
THE TROPICAL FLORA OF SOUTHERN YUNNAN, CHINA, AND ITS BIOGEOGRAPHIC AFFINITIES¹

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ABSTRACT

The flora of Xishuangbanna in southern Yunnan, southwestern China, consists of 3340 native seed plant species belonging to 1176 genera and 182 families. Tropical floristic elements at the generic level form a major contribution (78.3%) to the total flora of southern Yunnan, of which the dominant geographic elements are those of tropical Asian distribution. The tropical Asian flora of Xishuangbanna is similar in composition to other tropical floras from Yunnan, especially in the families with the most species richness. These regional floras have similarities of more than 89% at the family level and more than 76% at the generic level, but share only 43%–50% similarity at the specific level. Comparison with mainland Southeast Asia (Thailand) and Malesia (Malay Peninsula) floras reveals that most of the dominant families from southern Yunnan are also dominant in mainland Southeast Asian and Malesian floras. The floristic similarities between the flora of southern Yunnan and those of tropical Asia are more than 80% at the family level and more than 64% at the generic level. This suggests that the tropical flora of southern Yunnan has a close affinity with tropical Asian flora and supports the idea that the flora of southern Yunnan, together with mainland Southeast Asian flora, belongs to the Indo-Malaysian floristic subkingdom of the Paleotropical kingdom as suggested by Takhtajan, or the Malaysian subkingdom of the Paleotropical kingdom as suggested by Wu and Wu. However, situated at the northern margin of tropical Asia, the flora of southern Yunnan comprises less strictly tropical elements compared to Malaysian flora and, consequently, represents only a marginal type of Indo-Malaysian flora. The tropical flora of southern Yunnan is supposed to be derived from tropical Asian flora with the formation of the eastern monsoon climate after the Tertiary.

Key words: Biogeographic affinity, southern Yunnan, floristic composition.

The tropical area of southern China is located at the northern edge of tropical Asia and is composed of the extreme southeastern part of Xizang (Tibet) among the lower valleys of the southern Himalayas, southern Yunnan, southwestern Guangxi, southern Taiwan, and Hainan separately. The largest tropical area still covered by forests is in southern Yunnan, the most southwestern region of China, which is also a key area in biogeography and a hotspot for biodiversity (Myers, 1998). This is a mountainous region at the northern margin of mainland Southeast Asia, with a monsoon climate and a slightly lower annual mean temperature (ca. 21°C) and lower annual precipitation (average, 1500 mm) in lowlands and valleys compared to the main tropical rainforest areas of the world, e.g., Malaysia (Richards, 1996). The tropical forest in southern Yunnan is therefore intermediate between classic tropical rainforests and monsoon forests as defined by Schimper (1903), or a type of subtropical rainforest, which differs in various aspects from the true tropical rainforests described by Richards (1952).

After the Chinese-Russian expedition to remote areas of southwestern China, including southern Yunnan, in the late 1950s, papers on the tropical rainforest vegetation (Fedorov, 1958; Wang, 1961) and tropical flora (Fedorov, 1957; Wu, 1965) of this part of China were published. It was basically accepted that biogeographically real tropical rainforests exist in southwestern China, but these were considered to be a different type from those in Indo-Malaysia because of the lack of representatives from Dipterocarpaceae, which dominate the rainforests of tropical Southeast Asia.

Botanical interest was rekindled in the 1970s by the discovery of a dipterocarp forest in southern Yunnan, thus the Indo-Malaysian affinity of the tropical flora of Yunnan was reconsidered. Further results from biogeographic and ecological studies of the vegetation and flora of tropical southern Yunnan revealed that it does in fact comprise a part of the Indo-Malaysian flora (Zhu, 1992, 1993a, b, 1994, 1997, 2004; Zhu et al., 1998a, b, 2001, 2003; Zhu &

¹This project was funded by the National Natural Science Foundation of China (30570128, 30770158). Figure 1 was prepared by Li Hong-mei. The author thanks David E. Boufford of Harvard University Herbaria for his constructive comments and Chris Carpenter from University of California for improving the English grammar within the manuscript. I also give many thanks to the reviewers for their important and constructive comments.

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doi: 10.3417/2006081

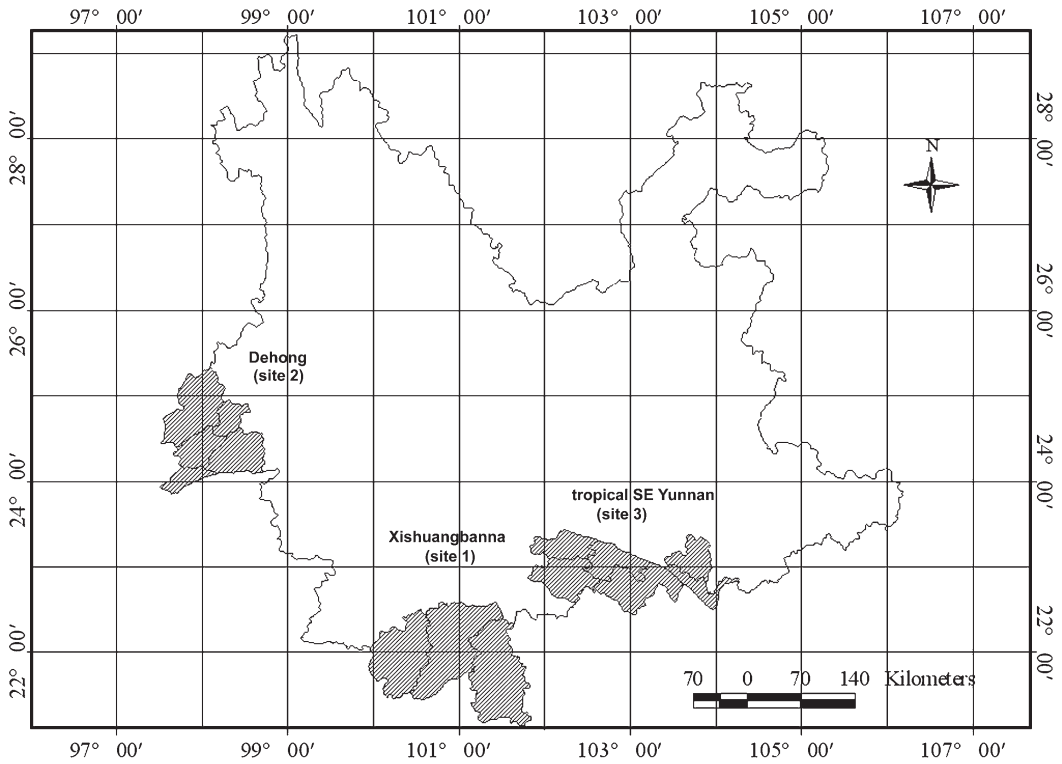


Figure 1. Map showing the locations of the tropical areas in southern Yunnan. Site 1: Xishuangbanna administrative region in south Yunnan; site 2: Dehong administrative region in southwestern Yunnan; site 3: tropical southeastern Yunnan.

Roos, 2004). Also, T. C. Whitmore, from his visit to southern Yunnan, observed that the birds in the tropical rainforest there sang the same songs as the birds in the tropical rainforest of Malaysia (Whitmore, 1982), and he confirmed that there is true evergreen rainforest present in the southern fringe of China (Whitmore, 1984).

To better understand the affinities of southern Yunnan's flora, the floristic composition was concisely enumerated, and its geographic elements were analyzed at family and generic levels. Also, the floristic similarities between southern, southeastern, and southwestern Yunnan (Fig. 1, sites 1–3), as well as between mainland Southeast Asia (Thailand) and Malaysia (Malay Peninsula), were compared using revised floristic inventories and checklists.

GEOGRAPHY

TOPOGRAPHY

Xishuangbanna in southern Yunnan lies between 21°09'N and 22°36'N, 99°58'E and 101°50'E (Fig. 1). The region occupies an area of 19,690 km². It borders Burma and Laos and has a mountainous topography with mountain ridges running in a north-

south direction, decreasing in elevation southward. Its elevation ranges from 480 m at the lowest valley bottom in the south (Mekong River) to 2429.5 m at the highest mountain summit in the north. The Mekong River runs through the region from the northwest to the southeast (Xu et al., 1987).

CLIMATE

The region has a typical monsoon climate. The annual mean temperature varies from 21.7°C at an elevation of 550 m to 15.1°C at 1979 m, and the 20°C isotherm is equal to the 850 m elevation isoline. The hottest month is June, with a mean temperature of 17.9°C at 1979 m and 25.3°C at 550 m, while the coldest month is January, with a mean temperature ranging from 8.8°C–15.6°C. Annual precipitation increases from 1193 mm at Mengyang in the central part of the region at 740 m to 2491 mm at the summit of Nangongshan in the southern part at 1979 m. More than 80% of the precipitation falls during the rainy season from May to October. In areas of lower hills and valleys covered by tropical rainforests, the annual mean temperature is about 21°C and the annual cumulative temperature (the sum of daily temperature means > 10°C) is 7600°C–7800°C. Annual precip-

itation is more than 1500 mm, relative humidity is about 80%, and frost has never been recorded (Xu et al., 1987).

Dense fog is frequent throughout the dry season on the lower hills and in the valleys, averaging 146 foggy days per year and 1 mm precipitation per foggy day in Mengla Xian in southern Xishuangbanna. The fog is thought to compensate for the insufficient precipitation so that a tropical moist climate can form locally despite relatively low annual precipitation (Zhu, 1997).

SOIL

There are three main soil types in the region. Lateritic soils developed from siliceous rocks such as granite, and gneiss occurs at 600–1000 m with a deep solum, but thin humus horizon. Lateritic red soils derived from sandstone substrate occur in areas above 1000 m. Limestone hill soils are derived from a hard limestone substrate of Permian origin with a pH of 6.75. The tropical rainforest in southern Yunnan occurs mainly on lateritic soils with pH values of 4.5–5.5.

GEOLOGICAL HISTORY

Southern Yunnan is at the junction of the Indian and Burmese plates of Gondwana and the Eurasian plate of Laurasia (Audley-Charles, 1987; Hall, 1998). Before the Mesozoic, the area was part of the Tethys margin, and later some fragments from Gondwana were combined. Since the Tertiary, the region had gone through several stages of rising and descending with the intermittent uplift of the Himalayas, and gradually formed the modern topography in the mid-Tertiary (Shi et al., 1998, 1999).

