they believe to be used and protected, which is of great significance to the protection of biodiversity.

Keywords: Ethnobotany, Yi people, Xiaoliangshan, Indigenous botanical nomenclature

*Correspondence: wangyuhua@mail.kib.ac.cn

[†]Yi-Won Addi and Yu Zhang contributed equally to this work

¹Yunnan Key Laboratory for Wild Plant Resources, Kunming Institute of Botany, Chinese Academy of Sciences, 132# Lanhei Road, Heilongtan, Kunming 650201, Yunnan, China

Full list of author information is available at the end of the article

Introduction

Plants have been studied and used throughout human history, and the vast number of botanical names in different languages attests to human plant knowledge [1]. Almost all cultures have names for indigenous plants [2], and as a unique naming system based on traditional



ethnobotanical knowledge and indigenous language, folk botanical nomenclature reflects the linguistic rules and cultural phenomena of the local population. Therefore, folk botanical nomenclature is an important resource that enables locals to recognise, remember and use plants, and ultimately to protect plant diversity [3]. Understanding and elucidating folk nomenclature of local plant species is an important part of ethnobotanical and anthropological research [4–7]. Many studies in China have focused on the folk botanical nomenclature of the Dai [2, 8–10] and the Mongolians [11–13]. Some researchers have documented the plant nomenclature of the Yi people in the Daliangshan Yi Autonomous Prefecture in Sichuan Province [3], where the Yi people often use monosyllabic words to name culturally important plants but use Chinese loanwords to name introduced species. The plant-naming system of the Yi people uses binomial and non-binomial forms, and a recent study on plants used in the Bimo religious rituals of the Yi people in Xiaoliangshan [14] found that plants with both binomial and non-binomial names were employed in these rituals. However, this study focused only on the use of plants by the Yi people from the perspective of religious rituals, and it is unclear whether the same nomenclature is employed for plants used for other purposes.

Hengduan Mountains, which are a popular area for studying biodiversity. The combination of the monsoon climate and the complex mountain environment makes it one of the most abundant alpine flora regions in the world [15, 16]. Various ethnic groups who live in this region, including the Yi people, depend on the region's flora for survival: plants are used for medicine, food, feed, fuel, dyes, spices, landscaping, religious ceremonies, and other purposes [17–19].

The Yi nationality is one of the oldest ethnic groups in China, with a population of 9.8 million [20]. The Yi people are widely distributed in Yunnan, Sichuan, and Guizhou provinces in southwestern China [21]. The Yi language belongs to Tibeto-Burman languages, and there are six dialects altogether. Liangshan Yi Autonomous Prefecture in Sichuan province is the main settlement area of the Yi people in China, with about 2.3 million Yi people living here [21]. The religious form of Yi nationality is in the advanced stage of primitive religion. It is a complex religious system with ancestor worship as the core, nature worship, totem worship and polytheistic belief [22]. The Yi people is a mountainous nationality with a livelihood of half farming and half grazing [23]. Due to its complicated historical origin and numerous branches, there are more than one hundred appellations for the Yi nationality. There are different opinions about the origin of Yi nationality in academic circles. Some scholars believe that the Yi nationality originated from the ancient Qiang

tribe(古羌) in northwest China, which migrated south to the banks of the Jinsha River(金沙江) and merged with many indigenous tribes [24]. However, after the further study, more scholars believe that: the Yi nationality is an indigenous people in southwest China. They have long been active in the Wumeng Mountain(乌蒙山) and Jinsha River basin [25]. The Yi people experienced great migration and gradually divided into six tribes the Wu, Zha, Nuo, Heng, Bu and Mo, all of them gradually settled into the vast areas of southwest China and Southeast Asia [26, 27].

Xiaoliangshan lies in the north-western part of Yunnan Province within the Hengduan Mountains. The Yi people living in Xiaoliangshan progressively migrated there from the Daliangshan and they now constitute the main ethnic group in this area [28, 29]. In the past, the Liangshan Yi people belonged to the Nuo and Heng tribes of the six Yi tribes. They migrated into the Liangshan area along the Jinsha River and became the main ethnic group in the Liangshan area. At present, there are many research on ethnobotany of the Yi nationality in Daliangshan [3, 30]. Academic research on the Xiaoliangshan Yi people has focused primarily on the cultural heritage of the Yi ethnic group from the perspective of anthropology [28, 29, 31], whereas no systematic research has investigated their ethnobotanical knowledge. Combined ethnobotanic and anthropologic studies of the Yi ethnic group would enable the folk botanical nomenclature used by the Yi community in Xiaoliangshan to be established, and such research would contribute to preserving traditional botanical knowledge and promoting and protecting biodiversity within this region.

Therefore, this study aimed to document and analyse the folk botanical nomenclature of the Yi ethnic group in Xiaoliangshan. We aimed to answer the two following questions: (1) What are the rules for the plant nomenclature used by the Yi people in Xiaoliangshan? (2) What are the similarities and differences between the plant folk nomenclature of the Xiaoliangshan Yi people and those of the Yi people in the Daliangshan, who have the same cultural heritage, but live in a different environment? This paper examines the significance of their plant nomenclature methods and the effect that folk botanical nomenclature has on protecting biodiversity and preserving traditional ethnobotanical knowledge.

Methods

Study area and introduction to the Yi people

Xiaoliangshan (lat. 26° 36'–27° 56' N; long. 100° 22'–101° 15' E) is situated in the northwest of Yunnan Province within the middle section of the Hengduan Mountains. It lies on the border of Sichuan and Yunnan province and has a temperate monsoon climate characterised by warm

and moist summers, cold and dry winters, and four distinct seasons [32]. Its primary soil types are subalpine meadow soil, dark brown soil, and subalpine desert soil [33]. Due to its unique geographical location and climatic conditions, there is abundant and diverse flora within the area. According to a former biodiversity inventory of this region, Xiaoliangshan has 6 vegetational forms, 17 formations, and 1943 species of plants [34].

Liangshan area is a geographical concept. It is home to the largest group of Yi people in China. The Yi people call the Liangshan area as "Yi ᄀᄀᄀ", which means the densely forested alpine area. In the present administrative divisions, Liangshan area is divided into Daliangshan and Xiaoliangshan. Daliangshan belongs to China's Sichuan Province including Xichang City, while Xiaoliangshan on the other side belongs to China's Yunnan Province including Ninglang County, Lijiang City. "Da" means "big" and "Xiao" means "small" in Chinese. In fact, people divide Liangshan into "Daliangshan" and "Xiaoliangshan", not only from the perspective of the difference in area size, but also from the residential history of Yi people in the two places by the size of population. In this study, Xiaoliangshan refers specifically to Ninglang Yi Autonomous County of Yunnan Province (Fig. 1).

In this study, we conducted ethnobotanical research in 14 villages and 3 communities within six townships in the eastern part of Xiaoliangshan (Table 1). The Yi people are the main ethnic group within the selected research location, and their traditional lifestyle is well preserved in these communities. According to some studies, the Yi people progressively migrated to Xiaoliangshan from the Daliangshan, and they have eventually become the main ethnic group in this region [28, 31]. In the early nineteenth century, the Yi people in Xiaoliangshan made a living through animal husbandry, farming, and hunting and gathering [35]. Traditional Yi dwellings are made of wood or clay-and-wood [36], and their staple foods include potato, buckwheat, oats, corn, and turnip [37]. Grilling and boiling are commonly used cooking methods [37]. The Yi people firmly believe in animism and worship nature. They also believe that all living things originate from snow, which they consider to be the common ancestor of animals and plants [38]. In the Bimo belief system, the Bimo (a ritual specialist or priest) presides over all major religious activities, including offering prayers and sacrifices [39, 40]. The Yi people in Xiaoliangshan have their

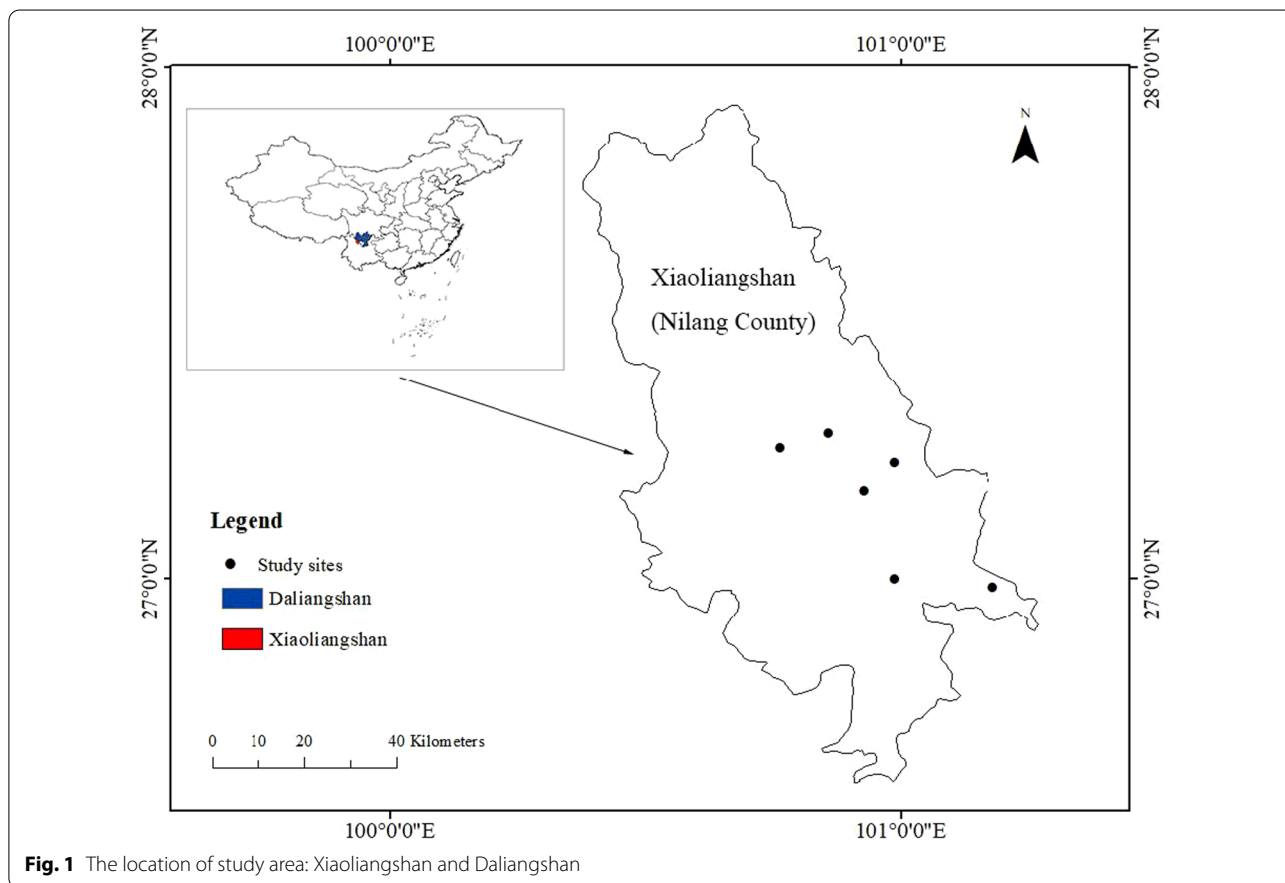


Table 1 Surveyed locations within study area

Town	Village/community	Longitude	Latitude	Altitude(m)	Population
Dàxíng town	Well-off homes community	100.861411E	27.304879N	2255	2329
Dàxíng town	Riverside Homes Community	100.865977E	27.284771N	2255	2840
Dàxíng town	Happy Homes Community	100.864976E	27.306978N	2255	6613
Nínglǐ township	Nínglǐ Village	100.765049E	27.251272N	2400	4956
Nínglǐ township	Báicǎopíng Village	100.71238E	27.174713N	2400	2043
Lànníqíng township	Lànníqíng Village	100.983124E	27.225657N	2850	2891
Lànníqíng township	Dàerdì Village	100.940823E	27.275785N	2750	2398
Xīnyíngpán township	Xīnyíngpán Village	100.926102E	27.172216N	2500	4476
Xīnyíngpán township	Dōng fēng Village	100.919985E	27.187754N	2654	3441
Xīnyíngpán township	Máojiāxiāng Village	100.945282E	27.138304N	2600	4052
Pǎomǎpíng township	Pǎomǎpíng Village	100.987172E	26.996425N	2680	4009
Pǎomǎpíng township	Shǎlpíng Village	101.013091E	26.969145N	2720	3297
Pǎomǎpíng township	Yángchǎng Village	101.045571E	26.937666N	2480	1728
Chánzhànhé township	Chánzhànhé Village	101.180402E	26.98326N	2900	4163
Chánzhànhé township	Sāngūshuǐ Village	101.077553E	26.973122N	2900	1627
Chánzhànhé township	Gànhǎizǐ Village	101.135092E	27.066066N	1680	1387
Chánzhànhé township	Wànǎchǎng Village	101.095586E	27.033905N	2900	923

own language and script and they use the northern Yi dialect in their daily communication [41].

Ethnobotanical survey and data collection

We conducted several systematic ethnobotanical surveys and investigations in Xialoianshan from September 2019 to August 2021 (Fig. 2). We used snowball sampling to recruit a total of 266 informants, including 151 males and 115 females. The informants held various occupations, such as local farmers and herdsmen, Bimo practitioners, students, forest rangers, and folk doctors. Key

informant interviews and semi-structured interviews were conducted with the informants upon their consent. The interviews were conducted at the informants' homes, fields, shrub, and pine forests, and at sacrificial ritual locations. The first author of this article is a local member of the Yi ethnic group, whose mother tongue is the Yi language. To facilitate communication with the informants and ensure the integrity of the acquired information, all interviews were conducted and documented in Yi language. During each interview, the informants were asked the following pre-prepared questions: (1) What plants do



Fig. 2 Yi women in traditional dress & Yi village & interviewing in the wild (from left to right)

Table 2 Catalogue of plants used by the Yi people in Xiaoliangshan, Yunnan Province

Yi language name	Yi language phonetic name	Latin name	Family	The number of use reports	Voucher number
𑄎𑄑	map bu	<i>Paris polyphylla</i> Sm.	Melanthiac eae	215	QTP- EBT5000
𑄎𑄒	hxi ke	<i>Artemisia argyi</i> H. Lév. & Vaniot	Compositae Papaverace	165	QTP- EBT5001
𑄎𑄓	yie pie	<i>Papaver somniferum</i> L.	ae	113	QTP- EBT5002
𑄎𑄔	va ddot chu	<i>Berberis pruinosa</i> Franch.	Berberidace ae	106	QTP- EBT5003
𑄎𑄕	chup nuop	<i>Prinsepia utilis</i> Royle	Rosaceae Caprifoliac	90	QTP- EBT5004
𑄎𑄖	a jji bap mop	<i>Dipsacus asper</i> Wall. ex C.B. Clarke	eae	87	QTP- EBT5005
𑄎𑄗	va bu syt pup ssut	<i>Taxillus balansae</i> (Lecomte) Danser	Loranthace ae	71	QTP- EBT5006
𑄎𑄘	vot mop ddie bbur	<i>Plantago asiatica</i> L.	Plantaginac eae	70	QTP- EBT5007
𑄎𑄙	bbit yop	<i>Bulbophyllum abbreviatum</i> (Rchb.f.) Schltr.	Orchidacea e	69	QTP- EBT5008
𑄎𑄚	chup tu	<i>Rubus biflorus</i> Buch. -Ham. ex Smith	Rosaceae	68	QTP- EBT5009
𑄎𑄛	va zza hnap zzy	<i>Potentilla lineata</i> Trevir.	Rosaceae	63	EBT5009