During the late Cretaceous, the region had a hot, dry climate, based on fossil records from Mengla in which a relatively high proportion of *Ulmipollenites* and *Ephedripites* were found (Sun, 1979). From the Paleocene to the Eocene, the region went through a rising stage with the uplift of the Himalayas and was influenced by a dry climate with a high deposition of salt minerals. From the Miocene to Pliocene, the region descended and formed a series of basins with a wet and warm climate. Since the Quaternary, the region has again experienced rapid uplift, associated with alternative climatic changes of wet and dry periods (Liu et al., 1986).

Paleobotanical data from the Tertiary in southern Yunnan (Xishuangbanna) are extremely insufficient. Available information from neighboring regions suggests that southern Yunnan could be a subtropical evergreen broad-leaved forest characterized by Faga-

ceae species during this period (Song et al., 1976, 1983; Song, 1984; Wang, 1996; Penny, 2001; Mehrotra et al., 2005).

The present tropical rainforest in southern Yunnan is at the elevational and latitudinal limits of tropical rainforests in the Northern Hemisphere. It is believed that the tropical moist climate in southern Yunnan did not form until the Himalayas uplifted to a certain elevation after the late Tertiary (Zhu, 1997). Thus, the tropical rainforests in the region were developed after the later Tertiary. The fundamental topography and climate of the region have been strongly affected by the uplift of the Himalayas and the formation of the eastern monsoon climate (Shi et al., 1998, 1999).

METHODS

Based on identifications of ca. 60,000 specimens from southern Yunnan in HITBC, acquired during more than 40 years of intermittent field collections, the former *List of Plants in Xishuangbanna* (Li, 1996) was revised and updated, and 3340 native species of 1176 genera and 182 families of seed plants have been recognized (see Appendix 1). Circumscription of families and species nomenclature follows *w*³TROPICOS of the Missouri Botanical Garden (<<http://www.tropicos.org>>). Floristic and geographic attributes of the flora of southern Yunnan were analyzed. Patterns of seed plant distribution of the flora were quantified at the family and generic levels based on C. Y. Wu's documentations (Wu, 1991; Wu et al., 2003). The inventory data of the floras of southwestern Yunnan from the Dehong administrative region (Zhu et al., 2004) and southeastern Yunnan (Shui, 2003) (see Fig. 1, sites 2 and 3, respectively) were compared to demonstrate the floristic variation in tropical Yunnan. The revised checklist of the vascular plants of Malay Peninsula (Turner, 1995) and the checklist of Thai plants (Smitinand, 2001) were also used to compare the floristic affinity between the tropical flora of southern Yunnan (Fig. 1, site 1) and that of mainland Southeast Asia and Malaysia.

FLORISTIC COMPOSITION

A total of 3340 native species of 1176 genera and 182 families of seed plants were recognized from Xishuangbanna in southern Yunnan. The families with highest species richness include Orchidaceae (94 genera/328 species), Fabaceae (65/211), Rubiaceae (45/142), Poaceae (63/132), Euphorbiaceae (36/117), Asteraceae (59/106), Moraceae (7/73), Lauraceae (14/70), Urticaceae (14/72), Zingiberaceae (17/72), Acanthaceae (32/68), Lamiaceae (28/61), Asclepiadaceae (26/58), and Apocynaceae (23/51) (Table 1).

Table 1. The flora of southern Yunnan (Xishuangbanna) by family. Only native species in southern Yunnan (Xishuangbanna) are included. Family size is from the Missouri Botanical Garden's w³TROPICOS (<<http://www.tropicos.org>>).

	No. of genera	No. of species		No. of genera	No. of species
Families with >100 spp.					
Orchidaceae	94	328	Poaceae	63	132
Fabaceae	65	211	Euphorbiaceae	36	117
Rubiaceae	45	142	Asteraceae	59	106
Families with 51–100 spp.					
Moraceae	7	73	Acanthaceae	32	68
Lauraceae	14	70	Lamiaceae	28	61
Urticaceae	14	72	Asclepiadaceae	26	58
Zingiberaceae	17	72	Apocynaceae	23	51
Families with 21–50 spp.					
Ammonaceae	15	49	Scrophulariaceae	15	33
Verbenaceae	11	48	Sterculiaceae	12	33
Cucurbitaceae	17	46	Commelinaceae	10	31
Rosaceae	18	46	Menispermaceae	14	30
Vitaceae	7	45	Gesneriaceae	13	29
Fagaceae	5	44	Myrsinaceae	4	28
Araceae	17	43	Melastomataceae	9	27
Arecaceae	8	40	Araliaceae	10	26
Cyperaceae	14	40	Rhamnaceae	9	26
Rutaceae	14	40	Solanaceae	5	25
Meliaceae	12	37	Myrtaceae	2	23
Convolvulaceae	13	36	Oleaceae	7	23
Liliaceae	19	35	Dioscoreaceae	1	22
Malvaceae	10	34	Theaceae	9	22
Piperaceae	3	33			
Families with 6–20 spp.					
Polygalaceae	4	20	Bignoniaceae	7	10
Polygonaceae	4	19	Lythraceae	4	10
Apiaceae	8	18	Ulmaceae	5	10
Boraginaceae	9	18	Myristicaceae	3	9
Elaeocarpaceae	2	18	Primulaceae	1	9
Loranthaceae	6	18	Symplocaceae	1	9
Anacardiaceae	12	18	Violaceae	1	9
Campanulaceae	9	17	Actinidiaceae	2	8
Tiliaceae	5	17	Burseraceae	3	8
Celastraceae	4	16	Proteaceae	2	8
Flacourtiaceae	6	16	Sabiaceae	2	8
Loganiaceae	6	15	Sapotaceae	3	8
Smilacaceae	1	15	Balsaminaceae	1	7
Caprifoliaceae	5	14	Caryophyllaceae	6	7
Capparaceae	4	14	Hernandiaceae	1	7
Ranunculaceae	4	14	Juglandaceae	3	7
Amaranthaceae	7	13	Lentibulariaceae	1	7
Clusiaceae	5	13	Styracaceae	4	7
Ericaceae	4	13	Viscaceae	2	7
Magnoliaceae	8	13	Aristolochiaceae	1	6
Sapindaceae	11	13	Ebenaceae	1	6
Aquifoliaceae	1	12	Malpighiaceae	2	6
Icacinaeae	8	12	Musaceae	2	6
Begoniaceae	1	11	Onagraceae	2	6
Combretaceae	4	11	Passifloraceae	2	6
Cornaceae	4	11	Pittosporaceae	1	6
Hippocrateaceae	3	11	Santalaceae	5	6

Table 1. Continued.

	No. of genera	No. of species		No. of genera	No. of species
Families with 1–5 spp.					
Brassicaceae	3	5	Podostemaceae	2	2
Elaeagnaceae	1	5	Portulacaceae	2	2
Gentianaceae	5	5	Potamogetonaceae	1	2
Hydrocharitaceae	4	5	Rhizophoraceae	2	2
Oxalidaceae	3	5	Saururaceae	2	2
Simaroubaceae	3	5	Stemonaceae	1	2
Staphyleaceae	2	5	Thymelaeaceae	2	2
Balanophoraceae	1	4	Xyridaceae	1	2
Betulaceae	3	4	Berberidaceae	1	1
Connaraceae	4	4	Cephalotaxaceae	1	1
Dilleniaceae	2	4	Ceratophyllaceae	1	1
Iridaceae	2	4	Crypteroniaceae	1	1
Lemnaceae	3	4	Cupressaceae	1	1
Nyssaceae	2	4	Datiaceae	1	1
Podocarpaceae	3	4	Dichapetalaceae	1	1
Saxifragaceae	3	4	Droseraceae	1	1
Aizoaceae	2	3	Erythroxylaceae	1	1
Alismataceae	2	3	Geraniaceae	1	1
Amaryllidaceae	2	3	Grossulariaceae	1	1
Burmanniaceae	1	3	Hydrangeaceae	1	1
Chloranthaceae	2	3	Hydrophyllaceae	1	1
Cycadaceae	1	3	Juncaceae	1	1
Gnetaceae	1	3	Lecythidaceae	1	1
Marantaceae	3	3	Menyanthaceae	1	1
Olacaceae	3	3	Myricaceae	1	1
Plantaginaceae	1	3	Najadaceae	1	1
Pontederiaceae	1	3	Nyctaginaceae	1	1
Aceraceae	1	2	Orobanchaceae	1	1
Bombacaceae	1	2	Pandanaceae	1	1
Butomaceae	2	2	Papaveraceae	1	1
Buxaceae	2	2	Pinaceae	1	1
Chenopodiaceae	2	2	Rafflesiaceae	1	1
Crassulaceae	2	2	Salicaceae	1	1
Daphniphyllaceae	2	2	Sonneratiaceae	1	1
Dipterocarpaceae	2	2	Sparganiaceae	1	1
Elatinaceae	2	2	Sphenocleaceae	1	1
Eriocaulaceae	1	2	Stachyuraceae	1	1
Fumariaceae	1	2	Stylidiaceae	1	1
Hamamelidaceae	2	2	Taccaceae	1	1
Lardizabalaceae	1	2	Trapaceae	1	1
Linaceae	2	2	Valerianaceae	1	1
Nymphaeaceae	2	2	Zygophyllaceae	1	1
Opiliaceae	2	2			

Total: 182 families, 1176 genera, and 3340 species including infraspecific taxa

The family Orchidaceae has higher species richness in Xishuangbanna than in Laos and Cambodia (Chen & Tsi, 1996).

Some families have only a small number of species, but are very abundant in the tropical forests of southern Yunnan, such as Sapindaceae (11 genera/13 species), Anacardiaceae (12/18), Burseraceae (3/8), Elaeocarpaceae (2/18), Ebenaceae (1/6), Combreta-

ceae (4/11), Ulmaceae (5/10), and Myrtaceae (2/23). The families Dipterocarpaceae (2/2), Datisaceae (1/1), Myristicaceae (3/9), Clusiaceae (5/13), Icacinaceae (8/12), Linaceae (2/2), and Sapotaceae (3/8) have even fewer species, but are also very abundant in some forest types.