Table 2 (continued)

ꠘꠞꠞꠞ	chup nuop ssut	<i>Taxillus balansae</i> (Lecomte) Danser	Loranthaceae ae	59	QTP- EBT5010
ꠘꠞꠞꠞ	sy qi ddi	<i>Sambucus williamsii</i> Hance	Adoxaceae	58	QTP- EBT5011
ꠘꠞꠞꠞ	ly sy ssut	<i>Taxillus delavayi</i> (Tiegh.) Danser	Loranthaceae ae	53	QTP- EBT5012
ꠘꠞꠞꠞ	vot mop zza ke	<i>Crepis lignea</i> (Vaniot) Bab.	Compositae	49	QTP- EBT5013
ꠘꠞꠞꠞ	syp ap mop	<i>Lonicera calcarata</i> Hemsl.	Caprifoliac eae	48	QTP- EBT5014
ꠘꠞꠞꠞ	mge	<i>Fagopyrum tataricum</i> (L.) Gaertn.	Polygonaceae ae	47	QTP- EBT5015
ꠘꠞꠞꠞ	ap yit	<i>Malva verticillata</i> L.	Malvaceae	42	QTP- EBT5016
ꠘꠞꠞꠞ	vot mop jyt nyi	<i>Codonopsis pilosula</i> (Franch.) Nannf. <i>Clinopodium chinense</i> subsp.	Campanula ceae	41	QTP- EBT5017
ꠘꠞꠞꠞ	mup sse hnap bo	<i>grandiflorum</i> (Maxim.) H.Hara	Lamiaceae	40	QTP- EBT5018
ꠘꠞꠞꠞ	bbap zzip	<i>Zanthoxylum bungeanum</i> Maxim.	Rutaceae	37	QTP- EBT5019
ꠘꠞꠞꠞ	te xy lat juo	<i>Pyrola calliantha</i> Andres	Ericaceae	36	QTP- EBT5020
ꠘꠞꠞꠞ	mu ku	<i>Litsea cubeba</i> (Lour.) Pers.	Lauraceae	35	QTP- EBT5021
ꠘꠞꠞꠞ	gge bu a nuo	<i>Gentiana rigescens</i> Franch. ex Hemsl.	Gentianaceae ae	34	QTP- EBT5022
ꠘꠞꠞꠞ	va hmip syp hmip	<i>Vaccinium delavayi</i> Franch.	Ericaceae	33	QTP- EBT5023
ꠘꠞꠞꠞ	bbut qip ddi	<i>Sambucus adnata</i> Wall. ex DC.	Adoxaceae	32	QTP- EBT5024
ꠘꠞꠞꠞ	dur lap	<i>Aconitum episcopale</i> H. Lév.	Ranunculac eae	32	QTP- EBT5025
ꠘꠞꠞꠞ	ma	<i>Fargesia yunnanensis</i> Hsueh & T.P. Yi <i>Schisandra lancifolia</i> (Rehder & E.H.	Poaceae Schisandrac	32	QTP- EBT5026
ꠘꠞꠞꠞ	nip ho vo	Wilson) A.C.Sm.	eae	31	QTP- EBT5027
ꠘꠞꠞꠞ	chyt jy	<i>Hypericum patulum</i> Thunb.	Hypericaceae ae	30	QTP- EBT5028
ꠘꠞꠞꠞ	dda bbo	<i>Pteridium revolutum</i> (Blume) Nakai	Dennstaedti aceae	30	QTP- EBT5029
ꠘꠞꠞꠞ	vot mop zza ke	<i>Taraxacum dasypodium</i> Soest	Compositae	30	QTP- EBT5030

Table 2 (continued)

ꠘꠞꠞꠞ	ddep bup a tu	<i>Urtica mairei</i> H. Lév.	Urticaceae	29	QTP- EBT5031
ꠘꠞꠞꠞ	le rre bbut cy	<i>Paeonia delavayi</i> Franch.	Paeoniaceae	29	QTP- EBT5032
ꠘꠞꠞꠞ	fa xie yop	<i>Lyonia ovalifolia</i> (Wall.) Drude	Ericaceae	25	QTP- EBT5033
ꠘꠞꠞꠞ	vup	<i>Rubia podantha</i> Diels	Rubiaceae	24	QTP- EBT5034
ꠘꠞꠞꠞ	hnit nra a hni	<i>Chenopodium album</i> L.	Amaranthaceae	23	QTP- EBT5035
ꠘꠞꠞꠞ	lop shet map	<i>Actaea yunnanensis</i> (P.K. Hsiao) J.Compton	Ranunculaceae	23	QTP- EBT5036
ꠘꠞꠞꠞ	te ssut	<i>Taxillus caloareas</i> (Diels) Danser	Loranthaceae	23	QTP- EBT5037
ꠘꠞꠞꠞ	fut mop	<i>Geranium strictipes</i> R. Knuth	Geraniaceae	21	QTP- EBT5038
ꠘꠞꠞꠞ	te bbo	<i>Pinus yunnanensis</i> Franch.	Pinaceae	21	QTP- EBT5039
ꠘꠞꠞꠞ	a ddu sha bbu	<i>Anemone vitifolia</i> Buch. -Ham. ex DC.	Ranunculaceae	20	QTP- EBT5040
ꠘꠞꠞꠞ	nzy njip	<i>Rodgersia sambucifolia</i> Hemsl.	Saxifragaceae	20	QTP- EBT5041
ꠘꠞꠞꠞ	ba lat	<i>Ehretia corylifolia</i> C. H. Wright	Boraginaceae	19	QTP- EBT5042
ꠘꠞꠞꠞ	ho bbo ssut	<i>Taxillus delavayi</i> (Tiegh.) Danser	Loranthaceae	19	QTP- EBT5043
ꠘꠞꠞꠞ	gep dep map ma	<i>Mahonia duclouxiana</i> Gagnep.	Berberidaceae	18	QTP- EBT5044
ꠘꠞꠞꠞ	xit zhup	<i>Desmodium elegans</i> DC.	Leguminosae	18	QTP- EBT5045
ꠘꠞꠞꠞ	yo nyi ke ddot	<i>Cynanchum otophyllum</i> C.K. Schneid.	Apocynaceae	18	QTP- EBT5046
ꠘꠞꠞꠞ	huo gat	<i>Populus adenopoda</i> Maxim.	Salicaceae	17	QTP- EBT5047
ꠘꠞꠞꠞ	hmup	<i>Cannabis sativa</i> L.	Cannabaceae	16	QTP- EBT5048
ꠘꠞꠞꠞ	pat qi xy hni	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	16	QTP- EBT5049
ꠘꠞꠞꠞ	yy ho	<i>Salix babylonica</i> L.	Salicaceae	16	QTP- EBT5050
ꠘꠞꠞꠞ	ddut jy	<i>Aconitum carmichaelii</i> Debeaux	Ranunculaceae	15	QTP- EBT5051
ꠘꠞꠞꠞ	ddep bup a nuop	<i>Girardinia diversifolia</i> (Link) Friis	Urticaceae	14	QTP- EBT5052

Table 2 (continued)

		<i>Aristolochia griffithii</i> Hook.f. & Thomson ex Duch.	Aristolochiaceae	14	QTP- EBT5053
田半李木	gge jot hne bbi		Chenopodia		QTP-
半登新O	hnit nra a tu	<i>Chenopodium album</i> L.	ceae	14	EBT5054
		<i>Cinnamomum tamala</i> (Buch. -Ham.) T.			QTP-
丫S×M	sy lur qi py	Nees & Eberm.	Lauraceae	14	EBT5055
			Campanula		QTP-
风J. E N	va bu shy ggo	<i>Adenophora stricta</i> Miq.	ceae	13	EBT5056
			Berberidaceae		QTP-
E. N. N. 基	yo sse la bbo	<i>Holboellia angustifolia</i> Wall.	ae	13	EBT5057
			Asparagaceae		QTP-
蕺菜	yyrx yyr	<i>Ophiopogon bodinieri</i> H. Lév.	ae	13	EBT5058
					QTP-
叶册字良	a mat lot si	<i>Serissa japonica</i> (Thunb.) Thunb.	Rubiaceae	12	EBT5059
		<i>Antennaria rosea</i> subsp. <i>confinis</i> (Greene) R.J. Bayer			QTP-
半字	gop gox		Compositae	12	EBT5060
					QTP-
山木半平	li bbi syp ddu	<i>Cornus capitata</i> Wall.	Cornaceae	12	EBT5061
					QTP-
半门半字	nyi mop syp vo	<i>Vitis heyneana</i> Roem. & Schult.	Vitaceae	12	EBT5062
			Loranthaceae		QTP-
半重半	syp ddat ssut	<i>Taxillus kaempferi</i> (DC.) Danser	ae	12	EBT5063
					QTP-
叶册半光	a jji bbu zza	<i>Morus australis</i> Poir.	Moraceae	11	EBT5064
			Amaryllida		QTP-
半叶	ap zzit	<i>Allium wallichii</i> Kunth	ceae	11	EBT5065
			Convolvula		QTP-
半X半	juo zy li	<i>Ipomoea cairica</i> (L.) Sweet	ceae	11	EBT5066
			Schisandrac		QTP-
半双	mge vut	<i>Illicium wardii</i> A. C. Sm.	eae	11	EBT5067
			Polygonaceae		QTP-
H×	pat qi	<i>Rumex acetosa</i> L.	ae	10	EBT5068
		<i>Docynia delavayi</i> (Franch.) C.K.			QTP-
丫J.	syp bu	Schneid.	Rosaceae	10	EBT5069
		<i>Cynoglossum amabile</i> Stapf & J.R. Drumm.	Boraginaceae		QTP-
叶册半可	a mat nyuo vut		ae	9	EBT5070
					QTP-
半E半光	bbu shy ddat zza	<i>Arisaema erubescens</i> (Wall.) Schott	Araceae	9	EBT5071
			Coriariaceae		QTP-
E丫	jy sy	<i>Coriaria nepalensis</i> Wall.	e	9	EBT5072
			Brassicaceae		QTP-
半火	vap ga	<i>Rorippa indica</i> (L.) Hiern	e	9	EBT5073

Table 2 (continued)

			Brassicaceae		QTP-
𑖧𑖮	vap ma	<i>Brassica rapa</i> L.	e	9	EBT5074
			Begoniaceae		QTP-
𑖧𑖯𑖮𑖮	a zhat vop ji	<i>Begonia grandis</i> Dryand. <i>Pyracantha angustifolia</i> (Franch.) C.K.	e	8	EBT5075
𑖧𑖮	ap jjit	Schneid.	Rosaceae	8	EBT5076
𑖧𑖮	bbie cy	<i>Iris tectorum</i> Maxim.	Iridaceae	8	EBT5077
					QTP-
𑖧𑖮𑖮𑖮	cep hlo a hni	<i>Fragaria vesca</i> L. <i>Leontopodium calocephalum</i> (Franch.)	Rosaceae	8	EBT5078
					QTP-
𑖧𑖮	gop gox	Beauverd	Compositae	8	EBT5079
		<i>Reynoutria multiflora</i> (Thunb.)	Polygonaceae		QTP-
𑖧𑖮𑖮	ho sha vu	Moldenke	ae	8	EBT5080
		<i>Cirsium lidjiangense</i> Petr. & Hand. -			QTP-
𑖧𑖮	rrup kot	Mazz.	Compositae	8	EBT5081
			Bignoniaceae		QTP-
𑖧𑖮𑖮	vat bbu yo	<i>Incarvillea diffusa</i> Royle	ae	8	EBT5082
			Euphorbiac		QTP-
𑖧𑖮	bit map	<i>Ricinus communis</i> L.	eae	7	EBT5083
			Ranunculac		QTP-
𑖧𑖮𑖮𑖮	but fu zha cy	<i>Anemone rivularis</i> Buch. -Ham. ex DC.	eae	7	EBT5084
					QTP-
𑖧𑖮	it mup	<i>Zea mays</i> L.	Poaceae	7	EBT5085
			Caprifoliac		QTP-
𑖧𑖮𑖮𑖮	nyip ggu a tu	<i>Lonicera trichosantha</i> Bureau & Franch.	eae	7	EBT5086
			Polygonaceae		QTP-
𑖧𑖮𑖮𑖮	qy sse mge hlop	<i>Fagopyrum esculentum</i> Moench	ae	7	EBT5087
					QTP-
𑖧𑖮	sy ga	<i>Prunus salicina</i> Lindl.	Rosaceae	7	EBT5088
			Caprifoliac		QTP-
𑖧𑖮	va jy	<i>Leycesteria formosa</i> Wall.	eae	7	EBT5089
					QTP-
𑖧𑖮𑖮𑖮	bbut xit ho cy	<i>Agrimonia pilosa</i> Ledeb.	Rosaceae	6	EBT5090
			Hypericaceae		QTP-
𑖧𑖮	chyt jy	<i>Hypericum forrestii</i> (Chitt.) N. Robson	ae	6	EBT5091
		<i>Psammosilene tunicoides</i> W.C.Wu &	Caryophyll		QTP-
𑖧𑖮𑖮	gguo lyr vop	C.Y.Wu	aceae	6	EBT5092
			Caryophyll		QTP-
𑖧𑖮𑖮	gguo lyr vop	<i>Saponaria officinalis</i> L.	aceae	6	EBT5093

Table 2 (continued)