At the generic level, *Ficus* L. has the most taxa (58 species including infraspecific taxa). Other genera

Table 2. Geographic elements of seed plants at the family level from the flora of southern Yunnan (Xishuangbanna).

Geographic elements	No. of families (%)
1. Cosmopolitan	52 (28.57)
2. Pantropic	77 (42.31)
3. Tropical Asia and tropical America disjunctions	10 (5.49)
4. Old World Tropic	4 (2.20)
5. Tropical Asia to tropical Australia	5 (2.75)
6. Tropical Asia	3 (1.65)
7. North temperate	24 (13.19)
8. East Asia and North America disjunctions	3 (1.65)
9. Old World temperate	1 (0.55)
10. East Asia	3 (1.65)
Total	182 (100.00)

with high species richness include *Dendrobium* Sw. (43 species), *Bulbophyllum* Thouars (40), *Piper* L. (27), *Calamus* L. (24), *Dioscorea* L. (22), *Syzygium* P. Browne ex Gaertn. (22), *Eria* Lindl. (22), *Litsea* Lam. (21), *Pilea* Lindl. (17), *Lithocarpus* Blume (16), *Millettia* Wight & Arn. (16), *Castanopsis* (D. Don) Spach (16), *Tetrastigma* (Miq.) Planch. (16), *Elaeocarpus* L. (16), *Elatostema* J. R. Forst. & G. Forst. (14), *Amomum* Roxb. (14), *Clerodendrum* L. (14), *Ardisia* Sw. (10), *Lasianthus* Jack (12), *Dysoxylum* Blume (10), and *Fissistigma* Griff. (9). *Pometia* J. R. Forst. & G. Forst., *Terminalia* L., *Antiaris* Lesch., *Girardinia* Gaudich., *Pouteria* Aubl., *Pterospermum* Schreb., and *Tetrameles* R. Br. have fewer species, but are highly abundant in the dominant tree layer of the tropical rainforests. *Lasiococca* Hook. f., *Garcinia* L., *Mitrephora* Hook. f. & Thomson, *Alphonsea* Hook. f. & Thomson, *Cleidion* Blume, *Sumbaviopsis* J. J. Sm., *Trigonostemon* Blume, and *Pittosporopsis* Craib are abundant in the lower tree layer (Zhu et al., 1998a; Zhu, 2006). In the tropical montane rainforest of southern Yunnan, *Castanopsis*, *Lithocarpus*, *Machilus* Nees, *Litsea*, *Phoebe* Nees, *Anneslea* Wall., and *Shima* Reinw. ex Blume are the most abundant genera (Zhu et al., 2006).

GEOGRAPHIC ELEMENTS

GEOGRAPHIC ELEMENTS AT THE FAMILY LEVEL

In the flora of southern Yunnan, families of tropical distribution contribute 54.4% of the total flora (Table 2). These families include those of pantropic distribution (contributing to 42.31% of the total flora), such as Acanthaceae, Anacardiaceae, Annonaceae, Apocynaceae, Araceae, Arecaceae, Burseraceae, Clusiaceae, Combretaceae, Myristicaceae, Sapotaceae,

Table 3. Geographic elements of seed plants at the generic level from the flora of southern Yunnan (Xishuangbanna).

Geographic elements at the generic level	No. of genera (%)
1. Cosmopolitan	59 (5.02)
2. Pantropic	251 (21.34)
3. Tropical Asia and tropical America disjunctions	30 (2.55)
4. Old World Tropics	112 (9.52)
5. Tropical Asia to tropical Australia	76 (6.46)
6. Tropical Asia to tropical Africa	96 (8.16)
7. Tropical Asia	355 (30.19)
8. North temperate	60 (5.10)
9. East Asia and North America disjunctions	32 (2.72)
10. Old World temperate	24 (2.04)
11. Temperate Asia	5 (0.43)
12. Mediterranean region, western to central Asia	2 (0.17)
13. Central Asia	1 (0.09)
14. East Asia	62 (5.27)
15. Endemic to China	11 (0.94)
Total	1176 (100)

and Icacinaceae; Old World Tropic distribution, such as Pittosporaceae, Pandanaceae, and Musaceae; tropical Asian and tropical American disjunct distribution, including Araliaceae, Elaeocarpaceae, Gesneriaceae, Lardizabalaceae, Staphyleaceae, and Styracaceae; and the tropical Asian distribution, such as Crypteroniaceae, Rafflesiaceae, and Sabiaceae. Families of mainly temperate distribution contribute 17.04% of the total flora, including the ones of north temperate distribution such as Caprifoliaceae, Pinaceae, Aceraceae, Betulaceae, Buxaceae, Cornaceae, Fagaceae, Hamamelidaceae, Juglandaceae, and Salicaceae; East Asia and North America disjunct distribution, such as Magnoliaceae, Nyssaceae, and Saururaceae; and East Asia distribution, such as Actinidiaceae, Cephalotaxaceae, and Stachyuraceae.

GEOGRAPHIC ELEMENTS AT THE GENERIC LEVEL

Patterns of seed plant distribution of the flora at the generic level are enumerated in Table 3. The genera of tropical Asian distribution, such as *Alphonsea*, *Amoora* Roxb., *Pterospermum*, *Mitrephora*, *Mycetia* Reinw., *Aganosma* (Blume) G. Don, *Chukrasia* A. Juss., *Crypteronia* Blume, and *Knema* Lour., show the highest percentage among all distribution types, contributing to 30.19% of the flora. Genera of pantropic distribution, such as *Gnetum* L., *Beilschmiedia* Nees, *Cryptocarya* R. Br., *Capparis* L., *Piper*, *Croton* L., *Dioscorea*, *Uncaria* Schreb., *Lasianthus*, *Morinda* L., *Ardisia*, *Bauhinia* L., and *Marsdenia* R. Br., contribute to 21.34% of the flora.

Table 4. Similarity coefficients at family, generic, and species levels for three tropical regions of Yunnan.^{1, 2}

Compared regional flora	Southern Yunnan ³ Shared/similarity coefficient, %	Southwestern Yunnan ⁴ Shared/similarity coefficient, %	Tropical southeastern Yunnan ⁵ Shared/similarity coefficient, %
Similarity coefficients at family level			
Southern Yunnan	100/100		
Southwestern Yunnan	180/98.4	100/100	
Tropical southeastern Yunnan	163/89.1	179/96.2	100/100
Similarity coefficients at generic level			
Southern Yunnan	100/100		
Southwestern Yunnan	946/80.4	100/100	
Tropical southeastern Yunnan	939/79.9	1037/76.6	100/100
Similarity coefficients at specific level			
Southern Yunnan	100/100		
Southwestern Yunnan	1834/47.9	100/100	
Tropical southeastern Yunnan	1773/50.7	2165/43.2	100/100

¹ Data are from Zhu et al. (2004) for southwestern Yunnan and Shui (2003) for tropical southeastern Yunnan. There were 4933 species of native seed plants in 1432 and 199 families recognized from southwestern Yunnan (Dehong), and 4996 species of native seed plants in 1355 and 186 families recognized from tropical southeastern Yunnan based on Shui's list.

² The similarity coefficient between two regions equals the number of taxa shared by both regions divided by the lowest number of taxa of region 1 or 2, multiplied by 100%.

³ Southern Yunnan is defined as Xishuangbanna administrative region (site 1 in Fig. 1).

⁴ Southwestern Yunnan is defined as Dehong administrative region (site 2 in Fig. 1).

⁵ Tropical southeastern Yunnan is defined as the tropical area of southeastern part of Yunnan (site 3 in Fig. 1).

Next are the genera of Old World tropical distribution, such as *Thunbergia* Retz., *Dracaena* Vand. ex L., *Pandanus* Parkinson, *Ventilago* Gaertn., *Stephania* Lour., *Fissistigma*, *Polyalthia* Blume, *Barringtonia* J. R. Forst. & G. Forst., *Carallia* Roxb., *Canarium* L., *Chasalia* DC., and *Uvaria* L. Genera with distributions from tropical Asia to tropical Australia include *Ailanthus* Desf., *Hoya* R. Br., *Argyrea* Lour., *Dillenia* L., *Lagerstroemia* L., *Loeseneriella* A. C. Sm., *Murraya* J. König ex L., and *Toona* (Endl.) M. Roem. Genera with tropical Asian to tropical African distribution include *Bombax* L., *Flacourtia* Comm. ex L'Hér., *Quisqualis* L., *Bridelia* Willd., *Premna* L., *Urophyllum* Jack ex Wall., *Strophanthus* DC., *Mitragyna* Korth., *Garcinia*, *Anogeissus* (DC.) Wall. ex Guill., Perr. & A. Rich., and *Cymbopogon* Spreng. Genera of tropical distribution in all (Table 3, types 2–7) comprise 78.2% of the total number, while genera of temperate distribution in all (Table 3, types 8–14) contribute 15.82% of the total genera, including genera with north temperate distribution, such as *Artemisia* L., *Carpinus* L., *Betula* L., *Salix* L., *Swida* Opiz, *Corydalis* DC., *Pinus* L., and *Sorbus* L., those with a disjunct distribution in East Asia and North America, such as *Schisandra* Michx., *Photinia* Lindl., *Nyssa* L., *Osmanthus* Lour., *Magnolia* L., *Mahonia* Nutt., *Illicium* L., and *Castanopsis*, those of Old World temperate distribution such as *Ajuga* L., *Elsholtzia* Moench, *Herminium* L., *Inula* L., *Ligustrum* L., and *Paris* L., and East Asian distributions such as *Actinidia* Lindl., *Belamcanda* Adans., *Aspidistra* Ker Gawl., *Cephalo-*

taxus Siebold & Zucc. ex Endl., *Choerospondias* B. L. Burt & A. W. Hill, *Gardneria* Wall., *Hovenia* Thunb., *Pegia* Colebr., *Skimmia* Thunb., *Stachyurus* Siebold & Zucc., and *Pterocarya* Kunth. Only 11 genera are endemic to China, including *Biondia* Schltr., *Camptotheca* Decne., *Craspedolobium* Harms, *Cyphotheca* Diels, *Dichotomanthes* Kurz, *Eleutharrhena* Forman, *Nouelia* Franch., *Paramomum* S. Q. Tong, *Styrophyton* S. Y. Hu, *Tapiscia* Oliv., and *Thyrocarpus* Hance.