ꠘꠞ	nyie lyt	<i>Ligusticum sinense</i> Oliv.	Apiaceae	6	QTP- EBT5094
		<i>Fagopyrum acutatum</i> (Lehm.) Mansf. ex	Polygonaceae		QTP-
ꠘꠞꠘꠞ	qy sse mge hlop	K. Hammer	ae	6	EBT5095
					QTP-
ꠘꠞ	za qip	<i>Solanum tuberosum</i> L.	Solanaceae	6	EBT5096
		<i>Notopterygium incisum</i> K.C. Ting ex			QTP-
ꠘꠞꠘꠞꠘꠞ	a ddu bba jjo	H.T.Chang	Apiaceae	5	EBT5097
					QTP-
ꠘꠞꠘꠞ	bbu ga cy	<i>Datura stramonium</i> L.	Solanaceae	5	EBT5098
					QTP-
ꠘꠞꠘꠞꠘꠞ	bbut cha fu	<i>Bupleurum marginatum</i> Wall. ex DC.	Apiaceae	5	EBT5099
					QTP-
ꠘꠞꠘꠞꠘꠞ	bbut o jjie	<i>Bidens pilosa</i> L.	Compositae	5	EBT5100
		<i>Viburnum cylindricum</i> Buch. -Ham. ex			QTP-
ꠘꠞꠘꠞ	di pu	D. Don	Adoxaceae	5	EBT5101
			Davalliaceae		QTP-
ꠘꠞꠘꠞꠘꠞ	gup sup bu	<i>Davallia trichomanoides</i> Blume	e	5	EBT5102
			Phytolaccac		QTP-
ꠘꠞꠘꠞꠘꠞ	hxie ggat vat zza	<i>Phytolacca acinosa</i> Roxb.	eae	5	EBT5103
			Brassicaceae		QTP-
ꠘꠞꠘꠞꠘꠞ	hxie zy vap ga	<i>Capsella bursa-pastoris</i> (L.) Medic.	e	5	EBT5104
					QTP-
ꠘꠞꠘꠞꠘꠞ	lo ggur bbar zziep	<i>Zanthoxylum bungeanum</i> Maxim.	Rutaceae	5	EBT5105
			Verbenaceae		QTP-
ꠘꠞꠘꠞ	ma bie cy	<i>Verbena officinalis</i> L.	e	5	EBT5106
			Elaeagnaceae		QTP-
ꠘꠞꠘꠞꠘꠞ	mop mo zy ly	<i>Elaeagnus umbellata</i> Thunb.	ae	5	EBT5107
					QTP-
ꠘꠞꠘꠞ	rrup kot	<i>Cirsium shansiense</i> Petr.	Compositae	5	EBT5108
			Juglandaceae		QTP-
ꠘꠞꠘꠞ	syp hmi	<i>Juglans regia</i> L.	ae	5	EBT5109
					QTP-
ꠘꠞꠘꠞ	sy vo	<i>Prunus persica</i> (L.) Batsch	Rosaceae	5	EBT5110
			Caryophyll		QTP-
ꠘꠞꠘꠞꠘꠞꠘꠞ	a nyie hxi xy	<i>Stellaria vestita</i> Kurz	aceae	4	EBT5111
					QTP-
ꠘꠞꠘꠞꠘꠞ	bbu shy cap hlo	<i>Duchesnea indica</i> (Jacks.) Focke	Rosaceae	4	EBT5112
			Hypericaceae		QTP-
ꠘꠞꠘꠞ	chyt jy	<i>Hypericum acmosepalum</i> N. Robson	ae	4	EBT5113
			Hypericaceae		QTP-
ꠘꠞꠘꠞ	chyt jy	<i>Hypericum monogynum</i> L.	ae	4	EBT5114
			Ranunculac		QTP-
ꠘꠞꠘꠞ	huo mop to	<i>Clematis armandii</i> Franch.	eae	4	EBT5115

Table 2 (continued)

		<i>Toxicodendron succedaneum</i> (L.) Kuntze	Anacardiaceae	4	QTP- EBT5116
ཇི	ji				QTP-
ཇིལ་	nyie lyt	<i>Angelica sinensis</i> (Oliv.) Diels	Apiaceae	4	EBT5117
					QTP-
ཇིལ་	nyie lyt	<i>Angelica likiangensis</i> H. Wolff	Apiaceae	4	EBT5118
	shop shot mop a				QTP-
ཇིལ་ལྷོ་ལྷོ་	nuo	<i>Rubus niveus</i> Thunb.	Rosaceae	4	EBT5119
					QTP-
ཇིལ་ལྷོ་ལྷོ་	shuo ma a hni	<i>Rhododendron delavayi</i> Franch. <i>Lithocarpus cleistocarpus</i> (Seemen)	Ericaceae	4	EBT5120
					QTP-
ཇིལ་ལྷོ་	sy zyt	Rehder & E.H. Wilson	Fagaceae	4	EBT5121
					QTP-
ཇིལ་ལྷོ་	vat mop ne	<i>Hedera nepalensis</i> K. Koch	Araliaceae	4	EBT5122
					QTP-
ཇིལ་ལྷོ་ལྷོ་	vot mop rrup kot	<i>Arctium lappa</i> L.	Compositae	4	EBT5123
					QTP-
ཇིལ་ལྷོ་ལྷོ་	a ddu bba jjo	<i>Heracleum hemsleyanum</i> Diels	Apiaceae	3	EBT5124
					QTP-
ཇིལ་ལྷོ་ལྷོ་ལྷོ་	a ddu bba jjo it zy	<i>Pimpinella candolleana</i> Wight & Arn.	Apiaceae	3	EBT5125
			Loranthaceae		QTP-
ཇིལ་ལྷོ་ལྷོ་	bbap zzip ssut	<i>Taxillus tomentosus</i> Tiegh. <i>Asparagus filicinus</i> Buch. -Ham. ex D.	ae Asparagaceae	3	EBT5126
					QTP-
ཇིལ་ལྷོ་	bep bu	Don	ae	3	EBT5127
					QTP-
ཇིལ་ལྷོ་ལྷོ་	cep hlo a hni	<i>Fragaria gracilis</i> Losinsk.	Rosaceae	3	EBT5128
					QTP-
ཇིལ་	dda	<i>Contiogramme intermedia</i> Hieron. <i>Hylotelephium spectabile</i> (Boreau) H.	Pteridaceae Crassulaceae	3	EBT5129
					QTP-
ཇིལ་ལྷོ་ལྷོ་	ddip sse ka dda	Ohba	e Gentianaceae	3	EBT5130
					QTP-
ཇིལ་	gge bu	<i>Halenia elliptica</i> D. Don	ae	3	EBT5131
					QTP-
ཇིལ་	ho bbo	<i>Alnus nepalensis</i> D. Don	Betulaceae	3	EBT5132
					QTP-
ཇིལ་	jje bbo	<i>Quercus glauca</i> Thunb.	Fagaceae	3	EBT5133
			Bignoniaceae		QTP-
ཇིལ་	jop hop	<i>Incarvillea mairei</i> (H. Lév.) Grierson	ae	3	EBT5134
			Eucommiac		QTP-
ཇིལ་	lie sy	<i>Eucommia ulmoides</i> Oliv.	cae	3	EBT5135
			Leguminos		QTP-
ཇིལ་	lop fip	<i>Vicia amoena</i> Fisch. <i>Phyllostachys sulphurea</i> (Carrière)	ae	3	EBT5136
					QTP-
ཇིལ་	ma	Rivière & C. Rivière	Poaceae	3	EBT5137

Table 2 (continued)

					QTP-
𠵹	nbie cy	<i>Iris wattii</i> Baker ex Hook.f.	Iridaceae	3	EBT5138
			Polygonaceae		QTP-
𠵹	pat qi	<i>Rumex yungningensis</i> Sam.	ae	3	EBT5139
					QTP-
𠵹	shox shot	<i>Rubus pileatus</i> Focke	Rosaceae	3	EBT5140
		<i>Rhododendron traillianum</i> Forrest &			QTP-
𠵹	shuo ma a hni	W.W. Sm.	Ericaceae	3	EBT5141
			Thymelaeae		QTP-
𠵹	te shy jjiix	<i>Stellera chamaejasme</i> L.	ceae	3	EBT5142
		<i>Pseudognaphalium chrysocephalum</i>			QTP-
𠵹	vie ap shy	Hilliard & B. L. Burt	Compositae	3	EBT5143
					QTP-
𠵹	vup	<i>Rubia alata</i> Wall.	Rubiaceae	3	EBT5144
					QTP-
𠵹	yiep co	<i>Galinsoga parviflora</i> Cav.	Compositae	3	EBT5145
					QTP-
𠵹	a hxa	<i>Arisaema saxatile</i> Buchet	Araceae	2	EBT5146
			Rhamnaceae		QTP-
𠵹	a jji lot gga	<i>Berchemia yunnanensis</i> Franch.	e	2	EBT5147
			Smilacaceae		QTP-
𠵹	a mat lat chu	<i>milax ferox</i> Wall. ex Kunth	e	2	EBT5148
			Asparagaceae		QTP-
𠵹	a zhat xy si	<i>Polygonatum cirrhifolium</i> (Wall.) Royle	ae	2	EBT5149
			Ranunculac		QTP-
𠵹	bbop ddut	<i>Aconitum carmichaelii</i> Debeaux	eae	2	EBT5150
					QTP-
𠵹	bbut jjiy yy	<i>Prunella vulgaris</i> L.	Lamiaceae	2	EBT5151
		<i>Campylotropis hirtella</i> (Franch.)	Leguminos		QTP-
𠵹	bbut tip xu ge	Schindl.	ae	2	EBT5152
					QTP-
𠵹	hxie ggat vat zza	<i>Colocasia esculenta</i> (L.) Schott.	Araceae	2	EBT5153
					QTP-
𠵹	lo ggur ap jjiit	<i>Cotoneaster pannosus</i> Franch.	Rosaceae	2	EBT5154
					QTP-
𠵹	mgap hniep	<i>Prunus yunnanensis</i> Franch.	Rosaceae	2	EBT5155
					QTP-
𠵹	mu jjiip	<i>Acorus calamus</i> L.	Acoraceae	2	EBT5156
			Equisetaceae		QTP-
𠵹	ry zot	<i>Equisetum diffusum</i> D. Don	e	2	EBT5157
					QTP-
𠵹	shuo ma a ge	<i>Rhododendron decorum</i> Franch.	Ericaceae	2	EBT5158
		<i>Rhododendron traillianum</i> Forrest &			QTP-
𠵹	shuo ma ma ge	W.W. Sm.	Ericaceae	2	EBT5159

Table 2 (continued)

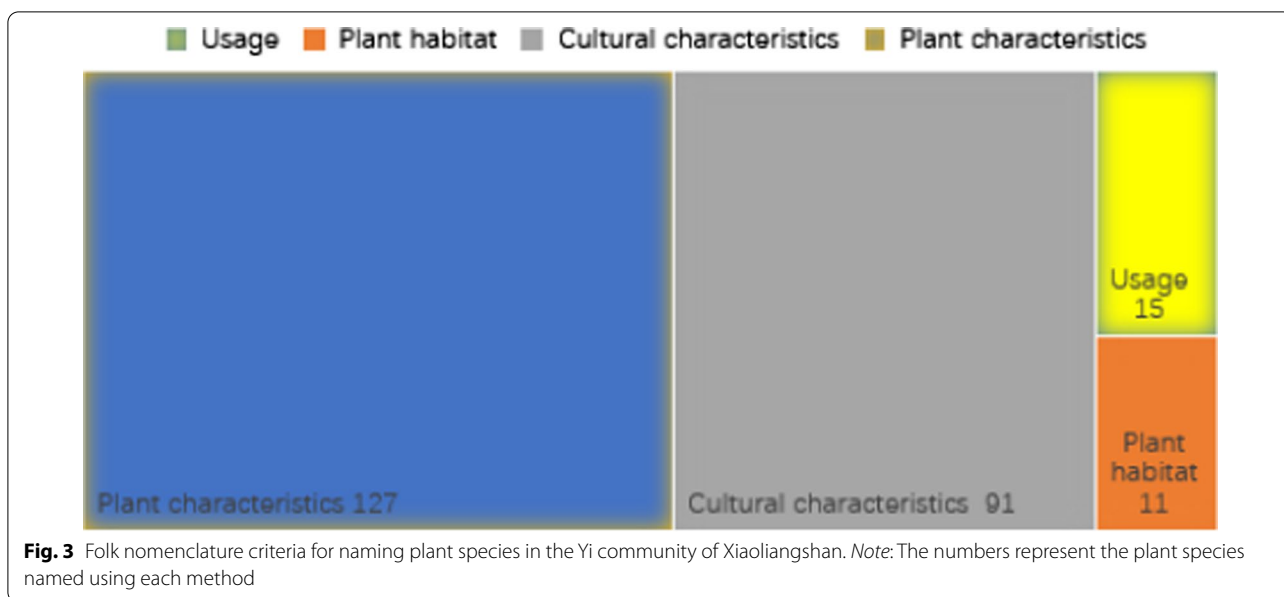
象象	si six	<i>Pinus armandii</i> Franch.	Pinaceae	2	QTP- EBT5160
象字平	ssup lot juo	<i>Keteleeria evelyniana</i> Mast.	Pinaceae	2	QTP- EBT5161
象字平	ssup shut hni	<i>Tsuga dumosa</i> (D. Don) Eichler	Pinaceae	2	QTP- EBT5162
丫丫	sy yi	<i>Prunus mume</i> (Siebold) Siebold & Zucc.	Rosaceae	2	QTP- EBT5163
瓦瓦	va vu gop	<i>Elsholtzia blanda</i> (Benth.) Benth	Lamiaceae	2	QTP- EBT5164
目目	vat dut	<i>Pisum sativum</i> L.	Leguminos ae	2	QTP- EBT5165
罗罗	vop qip shop shot	<i>Rubus sachalinensis</i> H. Léveillé	Rosaceae	2	QTP- EBT5166
罗罗	vot hxit	<i>Oxyria digyna</i> (L.) Hill. <i>Debregeasia longifolia</i> (Burm. F.)	Polygonaceae ae	2	QTP- EBT5167
罗罗	vot nzy	Wedd.	Urticaceae	2	QTP- EBT5168
瓦瓦	ry ddu o nuo	<i>Arundinella hookeri</i> Munro ex Keng	Poaceae	2	QTP- EBT5169
瓦瓦	a bba	<i>Dioscorea polystachya</i> Turcz.	Dioscoreac eae	1	QTP- EBT5170
瓦瓦	a hle va ry	<i>Gahnia ancistrophylla</i> Benth.	Cyperaceae	1	QTP- EBT5171
瓦瓦	a jji jie ddot	<i>Bauhinia brachycarpa</i> Benth. <i>Lyonia compta</i> (W.W. Sm. & Jeffrey)	Leguminos ae	1	QTP- EBT5172
瓦瓦	a ngy gop	Hand.-Mazz. <i>Christella dentata</i> (Forssk.) Brownsey &	Ericaceae Thelypterid	1	QTP- EBT5173
瓦瓦	a nyie bbyp zy	Jermy	aceae	1	QTP- EBT5174
瓦瓦	a nyie sip sit	<i>Rosa helenae</i> Rehder & E.H. Wilson <i>Corylus yunnanensis</i> (Franch.) A.	Rosaceae	1	QTP- EBT5175
瓦瓦	a nyut sy tur	Camus <i>Polygonatum kingianum</i> Collett &	Betulaceae Asparagace	1	QTP- EBT5176
瓦瓦	a zhat xy si	Hemsl.	ae	1	QTP- EBT5177
瓦瓦	ba lat	<i>Populus yunnanensis</i> Dode <i>Tenaxia cumminii</i> (Hook.f.) N.P.	Salicaceae	1	QTP- EBT5178
瓦瓦	ba ry	Barker & H.P.Linder	Poaceae	1	QTP- EBT5179
瓦瓦	bba juo	<i>Ensete lasiocarpum</i> (Franch.) Cheesman	Musaceae Balsaminac	1	QTP- EBT5180
瓦瓦	bbit syp	<i>Impatiens delavayi</i> Franch.	eae	1	QTP- EBT5181

Table 2 (continued)

			Commelina		QTP-
ꠘꠞꠞꠞ	bbut bbo di	<i>Commelina communis</i> L.	ceae	1	EBT5182
			Lycopodiaceae		QTP-
ꠘꠞꠞꠞꠞ	bbut che ji cy	<i>Lycopodium japonicum</i> Thunb.	eae	1	EBT5183
		<i>Ageratina adenophora</i> (Spreng.) R.M.			QTP-
ꠘꠞꠞꠞꠞ	bbut chy ni	King & H. Rob.	Compositae	1	EBT5184
		<i>Mentha longifolia</i> var. <i>asiatica</i> (Boriss.)			QTP-
ꠘꠞꠞꠞ	bo hop	Rech.f.	Lamiaceae	1	EBT5185
		<i>Decaisnea insignis</i> (Griff.) Hook.f. &	Lardizabala		QTP-
ꠘꠞꠞꠞꠞꠞ	chyt sse la ot	Thomson	ceae	1	EBT5186
					QTP-
ꠘꠞꠞꠞꠞꠞ	ddut bu o hni	<i>Pteris formosa</i> (Wall.) D. Don	Ericaceae	1	EBT5187
					QTP-
ꠘꠞꠞꠞꠞꠞꠞ	die gu shut ap mu	<i>Taxus wallichiana</i> Zucc.	Taxaceae	1	EBT5188
					QTP-
ꠘꠞꠞꠞ	hly vo	<i>Perilla frutescens</i> (L.) Britton	Lamiaceae	1	EBT5189
					QTP-
ꠘꠞꠞꠞ	hly vo	<i>Elsholtzia ciliata</i> (Thunb.) Hyl.	Lamiaceae	1	EBT5190
					QTP-
ꠘꠞꠞꠞ	hxa cu	<i>Schima argentea</i> E. Pritzl	Theaceae	1	EBT5191
		<i>Ternstroemia gymnanthera</i> (Wight &	Pentaphyla		QTP-
ꠘꠞꠞꠞ	hxa cu	Arn.) Sprague	caceae	1	EBT5192
			Coriariaceae		QTP-
ꠘꠞꠞꠞ	hy sy	<i>Coriaria terminalis</i> Hemsl.	e	1	EBT5193
			Berberidaceae		QTP-
ꠘꠞꠞꠞꠞꠞ	lap bbo la bbo	<i>Holboellia latifolia</i> Wall.	ae	1	EBT5194
			Rhamnaceae		QTP-
ꠘꠞꠞꠞꠞꠞ	lo ggur sy ga	<i>Rhamnus virgata</i> Roxb.	e	1	EBT5195
					QTP-
ꠘꠞꠞꠞ	ma mup	<i>Galium spurium</i> L.	Rubiaceae	1	EBT5196
			Polygonaceae		QTP-
ꠘꠞꠞꠞ	mu hxit	<i>Oxyria sinensis</i> Hemsl.	ae	1	EBT5197
			Celastraceae		QTP-
ꠘꠞꠞꠞꠞꠞ	nyip ggule zhy	<i>Celastrus stylosus</i> Wall.	e	1	EBT5198
		<i>Ligularia caloxantha</i> (Diels) Hand. -			QTP-
ꠘꠞꠞꠞꠞꠞ	pat qi a tu	Mazz.	Compositae	1	EBT5199
					QTP-
ꠘꠞꠞꠞ	put nuop	<i>Juncus effusus</i> L.	Juncaceae	1	EBT5200
					QTP-
ꠘꠞꠞꠞ	put nuop	<i>uncus allioides</i> Franch.	Juncaceae	1	EBT5201
			Zingiberaceae		QTP-
ꠘꠞꠞꠞ	qi py	<i>Curcuma longa</i> L.	ae	1	EBT5202
					QTP-
ꠘꠞꠞꠞ	rut shy	<i>Quercus guyavifolia</i> H. Lév.	Fagaceae	1	EBT5203

Table 2 (continued)

		<i>Quercus aquifolioides</i> Rehder & E.H.			QTP-
差E	rut shy	Wilson	Fagaceae	1	EBT5204
					QTP-
唵字用字	ryp ddu uo nuo	<i>Arundinella hookeri</i> Munro ex Keng	Poaceae	1	EBT5205
					QTP-
栗母	shuo ma	<i>Rhododendron simsii</i> Planch.	Ericaceae	1	EBT5206
					QTP-
栗母	shuo ma	<i>Rhododendron adenogynum</i> Diels	Ericaceae	1	EBT5207
		<i>Rhododendron araiophyllum</i> Balf. f. &			QTP-
栗母	shuo ma	W.W. Sm.	Ericaceae	1	EBT5208
	shuo ma mgep	<i>Rhododendron impeditum</i> Balf. f. &			QTP-
栗母既母	zzyp	W.W. Sm.	Ericaceae	1	EBT5209
			Cupressaceae		QTP-
唵	shut bbo	<i>Juniperus rigida</i> Siebold & Zucc.	ae	1	EBT5210
			Cupressaceae		QTP-
唵	shut bbo	<i>Juniperus formosana</i> Hayata	ae	1	EBT5211
			Sapindaceae		QTP-
唵字字	sy a jjie	<i>Acer miyabei</i> Maxim.	e	1	EBT5212
		<i>Chaenomeles cathayensis</i> (Hemsl.) C.K.			QTP-
唵字唵字	sy bu a ge	Schneid.	Rosaceae	1	EBT5213
		<i>Taxillus sutchuenensis</i> (Lecomte)	Loranthaceae		QTP-
唵字#	sy bu ssut	Danser	ae	1	EBT5214
					QTP-
唵#	sy nda	<i>Pyrus pyrifolia</i> (Burm. F.) Nakai	Rosaceae	1	EBT5215
			Loranthaceae		QTP-
唵#	sy vo ssut	<i>axillus kaempferi</i> (DC.) Danser	ae	1	EBT5216
					QTP-
唵字唵	va bu syt pup	<i>Rosa sericea</i> Wall. ex Lindl.	Rosaceae	1	EBT5217
					QTP-
唵字唵	va bu syt pup	<i>Rosa sweginzowii</i> Koehne	Rosaceae	1	EBT5218
		<i>Parthenocissus semicordata</i> (Wall.)			QTP-
唵字S	vat ba sy lyr	Planch.	Vitaceae	1	EBT5219
					QTP-
唵字唵	vot mop zy ly	<i>Solanum americanum</i> Mill.	Solanaceae	1	EBT5220
					QTP-
唵字	yip syt	<i>Coriandrum sativum</i> L.	Apiaceae	1	EBT5221
			Polygonaceae		QTP-
唵字唵	yy zy ka py	<i>Persicaria nepalensis</i> (Meisn.) Miyabe	ae	1	EBT5222
			Polygonaceae		QTP-
唵字唵	yy zy ka py	<i>Polygonum tortuosum</i> D. Don	ae	1	EBT5223
		<i>Pistacia weinmannifolia</i> J. Poiss. ex	Anacardiaceae		QTP-
唵S	zzit lyr	Franch.	eae	1	EBT5224
					QTP-
唵'	ma ke	<i>Fargesia spathacea</i> Franch.	Poaceae	1	EBT5225
					QTP-
唵字O	cep hlo a tu	<i>Fragaria nilgerrensis</i> Schldl. ex J. Gay	Rosaceae	1	EBT5226



you usually use and how do you use them? (2) What are their names? (3) Can you explain the meaning of their names?

Finally, voucher specimens of the different plants were collected in the nearby fields, farmland, and along road-sides, under the guidance of the key informants. All the collected voucher specimens were authenticated by each member of the research team in charge of this study, based on the publication "Flora of China" [42] and then stored at the Herbarium of the Kunming Institute of Botany, Chinese Academy of Sciences.

Data analysis

After informant interviews, Microsoft Excel 2016 (Microsoft Corporation, <http://www.microsoft.com/>) was used to compile the collected data. Acai Yi input (<https://www.cr173.com/soft/642454.html>) was employed to transcribe the handwritten notes into the corresponding Excel tables. The information collected in the informant interviews served as the basis for our research on the folk botanical nomenclature and classification rules of the Yi people in Xiaoliangshan.

Results

Plant species used by the Yi community in Xiaoliangshan

We collected a total of 3088 use reports and extracted 228 folk names of local plants, belonging to 107 families, 178 genera, and 226 species (Table 2). The record of each useful plant includes the following information: plant name in the Yi language and Yi language phonetic name,

Latin name, family name of the plant species, voucher specimen number, and the number of use reports.

Folk nomenclature of plant species in the Xiaoliangshan Yi community

Based on the plant names listed in Table 1, the folk nomenclature criteria for naming local plants used in the Yi ethnic community are based on the following (Fig. 3): plant characteristics (127 species), cultural characteristics (91 species), usage (15 species) and plant habitat (11 species), and these are described in the following sub-sections.

Plant names based on characteristics

In this study, we documented 127 species with indigenous names that are based on plant characteristics. These species can be divided into four categories (although some species overlap categories), as follows: plant morphology (two types), plant taste, and plant scent. Of the 127 species, 99 names are based on plant morphology, and these are divided into two types: the first directly reflects the morphological characteristics of the plant and the second uses animal-related concepts and characteristics to describe the plant. In this second nomenclatural group, many of the plants have animal names (Table 3). Examples of plants in these categories are as follows: the locals use the term, 木筒 (Yi language phonetic name: *bba jjo*), in the Yi language for plants from the Umbelliferae family, which relates to the hollow stem of these plants; the Yi name for *Bidens pilosa* L. is 叉头草 (*bbut o jjie*), which means "pitchforked-head grass"; and *Anemone vitifolia* Buch. -Ham. ex DC., which is also known as wild cotton,

Table 3 Plant names based on animals in the Yi language

Animal	Latin name	Yi language name	Yi language phonetic name	Interpretation	Voucher number
Fox	<i>Notopterygium incisum</i> K.C. Ting ex H.T. Chang	ꨀꨛꨀꨛꨀꨛ	a ddu bba jjo	ꨀꨛꨀ: "fox"	QTP-EBT5002
Fox	<i>Pimpinella candolleana</i> Wight & Arn.	ꨀꨛꨀꨛꨀꨛꨀꨛ	a ddu bba jjo it zy	ꨀꨛꨀ: "fox"	QTP-EBT5003
Fox	<i>Anemone vitifolia</i> Buch. -Ham. ex DC.	ꨀꨛꨀꨛꨀꨛ	a ddu sha bbu	ꨀꨛꨀ: "fox"	QTP-EBT5004
Rabbit	<i>Cyperus duclouxii</i> E.G. Camus	ꨀꨛꨀꨛꨀꨛ	a hle va ry	ꨀꨛꨀ: "rabbit"	QTP-EBT5005
Crow	<i>Dipsacus asper</i> Wall. ex C.B. Clarke	ꨀꨛꨀꨛꨀꨛ	a jji bap mop	ꨀꨛꨀ: "crow"	QTP-EBT5007
Crow	<i>Morus australis</i> Poir.	ꨀꨛꨀꨛꨀꨛ	a jji bbu zza	ꨀꨛꨀ: "crow"	QTP-EBT5008
Crow	<i>Bauhinia brachycarpa</i> Benth.	ꨀꨛꨀꨛꨀꨛ	a jji jie ddu	ꨀꨛꨀ: "crow"	QTP-EBT5009
Crow	<i>Berchemia yunnanensis</i> Franch.	ꨀꨛꨀꨛꨀꨛ	a jji lot gga	ꨀꨛꨀ: "crow"	QTP-EBT5010
Cat	<i>Christella dentata</i> (Forssk.) Brownsey & Jermy	ꨀꨛꨀꨛꨀꨛ	a nyie bbyp zy	ꨀꨛꨀ: "cat"	QTP-EBT5015
Cat	<i>Stellaria vestita</i> Kurz	ꨀꨛꨀꨛꨀꨛ	a nyie hxi xy	ꨀꨛꨀ: "cat"	QTP-EBT5016
Cat	<i>Rosa helenae</i> Rehder & E.H. Wilson	ꨀꨛꨀꨛꨀꨛ	a nyie sip sit	ꨀꨛꨀ: "cat"	QTP-EBT5017
Monkey	<i>Corylus yunnanensis</i> (Franch.) A. Camus	ꨀꨛꨀꨛꨀꨛ	a nyut sy tur	ꨀꨛꨀ: "monkey"	QTP-EBT5018
Magpie	<i>Begonia grandis</i> Dryand.	ꨀꨛꨀꨛꨀꨛ	a zhat vop ji	ꨀꨛꨀ: "magpie"	QTP-EBT5019
Magpie	<i>Polygonatum kingianum</i> Collett & Hemsl.	ꨀꨛꨀꨛꨀꨛ	a zhat xy si	ꨀꨛꨀ: "magpie"	QTP-EBT5020
Magpie	<i>Polygonatum cirrhifolium</i> (Wall.) Royle	ꨀꨛꨀꨛꨀꨛ	a zhat xy si	ꨀꨛꨀ: "magpie"	QTP-EBT5021
Snake	<i>Duchesnea indica</i> (Jacks.) Focke	ꨀꨛꨀꨛꨀꨛ	bbu shy cap hlo	ꨀꨛꨀ: "snake"	QTP-EBT5037
Snake	<i>Arisaema erubescens</i> (Wall.) Schott	ꨀꨛꨀꨛꨀꨛ	bbu shy ddu zza	ꨀꨛꨀ: "snake"	QTP-EBT5038
Goat	<i>Decaisnea insignis</i> (Griff.) Hook.f. & Thomson	ꨀꨛꨀꨛꨀꨛ	chyt sse la ot	ꨀꨛꨀ: "lamb"	QTP-EBT5060
Pig	<i>Colocasia esculenta</i> (L.) Schott.	ꨀꨛꨀꨛꨀꨛ	hxie ggat vat zza	ꨀꨛꨀ: "Pig"	QTP-EBT5095
Pig	<i>Phytolacca acinosa</i> Roxb.	ꨀꨛꨀꨛꨀꨛ	hxie ggat vat zza	ꨀꨛꨀ: "Pig"	QTP-EBT5096
Bird	<i>Capsella bursa-pastoris</i> (L.) Medik.	ꨀꨛꨀꨛꨀꨛ	hxie zy vap ga	ꨀꨛꨀ: "bird"	QTP-EBT5097
Cattle	<i>Paeonia delavayi</i> Franch.	ꨀꨛꨀꨛꨀꨛ	le rre bbut cy	ꨀꨛꨀ: "cattle"	QTP-EBT5107
Foal	<i>Clinopodium urticifolium</i> (Hance) C.Y. Wu & S.J. Hsuan ex H.W. Li	ꨀꨛꨀꨛꨀꨛ	mup sse hnap bo	ꨀꨛꨀ: "foal"	QTP-EBT5127
Cock	<i>Adenophora stricta</i> Miq.	ꨀꨛꨀꨛꨀꨛ	va bu shy ggo	ꨀꨛꨀ: "cock"	QTP-EBT5186
Cock	<i>Rosa sericea</i> Wall. ex Lindl.	ꨀꨛꨀꨛꨀꨛ	va bu syt pup	ꨀꨛꨀ: "cock"	QTP-EBT5187
Chicken	<i>Berberis pruinosa</i> Franch.	ꨀꨛꨀꨛꨀꨛ	va ddot chu	ꨀꨛꨀ: "chicken"	QTP-EBT5190
Chicken	<i>Potentilla lineata</i> Trevir.	ꨀꨛꨀꨛꨀꨛ	va zza hnap zzy	ꨀꨛꨀ: "chicken"	QTP-EBT5194
Sow	<i>Plantago depressa</i> Willd.	ꨀꨛꨀꨛꨀꨛ	vot mop ddie bbur	ꨀꨛꨀ: "sow"	QTP-EBT5206
Sow	<i>Codonopsis pilosula</i> (Franch.) Nannf.	ꨀꨛꨀꨛꨀꨛ	vot mop jyt nyi	ꨀꨛꨀ: "sow"	QTP-EBT5207
Sow	<i>Arctium lappa</i> L.	ꨀꨛꨀꨛꨀꨛ	vot mop rrup kot	ꨀꨛꨀ: "sow"	QTP-EBT5208
Sow	<i>Solanum americanum</i> Mill.	ꨀꨛꨀꨛꨀꨛ	vot mop zy ly	ꨀꨛꨀ: "sow"	QTP-EBT5209
Sow	<i>Taraxacum dasypodum</i> Soest	ꨀꨛꨀꨛꨀꨛ	vot mop zza ke	ꨀꨛꨀ: "sow"	QTP-EBT5210