COMPARISON WITH TROPICAL FLORAS OF SOUTHWESTERN AND SOUTHEASTERN YUNNAN

The tropical area in southwestern Yunnan is located mainly in the Dehong administrative region (Fig. 1, site 2), which borders Burma and lies between 23°50'–25°20'N and 97°31'–98°43'E. The region is 11,229 km² in area and has a monsoon climate with an annual mean temperature of 19.2°C and an annual precipitation of 1540 mm. There have been 4933 species of 1432 genera and 199 families of native seed plants recognized from the region (Zhu et al., 2004).

The tropical area in southeastern Yunnan referred to in this study (Fig. 1, site 3) is located between the Tropic of Cancer and the Yunnan–Vietnam border, 22°26'–23°26' N and 104°27'–108°48'E. The region, including six counties, such as Pingbian, Hekou, Jingping, Luchun, Yuanyang, and Honghe, is 14,389 km² in area. It also has a monsoon climate with an annual mean temperature of 22.8°C and an annual precipitation of 1764 mm. From Shui (2003),

Table 5. Top 20 families with the highest species richness among the tropical floras of southern, southwestern, and southeastern Yunnan.^{1, 2}

Flora of southern Yunnan ³		Flora of southwestern Yunnan ⁴		Flora of tropical southeastern Yunnan ⁵	
Family	No. of species (%) ⁶	Family	No. of species (%) ⁶	Family	No. of species (%) ⁶
Orchidaceae	328 (9.82)	Fabaceae	297 (6.02)	Fabaceae	285 (5.70)
Fabaceae	211 (6.32)	Poaceae	269 (5.45)	Orchidaceae	276 (5.52)
Rubiaceae	142 (4.25)	Asteraceae	267 (5.41)	Rubiaceae	232 (4.64)
Poaceae	132 (3.95)	Orchidaceae	259 (5.25)	Poaceae	219 (4.38)
Euphorbiaceae	117 (3.50)	Rubiaceae	166 (3.36)	Asteraceae	196 (3.92)
Asteraceae	106 (3.17)	Rosaceae	153 (3.10)	Lauraceae	141 (2.82)
Moraceae	73 (2.19)	Euphorbiaceae	110 (2.23)	Urticaceae	134 (2.68)
Lauraceae	70 (2.10)	Lauraceae	101 (2.05)	Euphorbiaceae	126 (2.52)
Urticaceae	72 (2.16)	Cyperaceae	97 (1.96)	Rosaceae	124 (2.48)
Zingiberaceae	72 (2.16)	Urticaceae	90 (1.82)	Fagaceae	109 (2.18)
Acanthaceae	68 (2.04)	Moraceae	89 (1.80)	Moraceae	104 (2.08)
Lamiaceae	61 (1.83)	Ericaceae	85 (1.72)	Ericaceae	96 (1.92)
Asclepiadaceae	58 (1.74)	Acanthaceae	77 (1.56)	Lamiaceae	91 (1.82)
Apocynaceae	51 (1.53)	Theaceae	71 (1.44)	Cyperaceae	89 (1.78)
Annonaceae	49 (1.47)	Liliaceae	71 (1.44)	Theaceae	81 (1.62)
Verbenaceae	48 (1.44)	Scrophulariaceae	69 (1.40)	Gesneriaceae	79 (1.58)
Cucurbitaceae	46 (1.38)	Fagaceae	68 (1.38)	Acanthaceae	77 (1.54)
Rosaceae	46 (1.38)	Araliaceae	66 (1.34)	Celastraceae	65 (1.30)
Vitaceae	45 (1.35)	Apiaceae	66 (1.34)	Araliaceae	64 (1.28)
Fagaceae	44 (1.32)	Asclepiadaceae	64 (1.30)	Verbenaceae	62 (1.24)
Sum of the top 20 families	1839 (55.10)		2535 (51.38)		2650 (53.04)
All other families	1501 (44.90)		2398 (48.62)		2346 (46.6)
Total flora	3340 (100)		4933 (100)		4996 (100)

¹ Data are from Zhu et al. (2004) for southwestern Yunnan and Shui (2003) for the tropical southeastern Yunnan.

² Families in boldface are the top 20 families, which can be found only in the flora of Xishuangbanna, in both the floras of Dehong and tropical southeastern Yunnan, or in one of them, respectively.

³ Southern Yunnan is defined as Xishuangbanna administrative region (site 1 in Fig. 1).

⁴ Southwestern Yunnan is defined as Dehong administrative region (site 2 in Fig. 1).

⁵ Tropical Southeastern Yunnan is defined as the tropical area of southeastern part of Yunnan (site 3 in Fig. 1).

⁶ Number of species for each family in the respective floras, and their percentage within the respective floras.

we compiled a list of 4996 species of 1355 genera and 186 families of native seed plants from the region in southeastern Yunnan.

Floristic similarities at the family, generic, and species levels between the floras of southern Yunnan (Xishuangbanna), southwestern Yunnan (Dehong), and southeastern Yunnan (Fig. 1, sites 1, 2, and 3, respectively) are detailed in Table 4. The floristic similarity between these regional floras of tropical Yunnan is more than 89% at the family level and more than 76% at the generic level, but it is lower at the species level (43%–50%).

The comparison of the 20 families with the most species among these tropical floras of southern, southwestern, and southeastern Yunnan is enumerated in Table 5.

The top-ranking families in all three regional floras are basically similar. These three regional floras belong to the same floristic unit and represent the tropical flora of Yunnan. The families Zingiberaceae,

Apocynaceae, Annonaceae, and Cucurbitaceae are in the top 20 ranking families of the flora of southern Yunnan (Fig. 1, site 1), while Ericaceae, Theaceae, and Araliaceae are in the top 20 ranking families of these floras of southwestern and southeastern Yunnan (Fig. 1, sites 2 and 3, respectively).

Comparison of geographic elements at the generic level from these regional floras revealed that the tropical elements (Table 6, types 2–7) contribute more than 64% of the total genera in these regional floras of Yunnan, and the highest proportion of the tropical elements occurs in the flora of southern Yunnan (making up 78.3% of all the genera).

COMPARISON WITH TROPICAL FLORAS OF MAINLAND SOUTHEAST ASIA AND MALESIA

A Catalogue of the Vascular Plants of Malaya (Turner, 1995) and *Thai Plant Names* (Smitinand, 2001) provide recently updated and relatively com-

Table 6. Comparison of geographic elements at the generic level from the tropical floras of southern, southwestern, and southeastern Yunnan.

Geographical elements of genera	Southern Yunnan ¹	Southwestern Yunnan ²	Tropical southeastern Yunnan ³
	No. of genera (%) ⁴	No. of genera (%) ⁴	No. of genera (%) ⁴
1. Cosmopolitan	59 (5.0)	76 (5.3)	62 (4.6)
2. Pantropic	251 (21.3)	267 (18.6)	239 (17.6)
3. Tropical Asia and tropical America disjunctions	30 (2.6)	30 (2.1)	29 (2.1)
4. Old World Tropics	112 (9.5)	120 (8.4)	116 (8.6)
5. Tropical Asia to tropical Australia	76 (6.5)	74 (5.2)	82 (6.1)
6. Tropical Asia to tropical Africa	96 (8.2)	94 (6.6)	95 (7.0)
7. Tropical Asia	355 (30.2)	340 (23.7)	371 (27.4)
8. North temperate	60 (5.1)	157 (11.0)	111 (8.2)
9. East Asia and North America disjunctions	32 (2.7)	54 (3.8)	47 (3.5)
10. Old World temperate	24 (2.0)	50 (3.5)	32 (2.4)
11. Temperate Asia	5 (0.4)	11 (0.8)	6 (0.4)
12. Mediterranean region, western to central Asia	2 (0.2)	5 (0.3)	3 (0.2)
13. Central Asia	1 (0.1)	4 (0.3)	1 (0.1)
14. East Asia	62 (5.3)	125 (8.7)	120 (8.9)
15. Endemic to China	11 (0.9)	25 (1.7)	41 (3.0)
Total	1176 (100)	1432 (100)	1355 (100)

¹ Southern Yunnan is defined as Xishuangbanna administrative region (site 1 in Fig. 1).

² Southwestern Yunnan is defined as Dehong administrative region (site 2 in Fig. 1).

³ Tropical southeastern Yunnan is defined as the tropical area of the southeastern part of Yunnan (site 3 in Fig. 1).

⁴ Number of genera for each geographical element in the respective floras, and their percentage within the respective floras.

plete data on the regional flora of mainland Southeast Asia and Malaysia, respectively. Comparisons of the floristic composition and similarities at the family and generic levels between southern Yunnan (Xishuangbanna), Thailand, and the Malay Peninsula are compared in Tables 7 and 8.

Most of the top 20 families with the most species richness in the flora of southern Yunnan (Xishuangbanna) are shared by the floras of Thailand and the Malay Peninsula as the top 20 families (Table 7). The families Orchidaceae, Rubiaceae, Euphorbiaceae, Lauraceae, Moraceae, Apocynaceae, Annonaceae, Zingiberaceae, and Acanthaceae are large tropical families shared by both southern Yunnan (Xishuangbanna) and Thailand–Malaysia. However, those families with strongly tropical characteristics such as Dipterocarpaceae, Melastomataceae, Myrtaceae, Arecaceae, and Clusiaceae are also dominant in the Thai–Malaysian flora, while Urticaceae, Lamiaceae, Cucurbitaceae, Rosaceae, and Vitaceae, which are of tropical to temperate distributions, are dominant in southern Yunnan (Xishuangbanna). The families with strongly tropical characteristics have a small number of species in the flora of southern Yunnan, but are highly abundant there (Zhu, 1997). The floristic similarity between the flora of southern Yunnan and the floras of Thailand and Malaysia exceeds 82.5% at the family level and 65.6% at the generic level (Table 8).

DISCUSSION

Tropical genera comprise a majority (78.2%) of the southern Yunnan (Xishuangbanna) flora. The dominant genera are those of tropical Asian distribution (Table 3). This reveals that the flora of southern Yunnan is tropical in nature and has strong tropical Asian affinity.