Animal-related words in the Yi language and the Yi language phonetic name are shown in bold

Table 4 Plant names based on their habitat in the Yi language

Yi language name	Yi language phonetic name	Latin name	Interpretation	Voucher number
☉ ☉ ☉ ☉	lo ggur ap jjit	<i>Cotoneaster pannosus</i> Franch.	☉ ☉: "Wild"	QTP-EBT5110
☉ ☉ ☉ ☉	lo ggur bbar zziep	<i>Zanthoxylum bungeanum</i> Maxim.	☉ ☉: "Wild"	QTP-EBT5111
☉ ☉ ☉ ☉	lo ggur syp ga	<i>Rhamnus virgata</i> Roxb.	☉ ☉: "Wild"	QTP-EBT5112
☉ ☉ ☉ ☉	te shy jjix	<i>Stellera chamaejasme</i> L.	☉ ☉: "Pine tree"	QTP-EBT5183
☉ ☉ ☉ ☉	te xy lat juo	<i>Pyrola calliantha</i> Andres	☉ ☉: "Under the pine tree"	QTP-EBT5185
☉ ☉ ☉ ☉	vat bbu yo	<i>Incarvillea diffusa</i> Royle	☉: "Cliff"	QTP-EBT5199
☉ ☉ ☉ ☉	vat mop ne	<i>Hedera nepalensis</i> K. Koch	☉: "Cliff"	QTP-EBT5202
☉ ☉ ☉ ☉	vot mop ddie bbur	<i>Plantago asiatica</i> L.	☉ ☉: "Earthen bank between fields"	QTP-EBT5206
☉ ☉ ☉ ☉	yy ho	<i>Salix cavaleriei</i> H. Lévl.	☉ ☉: "Waterside"	QTP-EBT5221
☉ ☉ ☉ ☉	yy zy ka py	<i>Persicaria nepalensis</i> (Meisn.) Miyabe	☉ ☉: "Swamp"	QTP-EBT5222
☉ ☉ ☉ ☉	yy zy ka py	<i>Polygonum lichiangense</i> W.W. Sm.	☉ ☉: "Swamp"	QTP-EBT5223
☉ ☉ ☉ ☉	za qip	<i>Solanum tuberosum</i> L.	☉ ☉: "Soil"	QTP-EBT5225

Habitat-related words in the Yi language and the Yi language phonetic name are shown in bold in the table

is named ☉ ☉ ☉ ☉ (a ddu sha bbu), which relates the wool-like surface of the plant’s achene to the hair of the fox. In addition, the leaf apexes of *Polygonatum kingianum* Collett & Hemsley and *Polygonatum cirrhifolium* (Wall.) Royle, which belong to the Polygonatum genus, are rolled downwards like a bird’s claw, and these are named ☉ ☉ ☉ ☉ (a zhat xy si), which means "magpie’s claws". Of the 127 plant species with names based on plant characteristics, 26 reflect the colour of the plant; for example, the Yi name for *Pseudognaphalium chrysocephalum* (Franch.) Hilliard & B.L. Burt is ☉ ☉ ☉ ☉ (vie ap shy), which means "yellow flower".

In addition, the names of nine species relate to the plant’s taste. For example, *Prunella vulgaris* L. is named ☉ ☉ ☉ ☉ (bbut jyy yy), which means "honey grass", and it is named in relation to the honey-like taste of its nectar. Furthermore, the Yi name for *Begonia grandis* Dryand. is ☉ ☉ ☉ ☉ (a zhat vop ji), which means "magpie’s sauerkraut", and it is so-named because of the sauerkraut-like taste of its stem.

Finally, one plant species is named based on its scent: *Ageratina adenophora* (Spreng.) R.M. King & H. Rob. is named ☉ ☉ ☉ ☉ (bbut chy ni), which means "stinky grass",

because the whole plant has a distinctly unpleasant odour.

Plant names based on habitat

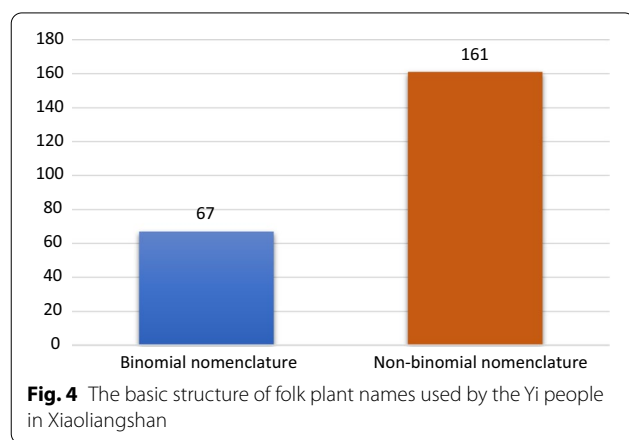
Many plant names in the Yi language are based on their native habitat (Table 4). Terms that describe the plant’s habitat (such as the Yi word, ☉ ☉, which means "wild") are often used in the plant’s name. For example, the Yi name for *Cotoneaster pannosus* Franch. is ☉ ☉ ☉ ☉, which means "firethorn that grows in the wild". This word distinguishes it from *Pyracantha angustifolia* (Franch.) C.K. Schneid., which is commonly planted around local dwellings. The Yi name for *Hedera nepalensis* K.Koch is ☉ ☉ ☉ ☉, in which ☉ ☉ means "cliff" and ☉ ☉ means "bead" because this plant is often found on cliff walls and it produces round bead-like fruit. Similarly, the names of many plants that generally grow near water or a swamp have the prefix "☉ ☉" or "☉ ☉", which mean "water" and "swamp", respectively; for example, *Persicaria nepalensis* (Meisn.) Miyabe is named "☉ ☉ ☉ ☉" in the Yi language and the willow tree is called "☉ ☉".

Table 5 Chinese loanwords in the folk plant names of the Yi community in Xiaoliangshan

Yi language name	Yi phonetic name	Chinese name (common name)	Chinese phonetic name	Latin name	Voucher number
					QTP-
ꞑꞑ	bba juo	地涌金莲(芭蕉)	dì yǒng jīn lián(bā jiāo)	<i>Ensete lasiocarpum</i> (Franch.) Cheesman	EBT5028
					QTP-
ꞑꞑꞑ	bbut cha fu	竹叶柴胡(柴胡)	zhú yè chái hú (chái hú)	<i>Bupleurum marginatum</i> Wall. ex DC.	EBT5039
	bbut che ji				QTP-
ꞑꞑꞑꞑ	cy	石松(抽筋草)	shí sōng (chōu jīn cǎo)	<i>Lycopodium japonicum</i> Thunb.	EBT5040
	bbut tip xu	毛抗子梢(铁血			QTP-
ꞑꞑꞑꞑ	ge	藤)	máo háng zi shāo (tiě xuè téng)	<i>Campylotropis hirtella</i> (Franch.) Schindl.	EBT5045
	bbut xit ho				QTP-
ꞑꞑꞑꞑ	cy	黄龙尾(仙鹤草)	huáng lóng wěi (xiān hè cǎo)	<i>Agrimonia pilosa</i> Ledeb.	EBT5046
		羊齿天门冬(百	yáng chí tiān mén dōng (bǎi		QTP-
ꞑꞑ	bep bu	部)	bù)	<i>Asparagus filicinus</i> Buch. -Ham. ex D. Don	EBT5047
					QTP-
ꞑꞑ	bit map	蓖麻	bì má	<i>Ricinus communis</i> L.	EBT5048
				<i>Mentha longifolia</i> var. <i>asiatica</i> (Boriss.)	QTP-
ꞑꞑ	bo hop	假薄荷	jiǎ bò he	Rech.f.	EBT5049
	but fu zha				QTP-
ꞑꞑꞑꞑ	cy	草玉梅(虎掌草)	cǎo yù méi (hǔ zhǎng cǎo)	<i>Anemone rivularis</i> Buch. -Ham. ex DC.	EBT5050
					QTP-
ꞑꞑ	dur lap	西南乌头(堵喇)	xī nán wū tóu (dǔ lǎ)	<i>Aconitum episcopale</i> H. Lév.	EBT5070
				<i>Davallia trichomanoides</i> Blume Enum. Pl.	QTP-
ꞑꞑꞑ	gup sup bu	骨碎补	gǔ suì bǔ	Javac.	EBT5081
					QTP-
ꞑꞑꞑ	ho sha vu	何首乌	hé shǒu wū	<i>Reynoutria multiflora</i> (Thunb.) Moldenke	EBT5089
					QTP-
ꞑꞑ	it mup	玉蜀黍(玉米)	yù shǔ shǔ (yù mǐ)	<i>Zea mays</i> L.	EBT5098
		山野豌豆(绿			QTP-
ꞑꞑ	lop fip	肥)	shān yě wān dòu (lǜ fēi)	<i>Vicia amoena</i> Fisch.	EBT5113
					QTP-
ꞑꞑꞑ	lop shet map	云南升麻	yún nán shēng má	<i>Actaea yunnanensis</i> (P.K. Hsiao) J. Compton	EBT5114
					QTP-
ꞑꞑꞑ	ma bie cy	马鞭草	mǎ biān cǎo	<i>Verbena officinalis</i> L.	EBT5117
					QTP-
ꞑꞑ	vat dut	豌豆	wān dòu	<i>Pisum sativum</i> L.	EBT5200
					QTP-
ꞑꞑ	yiep co	牛膝菊(洋葶)	niú xī jú (yáng cǎo)	<i>Galinsoga parviflora</i> Cav.	EBT5217

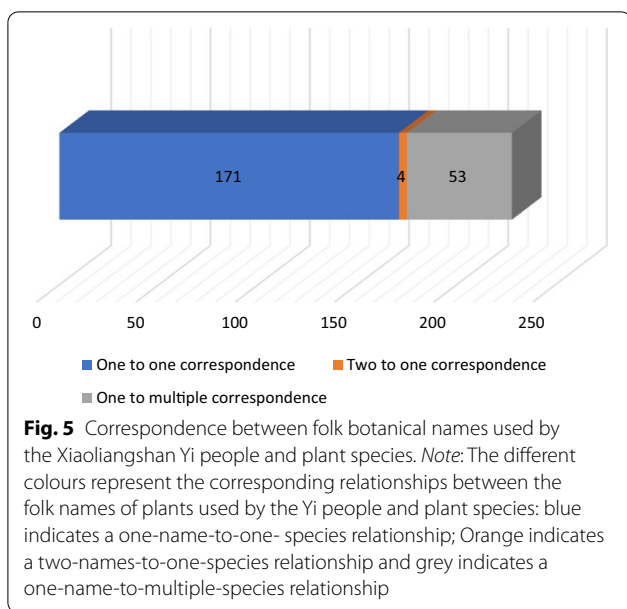
Table 6 Plant names based on their common use by the Yi community in Xiaoliangshan

Yi language name	Yi language phonetic name	Interpretation	Latin name	Family	Voucher number
𠃉𠃉	bbit yop	𠃉: "chapped skin" 𠃉: "medicine"	<i>Bulbophyllum drymoglossum</i> Maxim.	Orchidaceae	QTP-EBT5007
𠃉𠃉𠃉𠃉	le rre bbut cy	𠃉𠃉𠃉𠃉: "Strain injury medicine for cattle"	<i>Melastoma malabathricum</i> L.	Paeoniaceae	QTP-EBT5032
𠃉𠃉𠃉	bbu ga cy	𠃉𠃉: "expelling parasite" 𠃉: "medicine"	<i>Datura stramonium</i> L.	Solanaceae	QTP-EBT5098
𠃉𠃉	nbie cy	𠃉: "pneumonia" 𠃉: "medicine"	<i>Iris wattii</i> Baker ex Hook.f.	Iridaceae	QTP-EBT5138
𠃉𠃉𠃉𠃉	vot mop zza ke	𠃉𠃉: "Sow" 𠃉𠃉: "Bitter food"	<i>Crepis lignea</i> (Vantot) Babe.	Asteraceae	QTP-EBT5013
𠃉𠃉𠃉𠃉	vot mop zza ke	𠃉𠃉: "Sow" 𠃉𠃉: "Bitter food"	<i>Taraxacum dasypodum</i> Soest	Compositae	QTP-EBT5030
𠃉𠃉𠃉𠃉	a zhat vop ji	𠃉𠃉: "magpie" 𠃉𠃉: "Chinese sauerkraut"	<i>Begonia grandis</i> Dryand.	Begoniaceae	QTP-EBT5075
𠃉𠃉𠃉𠃉	te xy lat juo	𠃉𠃉: "Under the pine tree" 𠃉𠃉: "tea"	<i>Pyrola calliantha</i> Andres	Ericaceae	QTP-EBT5020
𠃉𠃉𠃉𠃉	vop qip shop shot	𠃉𠃉: "Grow rappini"	<i>Rubus idaeus</i> subsp. melanolasius Dieck ex Focke	Rosaceae	QTP-EBT5166
𠃉𠃉𠃉𠃉	a nyut sy tur	𠃉𠃉: "monkey" 𠃉𠃉: "chisel"	<i>Corylus yunnanensis</i> (Franch.) A. Camus	Corylaceae nom. conserv.	QTP-EBT5176



Plant names based on culture

Cultural heritage is another important element reflected in the folk botanical nomenclature of the Yi people. The influence of culture on the botanical nomenclature of the Yi community is reflected in the two types of names used: the first type is based on the Yi ethnic culture and the second is based on the combined effect of the Yi and Han cultures. Of the documented plants, the names of 71 species are based on the traditional culture of the Yi people; most of these plant names contain semantically vague phonetic symbols, such as 𠃉, 𠃉, 𠃉, 𠃉, 𠃉, 𠃉 and 𠃉, which are transmitted orally. There are 18 species of plants with names that reflect the fusion between the traditional Yi culture and the Han culture, and most of these plants are of economic importance (Table 5). Of these,



11 are used for medicinal purposes, six are used as fodder, and one is used as food. Most of these plant names are derived from Chinese transliteration: some are direct transliterations of the Chinese name into the Yi language, and some have a Yi-language prefix added to a Chinese transliteration; for example, the folk name for *Ensete lasiocarpum* (Franch.) Cheesman is 𑄎𑄏𑄐. This Yi name is romanised as "bba juo" which sounds like its Chinese name "ba jiao". Lycopods are called 𑄎𑄏𑄐𑄑, which is romanised as "bbut che ji cy"; this is a transliteration of the plant's common Chinese name "chou jin cao" with the prefix "𑄎𑄏" added to indicate a herbaceous plant.

Plant names based on their common usage

Naming plants based on their common usage is another method of nomenclature used by the Yi people in Xiaoliangshan (Table 6), and of the documented species, the names of 10 plants directly reflect their use. For example, *Paeonia delavayi* Franch., which is commonly used by the locals as strain-injury medication for humans and cattle, is named 𑄎𑄏𑄐𑄑, which means "strain injury medicine for cattle". Similarly, *Iris wattii* Baker ex Hook.f. is often used by the locals to treat pneumonia, and its Yi name is 𑄎𑄏𑄐, which means "pneumonia medicine". *Rubus sachalinensis* H. Léveillé is locally called "𑄎𑄏𑄐𑄑". When its fruit matures, the locals begin turnip planting. The Yi term "𑄎𑄏" means "planting turnips"; therefore, the plant's name directly reflects its indicator function.

Analysis of the basic structure of traditional plant names of the Yi people in Xiaoliangshan

In the folk nomenclature system of the Yi people in Xiaoliangshan, plant names have a binomial or non-binomial structure (Fig. 4). A binomial folk plant name consists of two Yi words: one of these is the core or the primary name and the other is a modifier used to describe or clarify the core word. A non-binomial plant name consists of one Yi word. Of the local plants documented in this study, 67 species have binomial names and 161 have non-binomial names. The following examples show the binomial structure of folk botanical names in the Xiaoliangshan ethnic community, where a modifier is added to the core word to highlight its characteristics:

Example 1 Latin name: *Ageratina adenophora* (Spreng.) R.M. King & H. Rob.

Yi name: 𑄎𑄏 (core word) + 𑄎𑄐 (modifier).

Meaning: smelly (modifier) + herb (core word).

Example 2 Latin name: *Rhododendron decorum* Franch.

Yi name: 𑄎𑄐 (core word) + 𑄎𑄑 (modifier).

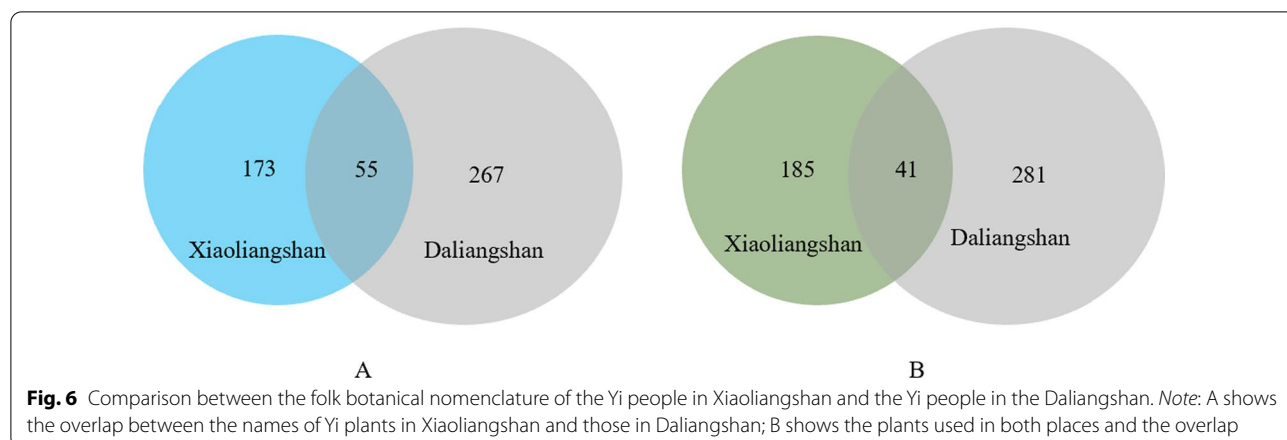
Meaning: Big (modifier) + Azalea (core word).

Plant names with a non-binomial structure consist of one semantically ambiguous core word or a Chinese word transliterated into the Yi language; for example, 𑄎𑄐 (Zanthoxylum bungeanum Maxim.), 𑄎𑄑 (Allium walliichii Kunth) and 𑄎𑄒 (Asparagus filicinus Buch.-Ham. ex D.Don).

Correspondence between plant names and species in the folk nomenclature of the Yi people in Xiaoliangshan

This study found that not all folk plant names and taxonomic species have a one-to-one correspondence; some plant species have multiple folk names, and one folk name may be used for multiple species (Fig. 5). The name to species correspondence is elucidated as follows:

1. One folk plant name corresponds to one species. Of the folk names, 171 correspond to one plant species; for example, the folk name 𑄎𑄐𑄑 (a jji bbu zza) corresponds only to *Morus australis* Poir.; 𑄎𑄐𑄒 (bbu shy ddat zza) corresponds only to *Arisaema erubescens*



(Wall.) Schott; 𑄎𑄏𑄐 (chup nuop) corresponds only to *Prinsepia utilis* Royle; 𑄑𑄒𑄓 (dda bbo) corresponds only to *Pteridium revolutum* (Blume) Nakai; 𑄔𑄕𑄖𑄗 (gep dep map ma) corresponds only to *Mahonia duclouxiana* Gagnep.; 𑄘𑄙 (huo gat) corresponds only to *Populus adenopoda* Maxim.; 𑄚𑄛 (jy bbo) corresponds only to *Toxicodendron succedaneum* (L.) Kuntze; 𑄜𑄝𑄞𑄟 (li bbi syp ddu) corresponds only to *Cornus capitata* Wall. and 𑄠𑄡 (mu ku) corresponds only to *Litsea cubeba* (Lour.) Pers..

- Two folk names corresponding to one plant species. Of the plant names, four have two folk names corresponding to one scientific name. *Chenopodium album* L. is an edible wild plant commonly used by locals for food and fodder. As the locals classify it as two different plants, it has two different Yi names: 𑄣𑄤𑄥𑄦 (hnit nra a hni) and 𑄧𑄨𑄩𑄪 (hnit nra a tu). Similarly, *Rhododendron traillianum* Forrest & W.W. Sm. has two corresponding Yi names, 𑄬𑄭𑄮𑄯 (shuo ma a hni) and 𑄰𑄱𑄲𑄳 (shuo ma ma ge).
- One folk name corresponding to multiple plant species. Of the plant names, 53 have folk plant names that correspond to multiple plant species. For example, four different plant species correspond to the Yi name 𑄴𑄵 (chyt jy): *Hypericum acmosepalum* N. Robson, *Hypericum monogynum* L., *Hypericum forrestii* (Chitt.) N. Robson, and *Hypericum patulum* Thunb.; two different species correspond to the Yi name 𑄶𑄷 (jy sy): *Coriaria nepalensis* Wall.; and two different species correspond to the Yi name 𑄸𑄹 (shut bbo): *Juniperus rigida* Siebold & Zucc. and *Juniperus formosana* Hayata.

Comparison between folk botanical nomenclature of the Yi people in Xiaoliangshan and the Yi people in the Daliangshan

We compared the folk botanical nomenclature of the Yi people in the Daliangshan [3] with that of the Yi community in Xiaoliangshan (Fig. 6) and found that the plant names and usages of the Yi people in the two places overlapped to a certain extent. More specifically, the two places have 55 plant names in common (Fig. 6A), corresponding to approximately 24% of the total number of plant names collected in Xiaoliangshan. However, only 18 out of the 55 names represent the same species in both places and the remaining names represent different species. Most of these 18 identical plant species have been used by the local people for a very long time and they have non-binomial Yi names (for example 𑄱, 𑄲, and 𑄳). The other 37 plant names that are common to both places refer to different plants; however, the plants belong to the same family or genus in modern taxonomy, or they have some similar attributes. For example, the Yi name 𑄴𑄵 is used for three species of the Pinaceae family: in the Daliangshan it refers to *Abies fabri* (Mast.) Craib and *Larix potaninii* Batalin, whereas in Xiaoliangshan it refers to *Tsuga dumosa* (D. Don) Eichler. In addition, the Yi name 𑄶𑄷 represents three different species of the Artemisia genus: *Artemisia annua* L. and another species of wormwood in the Daliangshan, and *Artemisia argyi* H. Lév. & Vaniot in Xiaoliangshan. In the Daliangshan, the Yi name 𑄸𑄹 represents *Crataegus pinnatifida* Bunge and *Crataegus scabrifolia* (Franch.) Rehder, whereas in Xiaoliangshan, it refers to *Docynia delavayi* (Franch.) C.K. Schneid.. Similarly, in the Daliangshan, the Yi word, 𑄠𑄡, refers to *Populus* sp. L., whereas in Xiaoliangshan, it refers to *Ehretia corylifolia* C.H. Wright.

Analysis of "key plants" in folk botanical nomenclature of the Yi nationality in Xiaoliangshan

Different plants play different role in the daily life of the Yi people in Xiaoliangshan, and their importance is also different. Through interviews, we summarized many important plants in the daily lives of the Yi people in Xiaoliangshan. These plants often have the following characteristics:

(1) Plants with monosyllabic non-binomial structured names. A total of 13 species of plants of this type were recorded. For example, 檜 (*Juniperus rigida* Siebold & Zucc.), 葎 (*Rubia alata* Wall.), 毒漆 (*Toxicodendron succedaneum* (L.) Kuntze), etc.

(2) Plants with "木" in the name. In the Yi language, "木" means "tree". The Yi people in Xiaoliangshan often use the word "木" as the name suffix for woody plants. In this study, 21 species of plants of this type were recorded. The life forms of these plants are often tall woody plants such as *Cornus capitata* Wall., *Docynia delavayi* (Franch.) C.K. Schneid., *Lithocarpus cleistocarpus* (Seemen) Rehder & E.H. Wilson, etc.

(3) The plants used in Yi nationality's traditional folk customs including weddings, funerals, sacrifices, the new year of Yi ethnic group, and the torch festivals are also important in Yi nationality's daily life. This type of traditional folk plant culture is widespread in the life of the Yi people in Xiaoliangshan. A total of 38 species of this type of plants have been recorded in this study. For example, *Fargesia yunnanensis* Hsueh & T.P. Yi, *Pinus yunnanensis* Franch., *Rhododendron decorum* Franch., etc.

The above-mentioned plants are mostly "sacred" plants recognized by the Yi people in Xiaoliangshan as indispensable in daily life of the Yi people. The Yi people also pay special attention to their protection and utilization.

Discussion

Characteristics of folk plant nomenclature of the Yi people in Xiaoliangshan

Many ethnic groups name plant species based on what the plant resembles [2, 9, 43, 44]. This method reflects a direct approach of recognising plants through the human senses, and it is based on the plants' visual appearance and taste. All such information is contained in the indigenous plant name. Similarly, the Yi people in Xiaoliangshan named plants based on their characteristics, and the names are often related to the characteristic shape, colour, smell, or taste of the plant. In addition to directly describing plant characteristics, the folk plant names used by the Xiaoliangshan Yi people are often based on animals, a nomenclature practice that is common in other places [3, 45–47]. The frequent use of animal names for plants can be explained by the traditional livelihood of the Yi people, which involves various animals.

Some studies have reported that to adapt to the demands of the mountainous environment in southwestern China, the Yi people formed a lifestyle based on farming and pastoral practices, and their dependence on livestock has thus been relatively high [22, 23]. It is therefore likely that when naming local plants, some of the salient features of a plant would stimulate a certain sensory response in the observer and cause them to associate the plant with a familiar object, which was ultimately used in the name selected for the plant. Due to the semi-pastoral lifestyle of the Yi people, it would be easy for an observer to assign suitable animal characteristics to a plant and use them to describe the plant, which is a nomenclature practice similar to that of the Mongolian herders [46].

Of the indigenous plant names of the Yi people in Xiaoliangshan, many include words that describe the plant's habitat, such as water, swamp, and field. This practice is also common in the folk plant nomenclature of the Mongolian and the Tung ethnic groups [48, 49]. Adding a habitat-related word to the plant's name would likely help distinguish it from other species and make it easier to find and collect. For example, the Yi people believe that *Rhamnus virgata* Roxb. is a wild plum (*Prunus salicina* Lindl.), so they use a habitat-based name to reflect the similarities and the differences between the two plant species. Another example is *Plantago major* L., which is a type of plant often used by the locals as pig feed; the Yi name of this plant reflects its habitat, which provides a clue to locals about where to find it.

Folk plant nomenclature is also based on oral traditions [50–52]. This study found that many plant names that are transmitted orally often contain semantically ambiguous phonetic symbols, and this finding is consistent with those of other studies of folk plant names used in traditional rituals within this area [14]. It is believed that in this type of nomenclature, in which the plant name is assigned directly and passed on orally, the unique name refers to the biological organism itself, and no further semantic analysis is therefore required.

In addition to the local Yi culture, the Han culture has also impacted the folk nomenclature of the Yi community in Xiaoliangshan. Many foreign plants have been introduced to the community, and the majority are used for medicinal purposes. The Yi people either directly transliterate the Chinese names of the introduced plants or add a Yi-language prefix to the Chinese transliteration. It is believed that these Chinese loanwords were introduced to Xiaoliangshan in a brief window of time during the 1960s when there was a lack of medical care in China, and the "barefoot doctor" policy was implemented [53]. The local government conducted basic medical training for barefoot doctors lasting 4 to 6 months [54], and they were later employed in local villages as healthcare

providers, which may have helped spread knowledge about Chinese herbal medicine in the Xiaoliangshan area. The increased use of borrowed Chinese names may also be related to the popularisation of standard Mandarin in basic education, ethnic integration, and the transformation of traditional lifestyles in the Xiaoliangshan region, and this was determined by another study based on the folk botanical nomenclature of the Yi people in Daliangshan [3].

With respect to the function-based plant nomenclature of the Yi people in Xiaoliangshan, the indigenous names employed reflect the plant's use or its value to humans and animals. This is similar to the function-based plant names used by the Han ethnic group [24]. For example, the Yi name of *Paeonia delavayi* Franch., which is used by the locals to treat injuries in humans and cattle, directly reflects the plant's use. It is believed that this practice is also related to the traditional livelihood of the Yi people. The Yi people are nomadic farmers, and cattle are the main source of power used in their traditional farming practices [25]. As wasteland reclamation is labour intensive, both humans and animals, but especially cattle, would often suffer strain injuries. Therefore, the plant that was used as a folk remedy for strain injuries has been given an indigenous name that reflects this use. Similarly, the Yi name for *Rubus sachalinensis* Lévl. reflects its indicator plant function. The Yi people in Xiaoliangshan have a long-standing practice of turnip cultivation, and this overwintering vegetable is sown seasonally and continues to be a staple food of the Yi people [26]. However, turnips are formed approximately three months after flowering [55, 56], and such a short growth cycle means that locals need to correctly assess the optimum sowing time for the crop. The fruiting period of *Rubus sachalinensis* Lévl. is from August to September [57], which coincides with the time when the locals begin turnip planting. Therefore, the indigenous name for *Rubus sachalinensis* Lévl. reflects this indicator plant's function of notifying the Yi people that it is time to sow turnips.

This study found that the Yi people named useful plants using a binomial and non-binomial structure. This is consistent with the findings of a study focusing on plants used in religious rituals [14]. The binomial structure for the botanical nomenclature used by the Yi people is similar to that of the Dai and Han ethnic groups [9, 58]. It is believed that this naming structure is used due to practical considerations: it enables the locals to learn important information about different plants, including their life form, habitat, and functions, which ultimately makes it easier to recognise and remember useful plants. The non-binomial names tend to reflect the characteristics of the local language; these names are generally transmitted

orally using semantically ambiguous phonetic symbols. Plants such as *Fagopyrum tataricum* (L.) Gaertn., *Cannabis sativa* L., and *Oryza sativa* L. have been cultivated by the Yi people for a very long time [59–61], and the ancient Yi names of these plants have a monosyllabic non-binomial structure. They are often used as root words when naming more complex plants, which indicates their important roles in the lives of the local Yi people [62].