The tropical floras from southwestern, southern, and southeastern Yunnan (Fig. 1, sites 1–3) are similar in families with the most species richness and have high similarities at family and generic levels (more than 89% at the family level and more than 76% at the generic level; see Table 4). The tropical elements comprise more than 64% of the total genera, of which the tropical Asian element contributes more than 23.7% of the total genera in these regional floras of tropical Yunnan. These patterns suggest that these three regions of Yunnan belong to the same floristic unit and are part of tropical Asian or Indo-Malaysian flora.

In comparing the flora of southern Yunnan (Xishuangbanna) to the tropical floras of Guangxi in southern China and Hainan in southeastern China (Zhu & Roos, 2004), the top-ranking families are similar, except that the family Cucurbitaceae is in the top 20 ranking families of the flora of southern Yunnan only, and Theaceae, Myrsinaceae, Liliaceae, and Myrtaceae (in Hainan) are in the top 20 families of those of southern and southeastern China. When

Table 7. Top 20 families with the most species richness among the tropical floras of southern Yunnan, Thailand, and the Malay Peninsula.^{1, 2}

Flora of southern Yunnan (Xishuangbanna)		Flora of Thailand		Flora of the Malay Peninsula	
Family	No. of species (%) ³	Family	No. of species (%) ³	Family	No. of species (%) ³
Orchidaceae	328 (9.82)	Orchidaceae	530 (8.67)	Orchidaceae	853 (11.16)
Fabaceae	211 (6.32)	Fabaceae	398 (6.51)	Rubiaceae	562 (7.35)
Rubiaceae	142 (4.25)	Euphorbiaceae	365 (5.97)	Euphorbiaceae	369 (4.81)
Poaceae	132 (3.95)	Rubiaceae	357 (5.84)	Fabaceae	298 (3.90)
Euphorbiaceae	117 (3.50)	Poaceae	227 (3.71)	Poaceae	238 (3.11)
Asteraceae	106 (3.17)	Cyperaceae	222 (3.63)	Myrtaceae	215 (2.81)
Moraceae	73 (2.19)	Araceae	167 (2.73)	Lauraceae	214 (2.80)
Lauraceae	70 (2.10)	Araceae	151 (2.47)	Annonaceae	202 (2.64)
Urticaceae	72 (2.16)	Apocynaceae	120 (1.96)	Araceae	198 (2.59)
Zingiberaceae	72 (2.16)	Annonaceae	117 (1.91)	Gesneriaceae	189 (2.47)
Acanthaceae	68 (2.04)	Zingiberaceae	112 (1.83)	Melastomataceae	172 (2.25)
Lamiaceae	61 (1.83)	Scrophulariaceae	103 (1.69)	Cyperaceae	162 (2.12)
Asclepiadaceae	58 (1.74)	Moraceae	103 (1.69)	Acanthaceae	158 (2.07)
Apocynaceae	51 (1.53)	Asteraceae	100 (1.64)	Dipterocarpaceae	156 (2.04)
Annonaceae	49 (1.47)	Fagaceae	100 (1.64)	Zingiberaceae	153 (2.00)
Verbenaceae	48 (1.44)	Myrtaceae	96 (1.57)	Araceae	141 (1.84)
Cucurbitaceae	46 (1.38)	Verbenaceae	83 (1.36)	Moraceae	138 (1.81)
Rosaceae	46 (1.38)	Lauraceae	82 (1.34)	Clusiaceae	120 (1.57)
Vitaceae	45 (1.35)	Acanthaceae	80 (1.31)	Apocynaceae	119 (1.56)
Fagaceae	44 (1.32)	Convolvulaceae	78 (1.28)	Asclepiadaceae	116 (1.52)
Sum of the top 20 families	1839 (55.10)		3591 (58.75)		4773 (62.42)
All other families	1501 (44.90)		2520 (41.25)		2864 (37.58)
Total flora	3340 (100)		6111 (100)		7637 (100)

¹ Data are from Smitinand (2001) for Thailand and from Turner (1995) for the Malay Peninsula. There were 6111 species of native seed plants in 1573 genera and 198 families recognized from Smitinand's list, and 7637 species of native seed plants in 1554 genera and 191 families recognized from Turner's list. Circumscription of families and nomenclature follow the Missouri Botanical Garden's w³TROPICOS (<<http://www.tropicos.org>>).

² Families in boldface are the top 20 families, which can be found only in the flora of Xishuangbanna, in both the floras of Thailand and the Malay Peninsula, or in one of them, respectively.

³ Number of species for each family in the respective floras, and their percentage within the respective floras.

Table 8. Comparison of floristic similarities at the family and generic levels between southern Yunnan, Thailand, and the Malay Peninsula.^{1, 2}

Compared flora	Southern Yunnan	Thailand	Malay Peninsula
	Shared/similarity coefficient, %	Shared/similarity coefficient, %	Shared/similarity coefficient, %
Similarity coefficients at family level			
Southern Yunnan (Xishuangbanna)	100/100		
Thailand	174/95.08	100/100	
Malay Peninsula	151/82.51	173/90.58	100/100
Similarity coefficients at generic level			
Southern Yunnan (Xishuangbanna)	100/100		
Thailand	867/73.72	100/100	
Malay Peninsula	772/65.65	1099/70.72	100/100

¹ Data are from Smitinand (2001) for Thailand and from Turner (1995) for the Malay Peninsula.

² The similarity coefficient between two regions equals the number of taxa shared by both regions divided by the lowest number of taxa of region 1 or 2, multiplied by 100%.

Table 9. Comparison of the distribution types of genera from the flora of southern Yunnan (Xishuangbanna), the flora of tropical Guangxi, and the flora of Hainan.¹

Distribution types (geographic elements)	Southern Yunnan (Xishuangbanna)	Tropical Guangxi ²	Hainan
	Genera %	Genera %	Genera %
1. Cosmopolitan	5.02	5.56	5.09
2. Pantropic	21.34	19.71	23.42
3. Tropical Asia and tropical America disjunctions	2.55	2.24	2.75
4. Old World Tropics	9.52	9.35	11.39
5. Tropical Asia to tropical Australia	6.46	7.42	10.26
6. Tropical Asia to tropical Africa	8.16	7.19	7.03
7. Tropical Asia	30.19	25.81	25.93
8. North temperate	5.1	6.8	4.44
9. East Asia and North America disjunctions	2.72	3.48	2.99
10. Old World temperate	2.04	2.55	1.94
11. Temperate Asia	0.43	0.46	0.32
12. Mediterranean region, western to central Asia	0.17	0.15	0.16
13. Central Asia	0.09	0.00	0.00
14. East Asia	5.27	6.65	2.75
15. Endemic to China	0.94	2.63	1.53
Total	100	100	100.00

¹ Data are from Fang et al. (1995) for tropical Guangxi (1294 genera) and from Wu et al. (1996) for Hainan (1238 genera).

² Tropical Guangxi is in the southwestern part of Guangxi province in southern China.

comparing geographic elements at the generic level, the tropical elements contribute to more than 71% of the total genera in all these tropical floras of China (Table 9).

Most of the dominant families from the flora of southern Yunnan (Xishuangbanna) are also dominant in mainland Southeast Asian and Malaysian floras. The similarities between the flora of southern Yunnan and these floras of tropical Asia are more than 82.5% at the family level and more than 65.6% at the generic level (Table 8). This pattern indicates that the tropical flora of southern Yunnan is similar to the Indo-Malaysian flora and belongs to the Indo-Malaysian or Malesian floristic region as suggested by Takhtajan (1988) and Wu and Wu (1996). In our study, these floras of southern Yunnan, Thailand, and the Malay Peninsula comprise a floristic continuum. We agree with van Balgooy that the number of taxa in common is the first step in surveying floristic affinity (van Balgooy et al., 1996). The higher percentage of taxa shared by these floras suggests their close floristic affinity.

The flora of southern Yunnan occurs on the margin of tropical Asia. However, although tropical families and genera contribute most to its total flora, the taxa of strictly tropical distribution are still under-represented compared to the Malaysian flora. For example, Dipterocarpaceae has only two species from two genera, respectively, in the flora of southern Yunnan, although these taxa are the most abundant trees in some forest types (Zhu, 1992).

The flora of southern Yunnan is similar to both the Tertiary flora and the present flora of northeast India. The Tertiary flora of northeast India, such as *Syzygium*, *Terminalia*, *Artocarpus* J. R. Forst. & G. Forst., *Ficus*, *Mangifera* L., *Bombax*, *Garcinia*, *Calophyllum* L., *Nephelium* L., *Rhizophora* L., *Memecylon* L., *Barringtonia*, *Canarium*, *Pometia*, *Sterculia* L., and *Garuga* Roxb. (Mehrotra et al., 2005), which are frequent genera in the flora of southern Yunnan, were formed by tropical elements. A floristic comparison between the dipterocarp forest in southern Yunnan (Xishuangbanna) and the dipterocarp forest in the upper Assam (Rajkhowa, 1961) revealed that the floristic similarities are 97.3% at the family level and 79.7% at the generic level (Zhu, 1994). The vegetation history of southern Yunnan (Xishuangbanna) during the Tertiary could not be accurately portrayed because of the lack of paleobotanical data. However, the available information from the neighboring regions suggested that southern Yunnan could be a subtropical evergreen broad-leaved forest during the Tertiary. A 40,000-year palynological record from northeast Thailand indicated that the region supported a Fagaceae-coniferous forest, similar to contemporary vegetation from subtropical southwest China, and climatic conditions were cooler and probably drier in the Pleistocene than in present-day northern Thailand (Penny, 2001). Southern Yunnan is geographically near northern Thailand, so it is possible that southern Yunnan had similar vegetation and climatic condi-

tions during the Pleistocene. The migration of tropical Asian elements into southern Yunnan could have mainly taken place after the Tertiary. The tropical flora of southern Yunnan is believed to be derived from tropical Asian flora with the uplift of the Himalayas and the formation of the eastern monsoon climate after the Tertiary.

Studies on the geological history of Southeast Asia reveal that the direct land connection between mainland Southeast Asia and western Malesia existed until the early Pliocene 5 million years ago (Hall, 1998), and there was no geographical barrier between southern Yunnan, mainland Southeast Asia, and western Malesia during most of the Tertiary (Morley, 1998). Thus, geology contributes to and underlies the close affinity between the flora of southern Yunnan and the flora of Malaysia.

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APPENDIX 1. Genera list of the flora of southern Yunnan (Xishuangbanna). Numbers in parentheses after the family and genus names indicate the inclusive number of genera and species, respectively.

Families	Genera
Acanthaceae (32)	<i>Acanthus</i> L. (1), <i>Adhatoda</i> Mill. (1), <i>Andrographis</i> Wall. ex Nees (2), <i>Asystasia</i> Blume (2), <i>Asystasiella</i> Lindau (1), <i>Baphicacanthus</i> Bremek. (1), <i>Barleria</i> L. (1), <i>Calophanoides</i> Ridl. (1), <i>Chroesthes</i> Benoist (2), <i>Codonacanthus</i> Nees (2), <i>Dicliptera</i> Juss. (2), <i>Eranthemum</i> L. (1), <i>Goldfussia</i> Nees (1), <i>Hemigraphis</i> Nees (1), <i>Hygrophila</i> R. Br. (1), <i>Hypoestes</i> Sol. ex R. Br. (1), <i>Isoglossa</i> Oerst. (1), <i>Lepidagathis</i> Willd. (1), <i>Mananthes</i> Bremek. (1), <i>Nelsonia</i> R. Br. (1), <i>Ophiorrhizophyllum</i> Kurz (1), <i>Peristrophe</i> Nees (1), <i>Phaulopsis</i> Willd. (1), <i>Phlogacanthus</i> Nees (2), <i>Pseuderanthemum</i> Radlk. (3), <i>Pteracanthus</i> (Nees) Bremek. (1), <i>Rhaphidosperma</i> G. Don (1), <i>Rostellularia</i> Rchb. (2), <i>Rungia</i> Nees (4), <i>Sericocalyx</i> Bremek. (1), <i>Strobilanthes</i> Blume (21), <i>Thunbergia</i> Retz. (5)
Aceraceae (1)	<i>Acer</i> L. (4).
Actinidiaceae (2)	<i>Actinidia</i> Lindl. (2), <i>Saurauia</i> Willd. (6)
Aizoaceae (2)	<i>Glinus</i> L. (2), <i>Mollugo</i> L. (1)
Alismataceae (2)	<i>Caldesia</i> Parl. (1), <i>Sagittaria</i> L. (2)
Amaranthaceae (7)	<i>Achyranthes</i> L. (4), <i>Aerva</i> Forssk. (1), <i>Alternanthera</i> Forssk. (2), <i>Amaranthus</i> L. (3), <i>Celosia</i> L. (1), <i>Cyathula</i> Blume (1), <i>Deeringia</i> R. Br. (1)
Amaryllidaceae (2)	<i>Curculigo</i> Gaertn. (2), <i>Hypoxis</i> L. (1)
Anacardiaceae (12)	<i>Buchanania</i> Spreng. (1), <i>Choerospondias</i> B. L. Burt & A. W. Hill (1), <i>Dracontomelon</i> Blume (1), <i>Drimycarpus</i> Hook. f. (1), <i>Lannea</i> A. Rich. (1), <i>Mangifera</i> L. (2), <i>Pegia</i> Colebr. (1), <i>Pistacia</i> L. (1), <i>Rhus</i> L. (2), <i>Semecarpus</i> L. f. (2), <i>Spondias</i> L. (2), <i>Toxicodendron</i> Mill. (3)

APPENDIX 1. Continued.

Families	Genera
Annonaceae (15)	<i>Alphonsea</i> Hook. f. & Thomson (5), <i>Artabotrys</i> R. Br. ex Ker Gawl. (2), <i>Cyathostemma</i> Griff. (1), <i>Dasymaschalon</i> Dalla Torre & Harms (1), <i>Desmos</i> Lour. (3), <i>Fissistigma</i> Griff. (9), <i>Goniothalamus</i> (Blume) Hook. f. & Thomson (2), <i>Mezzettiopsis</i> Ridl. (1), <i>Miliusa</i> Lesch. (6), <i>Mitrephora</i> Hook. f. & Thomson (3), <i>Orophea</i> Blume (1), <i>Phaeanthus</i> Hook. f. & Thomson (1), <i>Polyalthia</i> Blume (8), <i>Pseuduaria</i> Miq. (1), <i>Uvaria</i> L. (5)
Apiaceae (8)	<i>Centella</i> L. (1), <i>Eryngium</i> L. (1), <i>Heracleum</i> L. (1), <i>Hydrocotyle</i> L. (6), <i>Oenanthe</i> L. (3), <i>Pimpinella</i> L. (4), <i>Sanicula</i> L. (1), <i>Trachyspermum</i> Link (1)
Apocynaceae (23)	<i>Aganosma</i> (Blume) G. Don (4), <i>Alstonia</i> R. Br. (2), <i>Alyxia</i> Banks ex R. Br. (4), <i>Amalocalyx</i> Pierre (1), <i>Anodendron</i> A. DC. (2), <i>Beaumontia</i> Wall. (2), <i>Bousigonia</i> Pierre (2), <i>Chonemorpha</i> G. Don (4), <i>Cleghornia</i> Wight (1), <i>Epigynum</i> Wight (1), <i>Holarrhena</i> R. Br. (1), <i>Ichnocarpus</i> R. Br. (2), <i>Kibatalia</i> G. Don (2), <i>Kopsia</i> Blume (1), <i>Melodinus</i> J. R. Forst. & G. Forst. (2), <i>Parameria</i> Benth. (1), <i>Pottsia</i> Hook. & Arn. (1), <i>Rawolfia</i> L. (1), <i>Strophanthus</i> DC. (2), <i>Tabernaemontana</i> L. (3), <i>Trachelospermum</i> Lem. (3), <i>Urceola</i> Vand. (4), <i>Wrightia</i> R. Br. (5)
Aquifoliaceae (1)	<i>Ilex</i> L. (12)
Araceae (17)	<i>Acorus</i> L. (2), <i>Aglaonema</i> Schott (1), <i>Alocasia</i> (Schott) G. Don (2), <i>Amorphophallus</i> Blume ex Decne. (7), <i>Arisaema</i> Mart. (4), <i>Colocasia</i> Schott (4), <i>Cryptocoryne</i> Fischer ex Wydler (1), <i>Epipremnum</i> Schott (1), <i>Goatanthus</i> Klotzsch (1), <i>Homalomena</i> Schott (2), <i>Lasia</i> Lour. (1), <i>Pistia</i> L. (1), <i>Pothos</i> L. (3), <i>Remusatia</i> Schott (2), <i>Rhaphidophora</i> Hassk. (8), <i>Stuednera</i> K. Koch (1), <i>Typhonium</i> Schott (2)
Araliaceae (10)	<i>Aralia</i> L. (5), <i>Brassaiopsis</i> Decne. & Planch. (3), <i>Eleutherococcus</i> Maxim. (1), <i>Euaraliopsis</i> Hutch. (2), <i>Heteropanax</i> Seem. (2), <i>Macropanax</i> Miq. (3), <i>Panax</i> L. (2), <i>Schefflera</i> J. R. Forst. & G. Forst. (6), <i>Trevesia</i> Vis. (1), <i>Tupidanthus</i> Hook. f. & Thomson (1)
Arecaceae (8)	<i>Arenga</i> Labill. (1), <i>Calamus</i> L. (24), <i>Caryota</i> L. (3), <i>Livistona</i> R. Br. (1), <i>Phoenix</i> L. (2), <i>Pinanga</i> Blume (4), <i>Plectocomia</i> Mart. ex Blume (3), <i>Wallichia</i> Roxb. (2)
Aristolochiaceae (1)	<i>Aristolochia</i> L. (6)
Asclepiadaceae (26)	<i>Asclepias</i> L. (1), <i>Biondia</i> Schltr. (1), <i>Brachystelma</i> R. Br. (1), <i>Calotropis</i> R. Br. (1), <i>Ceropegia</i> L. (2), <i>Cryptolepis</i> R. Br. (2), <i>Cynanchum</i> L. (3), <i>Dischidia</i> R. Br. (2), <i>Dregea</i> E. Mey. (1), <i>Genianthus</i> Hook. f. (1), <i>Gongronema</i> (Endl.) Decne. (1), <i>Goniostemma</i> Wight (1), <i>Gymnema</i> R. Br. (4), <i>Heterostemma</i> Wight & Arn. (7), <i>Hoya</i> R. Br. (8), <i>Marsdenia</i> R. Br. (7), <i>Metaplexis</i> R. Br. (1), <i>Micholitzia</i> N. E. Br. (1), <i>Myriopteron</i> Griff. (1), <i>Oxystelma</i> R. Br. (1), <i>Pentasachme</i> Wall. ex Wight (1), <i>Raphistemma</i> Wall. (1), <i>Stelmocrypton</i> Baill. (1), <i>Streptocaulon</i> Wight & Arn. (1), <i>Toxocarpus</i> Wight & Arn. (4), <i>Tylophora</i> R. Br. (3)
Asteraceae (59)	<i>Acanthospermum</i> Schrank (2), <i>Achillea</i> L. (1), <i>Adenostemma</i> J. R. Forst. & G. Forst. (2), <i>Ageratum</i> L. (1), <i>Arctium</i> L. (1), <i>Artemisia</i> L. (4), <i>Bidens</i> L. (4), <i>Blainvillea</i> Cass. (1), <i>Blumea</i> DC. (9), <i>Blumeopsis</i> Gagnep. (1), <i>Camchaya</i> Gagnep. (1), <i>Carpesium</i> L. (1), <i>Centipeda</i> Lour. (1), <i>Chromolaena</i> DC. (1), <i>Cirsium</i> Mill. (1), <i>Conyza</i> Less. (4), <i>Cotula</i> L. (1), <i>Crassocephalum</i> Moench (1), <i>Crepis</i> L. (1), <i>Cyathocline</i> Cass. (1), <i>Dichrocephala</i> L'Hér. ex DC. (3), <i>Eclipta</i> L. (1), <i>Elephantopus</i> L. (1), <i>Emilia</i> Cass. (1), <i>Enydra</i> Lour. (1), <i>Ethulia</i> L. f. (1), <i>Eupatorium</i> L. (1), <i>Galinsoga</i> Ruiz & Pav. (1), <i>Gerbera</i> L. (1), <i>Gnaphalium</i> L. (3), <i>Gochnatia</i> Kunth (1), <i>Grangea</i> Adans. (1), <i>Gynura</i> Cass. (2), <i>Hemistepia</i> Bunge ex Fisch. & C. A. Mey. (1), <i>Inula</i> L. (1), <i>Ixeridium</i> (A. Gray) Tzvelev (1), <i>Lactuca</i> L. (1), <i>Laggera</i> Sch. Bip. ex Benth. & Hook. f. (2), <i>Microglossa</i> DC. (1), <i>Novelia</i> Franch. (1), <i>Pentanema</i> Cass. (2), <i>Picris</i> L. (1), <i>Pluchea</i> Cass. (1), <i>Pterocypsela</i> C. Shih (1), <i>Senecio</i> L. (1), <i>Siegesbeckia</i> Steud. (3), <i>Sonchus</i> L. (1), <i>Sphaeranthus</i> L. (3), <i>Sphaeromorphaea</i> DC. (1), <i>Spilanthes</i> Jacq. (2), <i>Synedrella</i> Gaertn. (1), <i>Synotis</i> (C. B. Clarke) C. Jeffrey & Y. L. Chen (1), <i>Thespis</i> DC. (1), <i>Tricholepis</i> DC. (1), <i>Tridax</i> L. (1), <i>Vernonia</i> Schreb. (14), <i>Wedelia</i> Jacq. (2), <i>Xanthium</i> L. (1), <i>Youngia</i> Cass. (3)
Balanophoraceae (1)	<i>Balanophora</i> J. R. Forst. & G. Forst. (4)
Balsaminaceae (1)	<i>Impatiens</i> L. (7)
Begoniaceae (1)	<i>Begonia</i> L. (11)
Berberidaceae (1)	<i>Mahonia</i> Nutt. (1)
Betulaceae (3)	<i>Alnus</i> Mill. (1), <i>Betula</i> L. (1), <i>Carpinus</i> L. (2)
Bignoniaceae (7)	<i>Fernandoa</i> Welw. ex Seem. (1), <i>Markhamia</i> Seem. ex Baill. (2), <i>Mayodendron</i> Kurz. (1), <i>Nyctocalos</i> Teijsm. & Binn. (1), <i>Oroxylum</i> Vent. (1), <i>Radermachera</i> Zoll. & Moritz (2), <i>Stereospermum</i> Cham. (2)
Bombacaceae (1)	<i>Bombax</i> L. (2)
Boraginaceae (9)	<i>Bothriospermum</i> Bunge (1), <i>Cordia</i> L. (2), <i>Cynoglossum</i> L. (2), <i>Ehretia</i> P. Browne (5), <i>Heliotropium</i> L. (3), <i>Thyrocarpus</i> Hance (1), <i>Tournefortia</i> L. (2), <i>Trichodesma</i> R. Br. (1), <i>Trigonotis</i> Steven (1)