This study found that there were three types of correspondence between plant names used by the Yi people in Xiaoliangshan and the plant species, namely: one plant name for one plant species, two plant names for one plant species, and one plant name for multiple plant species. These correspondence types are similar to those found by Raven et al., who studied the folk nomenclature and taxonomy of indigenous plants in Mexico [4], and to those of the Chinese Mongolian ethnic group [46]. Investigating the correspondence between folk plant names and plant species enables us to better understand how the Yi people in Xiaoliangshan perceive and recognise plants. This is especially true when multiple indigenous names are given to one plant species, or when one indigenous name corresponds to multiple plant species. For example, the locals classify *Chenopodium album* L. as two plants, which is reflected by the folk nomenclature. Both names emphasise colour (ꨀꨁꨂꨃ and ꨀꨁꨂꨃꨄ), even though *Chenopodium album* L. is a plant that is widely distributed and has many morphological variations [63]. Another example is that four different species of *Hypericum* are all named ꨀꨁꨂꨃ in the Yi language. These species are primarily found in southwestern China [57], and they are all important medicinal plants used in Xiaoliangshan to treat the same health problem. It is thus believed that they share one indigenous name in Xiaoliangshan because they have a similar form and function.

The influence of national cultural similarities and differences on plant naming

Cultural differences are an important factor that underlies various people's conventions for plant naming. For example: (1) Differences in languages of different nationalities will lead to differences in plant naming. In this study, the Xiaoliangshan Yi people have many proper nouns for plant names, most of which are phonetic shells with no specific meaning, which are also common in the folk plant names of other ethnic groups [12].

This proper noun inherited by members of the cultural group representing the biological organism itself. The proper noun itself has no specific meaning. It belongs to the cultural characteristics of a specific nationality. (2) The differences in the use of plants by different ethnic groups lead to differences in plant naming. For the same

plant, local people with different cultural backgrounds use plants differently. Consequently, leading to differences when naming such plants. For example, in Xiaoliangshan, the root decoction of *Malva verticillata* L. can be used as a medicine for oxytocin, but the Yi name "ꞑꞑꞑ" is a noun passed by word of mouth and has no specific meaning. Therefore, the meaning of this proper noun is not related to the function of the plant. In contrast, the Mongolians named it "taur nogo", which means "Peach vegetable"[12]. The name comes from the fact that the tender leaves of this plant are often eaten as vegetables by Mongolians. In addition, traditional cultures such as different religious beliefs and livelihoods may affect people's naming of plants. The traditional culture of Yi people's religious beliefs means of livelihood and language deeply influence the naming of plants by Yi people. It is mainly reflected in the worship thought contained in plant names, many animal names, and a wealth of proper nouns.

However, for the same cultural groups living in different geographic environments.

The factors affecting plant naming may not only be caused by cultural characteristics. Ethnobotanists Cassandra L. Quave and Andrea Pieroni stated that regardless of the living environment, the decisions and behaviour of an ethnic group of people are influenced by their culture [64]. Therefore, analyzing the folk plant names of the same cultural group living in different environments can reveal the influence of external factors other than culture on plant naming. The Yi people in Xiaoliangshan and those in the Daliangshan belong to the same ethnic group, but their living environments differ. In this study, the plants referred to by similar plant names in two places were analyzed. The reason for this result may not only be related to culture, because the cultural origin of the Yi people in the two places is the same. This also explains why there are many the same words in the names of plants in these two places.

The Yi people of Xiaoliangshan immigrated from Daliangshan about 200 years ago [28, 29, 31]. Elderly people of Yi nationality in Xiaoliangshan will trace their family tree back to Daliangshan, and some families of Yi people in Xiaoliangshan still maintain marriage relations with Yi people in Daliangshan. Therefore, in this large-scale family migration and intermarriage, the Xiaoliangshan Yi people retain many of the original living habits of their parents. In the end, this traditional plant name was passed down through generations. However, the differences in geographical environment and the influence of other cultures may also cause some changes in plant names by their exploitation of the local flora for living.

The relationship between folk nomenclature of plant species in Yi communities and biodiversity conservation

Hengduan Mountains is a global diversity hotspot [65]. But accelerated urbanisation progress has resulted in a severe loss of biodiversity within this region [66]. To protect biodiversity more effectively in ethnic minority areas, it is necessary to first preserve cultural diversity, and particularly to protect aspects of ethnic cultures that are closely related to biodiversity. The folk nomenclature of fauna and flora are important parts of cultural diversity and are essential for use in biodiversity conservation [67]. This is reflected primarily in the following two aspects: first, from a local perspective, folk nomenclature reflects an indigenous knowledge and understanding of individual plants and their unique characteristics, and it contains important information about plant attributes. The traditional knowledge constituted by these individual plants, including diverse germplasm and traditional medicine resources that have been used for centuries by the ethnic group, is a treasure trove of material and cultural wealth [68]. Therefore, as an important part of ethnic and cultural diversity, folk botanical nomenclature is extremely relevant in biodiversity conservation practices [69]. Second, from the overall perspective of biodiversity conservation, ethnobiological nomenclature reflects the relationship between living organisms and habitats. It is the indigenous epistemology of a complex natural system involving individual organisms and the environment. The use and knowledge of the folk nomenclature of living organisms permit people with non-scientific backgrounds to participate in biodiversity conservation efforts [70]. Many studies have investigated the relationship between cultural diversity and biodiversity, and the positive effect of regional traditional cultures on biodiversity conservation has been widely recognised in the scientific community [71]. For example, studies have shown that biodiversity and cultural diversity overlap in their geographical distribution [72, 73].

For the Yi people in Xiaoliangshan, folk botanical nomenclature is a rich cultural tradition that was formed as a means of managing and using local plant resources. This traditional knowledge is essential for the protection and sustainable development of local biodiversity.

First, the Yi people often use monosyllable names with non-binomial structures to name plants that are essential in their daily lives. Moreover, the Yi people often worship and protect plants with such names. For example, ꞑ (bamboo) is often used to make ancestral spirit bamboo cards in the life of Yi people in Xiaoliangshan. ꞑ is the physical substance worshipped by the ancestors of the Yi people in Xiaoliangshan, and it is often given a sacred meaning. For example, bamboo

is worshipped in daily life and cannot be destroyed at will. 杉 (pine trees) and 松 (fir trees) are also very important plants in the life of the Yi people. The Yi people often live at high mountains with lush fir trees when choosing residential areas. They often gather on the edge of fir forests and regard the dense fir forests as a place where gods live. If people break into the fir forest at will and disturb the gods, they will be punished by the gods. Therefore, fir represents the homeland of the gods believed by the Yi people and has a sacred meaning. Interestingly, when an old man from the Yi ethnic group in Xiaoliangshan said that he was about to die, he would say: "I am waiting for a tree", which means "I am a dying person, and I just want to find a tree to cremate myself". The Yi people often choose fir trees and pine trees for cremation. These plants with monosyllable names are generally sacred in the life of the Yi people in Xiaoliangshan and cannot be destroyed.

Second, the plant names of the Yi people in Xiaoliangshan also directly reflect the worship of plants. The Yi people in Xiaoliangshan often believe that many plants have the attributes of "god" and are gifts given to patients by "god". If someone collects such plants as commodities for sale, or collects too much, the collector will be punished by the "god". The typical characteristics of these plants are the names that often have "deterrence", such as 山王松 (*Lonicera calcarata* Hemsl.), 山王松 (*Taxus wallichiana* Zucc.) and 山王草 (*Ophiopogon bodinieri* H.Lév.). Their meanings are "The Queen of the Tree", "The Alpine Tree King", and "The Spiritual Grass" respectively.

In addition, the Xiaoliangshan Yi people usually protect and reasonably use some plants with "神" in their names. Such plants are usually tall trees, these plants are easy to distinguish in the folk botanical nomenclature. The main source of fuel needed by the Yi people in Xiaoliangshan is firewood, and every household has a firepit. The daily cooking, sacrifices, weddings, and other important activities of the Yi people all revolve around the fire pond. The fuelwood is an indispensable and important source of fuel supply for firepits. Therefore, the Yi people often collect plants such as 山王松 (*Lithocarpus cleistocarpus* (Seem) Rehder & E.H. Wilson) and 山王松 (*Pinus yunnanensis* Franch.) as fuelwood.

When collecting firewood, the Yi people collect the branches of plants and will not cut down the entire tree under normal circumstances. However, during cremation ceremonies, building houses, etc., they will have to cut down the entire tree. At this time, the Yi people usually take off some branches of the felled trees and graft them on the stakes of the felled trees. In addition, they will use soil and moss to cover the "wounds" of the stumps.

In general, the folk botanical nomenclature of the Yi people in Xiaoliangshan contains an appreciation of

nature and plant biodiversity, which greatly promotes the local Yi people's awareness of the rational use and protection of biodiversity.

From the perspective of cultural heritage, the folk botanical nomenclature of the Yi people in Xiaoliangshan is an integral part of their traditional knowledge, and it needs to be preserved for future generations. In recent years, accelerated urbanisation and the introduction of foreign culture have greatly affected the traditional knowledge of the Yi people in Xiaoliangshan. One manifestation of this trend is the increasing economic migration of young people to large cities [74] and their gradual assimilation into urban society; they thus have fewer opportunities to use their native Yi language. Due to the assimilation process between the Yi people and the Chinese culture, the language is being increasingly affected. In addition, young people from the Yi ethnic group remaining in Xiaoliangshan now use many Chinese loanwords due to the internet and other mass media usage. Certain popular internet terms have already become an integral part of their language on a large scale, and these are gradually replacing the Yi language [75]. Furthermore, under the recent Poverty Alleviation Resettlement policy, many Yi ethnic group members have been relocated from the mountains to urban areas [76]. The most significant consequence of these above factors is the loss of the local language, and language is the core of culture and the means of transmitting traditional knowledge.

The indigenous nomenclature of plant species is a proper naming system that reflects the rules of the local Yi language. Some studies have shown that the loss of native languages in indigenous communities impairs the transfer of traditional knowledge between different generations, lowers their sense of ethnic identity, and adversely affects the mental and physical health of the indigenous people [77]. In Xiaoliangshan, the loss of the traditional Yi knowledge is obvious; for example, during the interviews conducted in this study, we found that the names of many wild plants commonly collected during the Great Famine in China in the 1960s [78] are now only known by a few aged community members. In addition, the names of plants that are still commonly used for medicinal purposes or as feed are only known by middle-aged and older community members. When shown photographs of different plants, the younger community members recognised the plants, but either could not name them in the Yi language or they only knew the names used by the Han ethnic group, even though their parents were very familiar with and used these plants.

This gradual loss of ethnobotanical names equates to a loss of traditional knowledge and ethnic culture. Studies have shown that the potential for humans to acquire resources from nature through language will become

increasingly difficult with the loss of languages. Because indigenous languages are closely related to the pharmaceutical knowledge of ethnic groups, it is believed that the demise of indigenous languages will have a greater impact on pharmaceutical knowledge than on the loss of biodiversity [79]. The use of folk botanical names enables us to harness benefits from natural plant resources. Therefore, from the perspective of cultural heritage, creating standardised records of the ethnobotanical nomenclature of the Yi people in Xiaoliangshan and the rules they used to name plants is critical for preserving this valuable traditional knowledge.

Conclusions

This study used ethnobotany research methods to document the indigenous plant nomenclature of 226 locally used plant species belonging to 178 genera and 107 families. The folk names of plants and their corresponding scientific names have the following three types of relationships: one plant name for one plant species, two plant names for one plant species, and one plant name for multiple plant species. The nomenclature used by the Yi people in Xiaoliangshan has either a binomial or non-binomial name structure, and four primary factors are used to name plant species: plant characteristics, plant habitat, plant-use, and cultural attributes. Among them, cultural characteristics are important factors that determine differences in plant naming. The Yi people in Xiaoliangshan usually use monosyllable non-binomial structure names to name the most important plants in their daily lives. At the same time, the plants with "Y" in the name and "divine attributes" must be rationally used in the daily life of the Yi people and cannot be destroyed arbitrarily. This study of the folk botanical nomenclature of the Yi ethnic group in Xiaoliangshan will help promote the preservation of traditional knowledge and biodiversity conservation in this area. However, this study only focused on an analysis of ethnobotanical nomenclature, and further research is thus needed to determine whether similar nomenclature rules are used for other living organisms, such as animals and fungi.

Acknowledgements

We are thankful to the Yi People of the field survey for their kind cooperation and time. The scholars who have made great contributions to the research field of Traditional Knowledge of Yi People are also acknowledged with much gratitude. We would like to say “扎西德勒” (thank you) to those who helped us.

Authors' contributions

Y.-H.W. organized the study team and provided technical support and guidance. Y.-H.W., Y.Z., and Y.-W.A.D. designed and executed the research plan. Y.-W.A.D. recorded and organized the data and wrote the manuscript. Y.-W.A.D., X.-Y.D. and C.-A.G. identified the specimen and checked the information. All authors took part in the field works. All authors were involved in the drafting and revision of the manuscript and approved the final revision.

Funding

The study was funded by "the Second Tibetan Plateau Scientific Expedition and Research (No. 2019QZKK0502)".

Availability of data and materials

Please contact author for data requests.

Declarations

Ethics approval and consent to participate

The authors asked for permission from the local authorities and the people interviewed to carry out the study.

Consent for publication

The people interviewed were informed about the study's objectives and the eventual publication of the information gathered, and they were assured that the informants' identities would remain undisclosed.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Yunnan Key Laboratory for Wild Plant Resources, Kunming Institute of Botany, Chinese Academy of Sciences, 132# Lanhei Road, Heilongtan, Kunming 650201, Yunnan, China. ²University of Chinese Academy of Sciences, Beijing, China.