APPENDIX 1. Continued.

Families	Genera
Brassicaceae (3)	<i>Cardamine</i> L. (2), <i>Raphanus</i> L. (1), <i>Rorippa</i> Scop. (2)
Burmanniaceae (1)	<i>Burmannia</i> L. (3)
Burseraceae (3)	<i>Canarium</i> L. (4), <i>Garuga</i> Roxb. (3), <i>Protium</i> Burm. f. (1)
Butomaceae (2)	<i>Butomopsis</i> Kunth (1), <i>Limnocharis</i> Bonpl. (1)
Buxaceae (2)	<i>Buxus</i> L. (1), <i>Sarcococca</i> Lindl. (1)
Campanulaceae (9)	<i>Asyneuma</i> Griseb. & Schenk (1), <i>Campanula</i> L. (1), <i>Campanumoea</i> Blume (4), <i>Cephalostigma</i> A. DC. (1), <i>Codonopsis</i> Wall. (1), <i>Lobelia</i> L. (6), <i>Pentaphragma</i> Wall. ex G. Don (1), <i>Pratia</i> Gaudich. (1), <i>Wahlenbergia</i> Schrad. ex Roth (1)
Capparaceae (4)	<i>Borthwickia</i> W. W. Sm. (1), <i>Capparis</i> L. (10), <i>Crateva</i> L. (2), <i>Stixis</i> Lour. (1)
Caprifoliaceae (5)	<i>Carlemannia</i> Benth. (1), <i>Lonicera</i> L. (4), <i>Sambucus</i> L. (1), <i>Silvianthus</i> Hook. f. (1), <i>Viburnum</i> L. (7)
Caryophyllaceae (6)	<i>Brachystemma</i> D. Don (1), <i>Drymaria</i> Willd. ex Schult. (1), <i>Myosoton</i> Moench (1), <i>Polycarpon</i> Loeffl. ex L. (1), <i>Silene</i> L. (1), <i>Stellaria</i> L. (2)
Celastraceae (4)	<i>Celastrus</i> L. (6), <i>Glyptopetalum</i> Thwaites (2), <i>Maytenus</i> Molina (6), <i>Microtropis</i> Wall. ex Meisn. (2)
Cephalotaxaceae (1)	<i>Cephalotaxus</i> Siebold & Zucc. ex Endl. (1)
Ceratophyllaceae (1)	<i>Ceratophyllum</i> L. (1)
Chenopodiaceae (2)	<i>Chenopodium</i> L. (1), <i>Dysphania</i> R. Br. (1)
Chloranthaceae (2)	<i>Chloranthus</i> Sw. (2), <i>Sarcandra</i> Gardner (1)
Clusiaceae (5)	<i>Calophyllum</i> L. (1), <i>Cratoxylum</i> Blume (2), <i>Garcinia</i> L. (6), <i>Hypericum</i> L. (3), <i>Triadenum</i> Raf. (1)
Combretaceae (4)	<i>Anogeissus</i> (DC.) Wall. ex Guill., Perr. & A. Rich. (1), <i>Combretum</i> Loeffl. (6), <i>Quisqualis</i> L. (2), <i>Terminalia</i> L. (2)
Commelinaceae (10)	<i>Amischotolype</i> Hassk. (2), <i>Commelina</i> L. (5), <i>Cyanotis</i> D. Don (3), <i>Dictyospermum</i> Wight (1), <i>Floscopa</i> Lour. (2), <i>Murdannia</i> Royle (9), <i>Pollia</i> Thunb. (5), <i>Porandra</i> D. Y. Hong (2), <i>Rhopalephora</i> Hassk. (1), <i>Streptolirion</i> Edgew. (1)
Connaraceae (4)	<i>Connarus</i> L. (1), <i>Rourea</i> Aubl. (1), <i>Roureopsis</i> Planch. (1), <i>Santaloides</i> G. Schellenb. (1)
Convolvulaceae (13)	<i>Argyrea</i> Lour. (12), <i>Cuscuta</i> L. (2), <i>Dichondra</i> J. R. Forst. & G. Forst. (1), <i>Dinetus</i> Buch.-Ham. ex Sweet (1), <i>Erycibe</i> Roxb. (2), <i>Ipomoea</i> L. (7), <i>Merremia</i> Dennst. ex Endl. (5), <i>Neuropeltis</i> Wall. (1), <i>Operculina</i> Silva Manso (1), <i>Porana</i> Burm. f. (1), <i>Poranopsis</i> Roberty (1), <i>Tridynamia</i> Gagnep. (1), <i>Xenostegia</i> D. F. Austin & Staples (1)
Cornaceae (4)	<i>Alangium</i> Lam. (6), <i>Helwingia</i> Willd. (1), <i>Mastixia</i> Blume (3), <i>Swida</i> Opiz (1)
Crassulaceae (2)	<i>Bryophyllum</i> Salisb. (1), <i>Kalanchoe</i> Adans. (1)
Crypteroniaceae (1)	<i>Crypteronia</i> Blume (1)
Cucurbitaceae (17)	<i>Coccinia</i> Wight & Arn. (1), <i>Cucumis</i> L. (2), <i>Gomphogyne</i> Griff. (1), <i>Gymnopetalum</i> Arn. (2), <i>Gynostemma</i> Blume (6), <i>Hemsleya</i> Cogn. ex F. B. Forbes & Hemsf. (2), <i>Hodgsonia</i> Hook. f. & Thomson (2), <i>Luffa</i> Mill. (1), <i>Momordica</i> L. (2), <i>Mukia</i> Arn. (2), <i>Neoalsomitra</i> Hutch. (1), <i>Siraitia</i> Merr. (1), <i>Solena</i> Lour. (1), <i>Thladiantha</i> Bunge (3), <i>Trichosanthes</i> L. (14), <i>Zanonia</i> L. (1), <i>Zehneria</i> Endl. (4)
Cupressaceae (1)	<i>Calocedrus</i> Kurz (1)
Cycadaceae (1)	<i>Cycas</i> L. (3)
Cyperaceae (14)	<i>Bulbostylis</i> Kunth (1), <i>Carex</i> L. (2), <i>Courtoisia</i> Marchand (1), <i>Cyperus</i> L. (14), <i>Eleocharis</i> R. Br. (4), <i>Fimbristylis</i> Vahl (4), <i>Fuirena</i> Rottb. (1), <i>Kyllinga</i> Rottb. (2), <i>Lipocarpha</i> R. Br. (1), <i>Mariscus</i> Vahl (3), <i>Pycneus</i> P. Beauv. (2), <i>Schoenoplectus</i> (Rchb.) Palla (2), <i>Scirpus</i> L. (1), <i>Scleria</i> P. J. Bergius (2)
Daphniphyllaceae (1)	<i>Daphniphyllum</i> Blume (2)
Datiaceae (1)	<i>Tetrameles</i> R. Br. (1)
Dichapetalaceae (1)	<i>Dichapetalum</i> Thouars (1)
Dilleniaceae (2)	<i>Dillenia</i> L. (3), <i>Tetracera</i> L. (1)
Dioscoreaceae (1)	<i>Dioscorea</i> L. (22)
Dipterocarpaceae (2)	<i>Parashorea</i> Kurz (1), <i>Vatica</i> L. (1)
Droseraceae (1)	<i>Drosera</i> L. (1)
Ebenaceae (1)	<i>Diospyros</i> L. (6)
Elaeagnaceae (1)	<i>Elaeagnus</i> L. (5)
Elaeocarpaceae (2)	<i>Elaeocarpus</i> L. (16), <i>Sloanea</i> L. (2)
Elatinaceae (2)	<i>Bergia</i> L. (1), <i>Elatine</i> L. (1)
Ericaceae (4)	<i>Agapetes</i> D. Don ex G. Don (4), <i>Craibiodendron</i> W. W. Sm. (1), <i>Rhododendron</i> L. (4), <i>Vaccinium</i> L. (5)
Eriocaulaceae (1)	<i>Eriocaulon</i> L. (2)
Erythroxylaceae (1)	<i>Erythroxylum</i> P. Browne (1)

APPENDIX 1. Continued.