Received: 5 November 2021 Accepted: 14 January 2022

Published online: 15 March 2022

References

- Berlin B. Folk systematics in relation to biological classification and nomenclature. *Annu Rev Ecol Syst.* 1973;4(1):259–71.
- Xu ZF, Yan HD, Duan QW, Zhou HF. *Dai plant vernacular names and explanations in Xishuangbanna, Yunnan*. Beijing: Science Press; 2015.
- Wang J, Seyler BC, Ticktin T, Zeng Y, Ezhu Z. Indigenous botanical nomenclature used by the Yi people in Liangshan Prefecture, Sichuan Province, China. *Econ Bot.* 2019;73(3):325–40. <https://doi.org/10.1007/s12231-019-09461-4>.
- Berlin B, Breedlove DE, Raven PH. Folk taxonomies and biological classification. *Science.* 1966;154(3746):273–5. <https://doi.org/10.1126/science.154.3746.273>.
- Berlin B, Breedlove DE, Raven PH. General principles of classification and nomenclature in folk biology. *Am Anthropol.* 1973;75(1):214–42.
- Breedlove DE, Laughlin RM. *The flowering of man: a Tzotzil botany of Zinacantan*. Washington: Smithsonian Institution Press; 1993.
- Pei SJ, Huai HY. *Ethnobotany*. Shanghai: Shanghai Scientific & Technical Publishers; 2007.
- Wang J, Liu H, Lei HG. Participatory approach for rapid assessment of plant diversity through a folk classification system in a tropical rainforest: Case study in Xishuangbanna, China. *Conserv Biol.* 2004;18(4):1139–42. <https://doi.org/10.1111/j.1523-1739.2004.00075.x>.
- Xu ZF, Huan YL. Research on plant folk nomenclature and taxonomic system of Xishuangbanna Dai nationality. *Acta Bot Yunnan.* 1991. <https://doi.org/10.1007/BF02919155>.
- Xu ZF. Dai People's botanical knowledge: nomenclature-meaning and classification. *Plant Divers Resour.* 2015;37(01):39–45. <https://doi.org/10.7677/ynzwjy201514056>.
- Khasbagan S. Indigenous knowledge for plant species diversity: a case study of wild plants' folk names used by the Mongolians in Ejina desert area, Inner Mongolia, P R China. *J Ethnobiol Ethnomed.* 2008;4(1):2–2. <https://doi.org/10.1186/1746-4269-4-2>.
- Soyolt, Galsannorbu, Yongping, Wunenbayar, Liu GH, Khasbagan. Wild plant folk nomenclature of the Mongol herdsmen in the Arhorchin national nature reserve, Inner Mongolia, PR China. *J Ethnobiol Ethnomed.* 2013;9(1):30–30. <https://doi.org/10.1186/1746-4269-9-30>.
- Mandakh U, Battseren M, Ganbat D, Ayanga T, Adiya Z, Borjigidai A, et al. Folk nomenclature of plants in *Cistanche deserticola*-associated

- community in South Gobi, Mongolia. *Plant Divers.* 2020;42(6):434–42. <https://doi.org/10.1016/j.pld.2020.09.008>.
14. Ma CW, Mao XL. Cultural implication of plants: a study of the bimo ritual of the Yi as practiced in Xiaoliangshan. *Thinking.* 2021;47(01):80–92. <https://doi.org/10.3969/j.issn.1001-778X.2021.01.010>.
 15. Stokstad E. Mountains and monsoons created Tibetan biodiversity. *Science.* 2020;369(6503):493–493. <https://doi.org/10.1126/science.369.6503.493>.
 16. Li XW, Li J. A preliminary floristic study on the seed plants from the region of Hengduan mountain. *Acta Bot Yunnan.* 1993;15(03):217–31.
 17. Ju Y, Zhuo JX, Liu B, Long CL. Eating from the wild: diversity of wild edible plants used by Tibetans in Shangri-la region, Yunnan, China. *J Ethnobiol Ethnomed.* 2013;9(1):28. <https://doi.org/10.1186/1746-4269-9-28>.
 18. Wang J, Seyler BC, Ticktin T, Zeng YG, Ayu KD. An ethnobotanical survey of wild edible plants used by the Yi people of Liangshan Prefecture, Sichuan Province, China. *J Ethnobiol Ethnomed.* 2020;16(1):10. <https://doi.org/10.1186/s13002-019-0349-5>.
 19. Yang LX, Ahmed S, Stepp JR, Mi K, Zhao YQ, Ma JZ, et al. Comparative homegarden medical ethnobotany of Naxi healers and farmers in North-western Yunnan, China. *J Ethnobiol Ethnomed.* 2014;10(1):6–6. <https://doi.org/10.1186/1746-4269-10-6>.
 20. China statistical yearbook 2021. <http://www.stats.gov.cn/tjsj/ndsj/2021/indexch.htm>, Accessed 24 Nov 2021.
 21. The Chinese Yi Ethnic Minority, History and Customs. <https://www.chinahighlights.com/travelguide/nationality/yi.htm>, Accessed 17 Aug 2021.
 22. Tan YL, Qin Z. A preliminary study on the influence of Yi's religious belief on their mental and physical health. *Chin J Ethnomed Ethnopharm.* 2020;29(21):3.
 23. Gao W. Acculturation and livelihood choice: an ecological anthropological study of animal husbandry economy in Yi Nationality region. *Heilongjiang Anim Sci Vet Med.* 2014;15:264–6.
 24. Chen H. The conceptual metaphors of "A PLANT IS A HUMAN BEING": a contrastive study based on Chinese and English plant names. *Foreign Lang Lit.* 2014;30(05):81–7. <https://doi.org/10.3969/j.issn.1674-6414.2014.05.014>.
 25. Du J, Wu J, Yang GL, Li YQ. Practice of Chuxiong Normal University in cultivating musicianship for "Application-orientated" primary School Teachers. *J Chuxiong Norm Univ.* 2016;031(011):84–91.
 26. Yang TS. Plant and culture: another interpretation of human history. *J Jishou Univ (Soc Sci).* 2012;33(01):1–7. <https://doi.org/10.3969/j.issn.1007-4074.2012.01.001>.
 27. Wu ZY. *Flora of Yunnan. Spermatophyta, vol. 6.* Beijing: Science Press; 1995.
 28. Zheng CJ. The Yi nationality family branch system and its change in Xiaoliangshan, Yunnan province. *J Southwest Minzu Univ (Humanit Soc Sci).* 2000;53:125–30.
 29. Jiarimuji. A study on the formation village space in the Xiaoliangshan Yi area of Yunnan: a dialogue with prasenjit Duara's "culture nexus of power". *Ethno-Natl Stud.* 2012;55(01):40–50+109.
 30. Wang J, Seyler BC, Ticktin T, Zeng YG, Ayu KD. An ethnobotanical survey of wild edible plants used by the Yi people of Liangshan Prefecture, Sichuan Province, China. *J Ethnobiol Ethnomed.* 2020. <https://doi.org/10.1186/s13002-019-0349-5>.
 31. Jiarimuji. Ethnic relations and regional politics in the legend of Yi nationality migration in Xiaoliangshan, Yunnan province in the late Qing Dynasty: an attempt to get rid of fei Xiaotong's Confusion. *J Southwest Minzu Univ (Humanit Soc Sci).* 2018;39(02):62–72. <https://doi.org/10.3969/j.issn.1004-3926.2018.02.009>.
 32. Li Z, Yang ZX. Proposes to forest resources investigation and forestry development in Ninglang County of Yunnan Province. *For Eng.* 2014;30(06):22–6. <https://doi.org/10.3969/j.issn.1001-005X.2014.06.006>.
 33. Ding Y, He YZ. Study on soil classification and improvement in Ninglang County. *Jiangxi Agric.* 2019;04:52–3. <https://doi.org/10.3969/j.issn.1674-1479.2019.04.044>.
 34. Wu JY, Yang XJ, Jiang WG, Wang YH, Zhao FW. An inventory of county-level biodiversity in Northwest Yunnan. *Biodivers Sci.* 2016;024(012):1414–20. <https://doi.org/10.17520/biods.2016154>.
 35. Xu SY. Anthropological analysis of changes of livelihood pattern of Yi ethnic minority in Xiaoliangshan Area: a case study of Paomaping Town of Lijiang City. *J Honghe Univ.* 2021;19(01):40–3. <https://doi.org/10.13963/j.cnki.hhxb.2021.01.010>.
 36. Wang Y, Li HJ. A study on Yi people's wooden houses in Xiaoliangshan of Yunnan. *J Wenshan Univ.* 2021;34(01):50–5. <https://doi.org/10.3969/j.issn.1674-9200.2021.01.010>.
 37. Jia YZ. *The diet culture of Yi nationality.* Chengdu: Sichuan University Press; 1994.
 38. Yang ZX, Bibu RF. Interpret the relationship between "snow nation" and human beings in the concept of Yi nationality. *J Southwest Minzu Univ (Humanit Soc Sci).* 2011;32(12):64–7. <https://doi.org/10.3969/j.issn.1004-3926.2011.12.014>.
 39. Zhang ZH. Bimo and Suni of the Yi religion in southwest China. *Relig Stud.* 2012;04:223–31.
 40. Zhang ZH. Ancestral worship and multi-belief system of Yi religion in Southwest China. *Relig Stud.* 2011;04:186–92.
 41. Wang CY. *A comparative study of Yi dialects.* Chengdu: Sichuan Nationalities Publishing House; 2003.
 42. Editorial Committee of Flora of China. *Flora of China.* Beijing: Science Press; 2013.
 43. Wang JX, Liu HM, Hu HB, Gao L. Participatory approach for rapid assessment of plant diversity through a folk classification system in a tropical rainforest: case study in Xishuangbanna, China. *Conserv Biol.* 2004;18(4):1139–42. <https://doi.org/10.1111/j.1523-1739.2004.00075.x>.
 44. Chen S. Plant naming and Mongolian culture. *J Inner Mongolia Norm Univ.* 1992;3:52–63. <https://doi.org/CNKI:SUN:NMSB.0.1992-03-007>.
 45. Kolosova V, Svanberg I, Kalle R, Strecker L, Özkan AMG, Pieroni A, et al. The bear in Eurasian plant names: motivations and models. *J Ethnobiol Ethnomed.* 2017;13(1):14. <https://doi.org/10.1186/s13002-016-0132-9>.
 46. Soyolt, Galsannorbu, Yongping, Wunenbayar, Liu G, Khasbagan. Wild plant folk nomenclature of the Mongol herdsman in the Arhorchin National Nature Reserve, Inner Mongolia, PR China. *BioMed Cent.* 2013;9(1):30–30. <https://doi.org/10.1186/1746-4269-9-30>.
 47. Li RT. The study of plant nouns based on animals. *J Henan Norm Univ.* 2008;35(5):3. <https://doi.org/10.16366/j.cnki.1000-2359.2008.05.026>.
 48. Cao WJSG, Te BQ. Exploration on the mutual infiltration teaching of Mongolian medicinal botany and Mongolian folk traditional medicine knowledge—a case study of medicinal plant folk name. *J Med Pharm Chin Minor.* 2015;21(10):48–51. <https://doi.org/10.16041/j.cnki.cn15-1175.2015.10.025>.
 49. Shi L, Huang Y. Cultural connotation in classifying and naming Dong plants. *J Baise Univ.* 2017;30(02):42–51.
 50. Xian XL. On the motivation of plant-naming in Sichuan Chorography. *J Neijiang Norm Univ.* 2008;11:102–6. <https://doi.org/10.3969/j.issn.1671-1785.2010.11.025>.
 51. Tan HJ, Chen YY. On the characteristics of plant nomenclature in Guangzhou dialect. *J Baicheng Norm Univ.* 2020;34(04):51–5.
 52. Tan HJ, Lei HY. Language cognitive analysis of plant names in modern Chinese. *J Chang Univ.* 2020;30(09):41–6. <https://doi.org/10.3969/j.issn.1009-3907.2020.05.009>.
 53. Zhang KN. *From the barefoot doctor to the country doctor.* Kunming: Yunnan People's Publishing House; 2002.
 54. Xu S, Hu D. Barefoot doctors and the "Health Care Revolution" in rural China: a study centered on Shandong province. *Endeavour.* 2017. <https://doi.org/10.1016/j.endeavour.2017.06.004>.
 55. Wu ZY. *Flora of Yunnan.* Beijing: Science Press; 2006.
 56. Yan QJ. Research on Yi people's food culture from the ecological perspective. *J Qingdao Agric Univ (Soc Sci).* 2020;32(04):87–90. <https://doi.org/10.3969/J.ISSN.1674-1471.2020.04.016>.
 57. Editorial Committee of Flora of China. *Flora of China.* Beijing: Science Press; 1990.
 58. Lan YH. The ancient Chinese method of naming plants and animals as found in the SHI MING OF THE BEN CAO GANG MU. *Stud Hist Nat Sci.* 1989;8(02):166–70.
 59. Group BYLT. *The history of Yi nationality in southwest of China.* Guiyang: Guizhou Nationalities Publishing House; 1988.
 60. Shang YH. The belief culture of the minority of Yi nationality in the micro perspective—a study on the relic worship of plants of Micha people of Yi nationality. *J Guizhou Univ Eng Sci.* 2019;37(06):54–9. <https://doi.org/10.3969/j.issn.1673-7059.2019.06.010>.
 61. Song YJ, Long CL. Traditional knowledge and culture of buckwheat. *Science.* 2019;71(02):9–12. <https://doi.org/10.3969/j.issn.0368-6396.2019.02.004>.

62. Zhu SZ. Plantation and distribution of the main crops in the Liangshan Yi ethnic areas in Sichuan Province in history. *Agric Hist China*. 2006. <https://doi.org/10.3969/j.issn.1000-4459.2006.02.002>.
63. Editorial Committee of Flora of China. *Flora of China*. Beijing: Science Press; 1974.
64. Quave CL, Pieroni A. A reservoir of ethnobotanical knowledge informs resilient food security and health strategies in the Balkans. *Nat Plants*. 2015;1(2):14021. <https://doi.org/10.1038/nplants.2014.21>.
65. Myers N, Mittermeier RA, Mittermeier CG, da Fonseca GAB, Kent J. Biodiversity hotspots for conservation priorities. *Nature*. 2000;403(6772):853–8. <https://doi.org/10.1038/35002501>.
66. Zhang Y, Lin GS. An introduction and analysis of biodiversity conservation in Indo-Burma biodiversity hotspot. *Landsc Archit*. 2015. <https://doi.org/10.14085/j.fyl.2015.06.0016.09>.
67. Wang JP, He J. Ethnic traditional culture and biodiversity conservation in Yunnan Province. *J West China For Sci*. 2021;50(05):124–8.
68. Huai HY, Pei SJ. Advances of medical ethnobotany. *Chin Bull Bot*. 2002. <https://doi.org/10.16473/j.cnki.xblykx1972.2021.05.018>.
69. Xue DY, Guo L. On concepts and protection of traditional knowledge. *Biodivers Sci*. 2009;17(02):135–42. <https://doi.org/10.3724/SPJ.1003.2009.08256>.
70. Phaka FM, Netherlands EC, Kruger DJD, Du Preez LH. Folk taxonomy and indigenous names for frogs in Zululand, South Africa. *J Ethnobiol Ethnomed*. 2019;15(1):17. <https://doi.org/10.1186/s13002-019-0294-3>.
71. Shao H, Yang JB, Xue DY. Applications of Wa traditional culture in biodiversity conservation. *Biodivers Sci*. 2021;29(08):1120–7. <https://doi.org/10.17520/biods.2020480>.
72. Gorenflo LJ, Romaine S, Mittermeier RA, Walker-Painemilla K. Co-occurrence of linguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. *PNAS*. 2012;109(21):8032–7. <https://doi.org/10.1073/pnas.1117511109>.
73. Loh J, Harmon D. A global index of biocultural diversity. *Ecol Ind*. 2005;5(3):231–41. <https://doi.org/10.1016/j.ecolind.2005.02.005>.
74. Li JP. Investigation of ethnic Minority migrant workers in cities—a case study of Yi nationality migrant workers in Xiegang Town, Dongguan. *J Aba Teach Univ*. 2010;27(03):36–9. <https://doi.org/10.3969/j.issn.1008-4142.2010.03.010>.
75. Li L. Language ecology of Yi nationality in Xiaoliangshan. *Yunnan Cult J*. 2016;12:175–7.
76. Zhang XY, Wang ZN. An analysis of poverty relief relocation in Ninglang County in post-poverty era, Shanxi. *Agric Econ*. 2021;15:23–5. <https://doi.org/10.16675/j.cnki.cn14-1065/f.2021.15.007>.
77. Khawaja M. Consequences and remedies of indigenous language loss in Canada. *Societies*. 2021;11(3):89. <https://doi.org/10.3390/soc11030089>.
78. Jia YM, Zhu J. A review of the great famine studies by domestic scholars. *J Jiangsu Univ (Soc Sci Ed)*. 2015;17(02):14–24. <https://doi.org/10.13317/j.cnki.jdskxb.2015.015>.
79. Cámara-Leret R, Bascompte J. Language extinction triggers the loss of unique medicinal knowledge. *PNAS*. 2021;118(24): e2103683118. <https://doi.org/10.1073/pnas.2103683118>.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