Families	Genera
Euphorbiaceae (36)	<i>Actephila</i> Blume (2), <i>Alchornea</i> Sw. (2), <i>Antidesma</i> L. (10), <i>Aporosa</i> Blume (3), <i>Baccaurea</i> Lour. (1), <i>Baliospermum</i> Blume (2), <i>Bischofia</i> Blume (1), <i>Blachia</i> Baill. (1), <i>Bryonia</i> J. R. Forst. & G. Forst. (5), <i>Bridelia</i> Willd. (4), <i>Chaetocarpus</i> Thwaites (1), <i>Claoxylon</i> A. Juss. (4), <i>Cleidion</i> Blume (3), <i>Cleistanthus</i> Hook. f. ex Planch. (1), <i>Croton</i> L. (7), <i>Dalechampia</i> L. (1), <i>Drypetes</i> Vahl (4), <i>Epiprinus</i> Griff. (1), <i>Euphorbia</i> L. (3), <i>Flueggea</i> Willd. (2), <i>Glochidion</i> J. R. Forst. & G. Forst. (12), <i>Gymnanthes</i> Sw. (1), <i>Homonioia</i> Lour. (1), <i>Lasiococca</i> Hook. f. (1), <i>Macaranga</i> Thouars (4), <i>Mallotus</i> Lour. (14), <i>Megistostigma</i> Hook. f. (1), <i>Ostodes</i> Blume (3), <i>Phyllanthodendron</i> Hemsl. (1), <i>Phyllanthus</i> L. (8), <i>Sapium</i> Jacq. (5), <i>Sauropus</i> Blume (2), <i>Sumbaviopsis</i> J. J. Sm. (1), <i>Suregada</i> Roxb. ex Rottler (1), <i>Trewia</i> L. (1), <i>Trigonostemon</i> Blume (3)
Fabaceae (65)	<i>Abrus</i> Adans. (1), <i>Acacia</i> Mill. (6), <i>Acrocarpus</i> Wight & Arn. (1), <i>Adenanthera</i> L. (1), <i>Aeschynomene</i> L. (1), <i>Albizia</i> Durazz. (6), <i>Alysicarpus</i> Desv. (2), <i>Antheroporum</i> Gagnep. (1), <i>Bauhinia</i> L. (9), <i>Caesalpinia</i> L. (7), <i>Cajanus</i> Adans. (4), <i>Campylotropis</i> Bunge (5), <i>Cassia</i> L. (2), <i>Catenaria</i> Benth. in Miquel (1), <i>Chamaecrista</i> Moench (1), <i>Clitoria</i> L. (1), <i>Codariocalyx</i> Hassk. (2), <i>Craspedolobium</i> Harms (1), <i>Crotalaria</i> L. (15), <i>Cylindrokelupha</i> Kosterm. (3), <i>Dalbergia</i> L. f. (6), <i>Dendrolobium</i> (Wight & Arn.) Benth. (2), <i>Derris</i> Lour. (4), <i>Desmodium</i> Desv. (9), <i>Dunbaria</i> Wight & Arn. (1), <i>Entada</i> Adans. (2), <i>Eriosema</i> (DC.) Desv. (1), <i>Erythrina</i> L. (2), <i>Euchresta</i> Benn. (2), <i>Flemingia</i> Roxb. ex W. T. Aiton (11), <i>Fordia</i> Hemsl. (2), <i>Gleditsia</i> L. (1), <i>Guelldenstaedtia</i> Fisch. (1), <i>Indigofera</i> L. (6), <i>Lespedeza</i> Michx. (1), <i>Mecopus</i> Benn. (1), <i>Melilotus</i> Mill. (1), <i>Milletia</i> Wight & Arn. (16), <i>Mimosa</i> L. (1), <i>Mucuna</i> Adans. (6), <i>Nicolsonia</i> DC. (11), <i>Ormosia</i> Jacks. (5), <i>Pachyrhizus</i> Rich. ex DC. (1), <i>Phaseolus</i> L. (1), <i>Phylacium</i> Benn. (1), <i>Phyllodium</i> Desv. (3), <i>Pithecolobium</i> Benth. (1), <i>Podocarpium</i> (Benth.) Yen C. Yang & P. H. Huang (3), <i>Priotropis</i> Wight & Arn. (1), <i>Psoralea</i> L. (1), <i>Pueraria</i> DC. (5), <i>Pycnospora</i> R. Br. ex Wight & Arn. (1), <i>Rhynchosia</i> Lour. (1), <i>Senna</i> Mill. (3), <i>Sesbania</i> Scop. (2), <i>Shuteria</i> Wight & Arn. (3), <i>Smithia</i> Aiton (2), <i>Sophora</i> L. (5), <i>Spatholobus</i> Hassk. (4), <i>Tadehagi</i> H. Ohashi (2), <i>Tephrosia</i> Pers. (2), <i>Uraria</i> Desv. (4), <i>Urariopsis</i> Schindl. (1), <i>Whitfordiodendron</i> Elmer (1), <i>Zornia</i> J. F. Gmel. (1)
Fagaceae (5)	<i>Castanopsis</i> (D. Don) Spach (16), <i>Cyclobalanopsis</i> Oerst. (6), <i>Lithocarpus</i> Blume (16), <i>Quercus</i> L. (5), <i>Trigonobalanus</i> Forman (1)
Flacourtiaceae (6)	<i>Bennettiodendron</i> Merr. (1), <i>Casearia</i> Jacq. (5), <i>Flacourtia</i> Comm. ex L'Hér. (4), <i>Homalium</i> Jacq. (2), <i>Hydnocarpus</i> Gaertn. (1), <i>Xylosma</i> G. Forst. (3)
Fumariaceae (1)	<i>Corydalis</i> DC. (2)
Gentianaceae (5)	<i>Canscora</i> Lam. (1), <i>Exacum</i> L. (1), <i>Gentiana</i> L. (1), <i>Swertia</i> L. (1), <i>Tripterospermum</i> Blume (1)
Geraniaceae (1)	<i>Geranium</i> L. (1)
Gesneriaceae (13)	<i>Aeschynanthus</i> Jack (10), <i>Chirita</i> Buch.-Ham. ex D. Don (4), <i>Didissandra</i> C. B. Clarke (1), <i>Didymocarpus</i> Wall. (1), <i>Epithema</i> Blume (1), <i>Leptoboea</i> C. B. Clarke (1), <i>Oreocharis</i> Benth. (1), <i>Ornithoboea</i> Parish ex C. B. Clarke (2), <i>Paraboea</i> (C. B. Clarke) Ridl. (3), <i>Petrocosema</i> Oliv. (1), <i>Rhynchoglossum</i> Blume (1), <i>Rhynchotechum</i> Blume (2), <i>Trisepalum</i> C. B. Clarke (1)
Gnetaceae (1)	<i>Gnetum</i> L. (3)
Grossulariaceae (1)	<i>Polyosma</i> Blume (1)
Hamamelidaceae (2)	<i>Altingia</i> Noronha (1), <i>Distyliopsis</i> P. K. Endress (1)
Hernandiaceae (1)	<i>Illigera</i> Blume (7)
Hippocrateaceae (3)	<i>Loeseneriella</i> A. C. Sm. (3), <i>Pristimera</i> Miers (3), <i>Salacia</i> L. (5)
Hydrangeaceae (1)	<i>Dichroa</i> Lour. (1)
Hydrocharitaceae (4)	<i>Blyxa</i> Noronha ex Thouars (2), <i>Hydrilla</i> Rich. (1), <i>Hydrocharis</i> L. (1), <i>Ottelia</i> Pers. (1)
Hydrophyllaceae (1)	<i>Hydrolea</i> L. (1)
Icacinaceae (8)	<i>Apodytes</i> E. Mey. ex Arn. (1), <i>Gomphandra</i> Wall. ex Lindl. (1), <i>Iodes</i> Blume (2), <i>Mappianthus</i> Hand.-Mazz. (1), <i>Natsiatopsis</i> Kurz (1), <i>Nothapodytes</i> Blume (3), <i>Peripterygium</i> Hassk. (2), <i>Pittosporopsis</i> Craib (1)
Iridaceae (2)	<i>Belamcanda</i> Adans. (1), <i>Iris</i> L. (3)
Juglandaceae (3)	<i>Engelhardia</i> Lesch. ex Blume (4), <i>Juglans</i> L. (2), <i>Pterocarya</i> Kunth (1)
Juncaceae (1)	<i>Juncus</i> L. (1)
Lamiaceae (28)	<i>Acrocephalus</i> Benth. (1), <i>Ajuga</i> L. (1), <i>Anisochilus</i> Wall. ex Benth. (1), <i>Anisomeles</i> R. Br. (1), <i>Ceratanthus</i> F. Muell. ex G. Taylor (1), <i>Clinopodium</i> L. (1), <i>Colebrookea</i> Sm. (1), <i>Coleus</i> Lour. (1), <i>Colquhounia</i> Wall. (1), <i>Craniotome</i> Rehb. (1), <i>Dysophylla</i> Blume (1), <i>Elsholtzia</i> Willd. (10), <i>Eurysolen</i> Prain (1), <i>Geniosporum</i> Wall. ex Benth. (1), <i>Glechoma</i> L. (1), <i>Gomphostemma</i> Benth. (9), <i>Leonurus</i> L. (1), <i>Leucas</i> R. Br. (3), <i>Leucoscepttrum</i> Sm. (1), <i>Microtoena</i> Prain (2), <i>Mosla</i> (Benth.) Buch.-Ham. ex Maxim. (1), <i>Origanum</i> L. (1), <i>Paraphlomis</i> (Prain) Prain (1), <i>Pogostemon</i> Desf. (7), <i>Rabdosia</i> Hassk. (6), <i>Salvia</i> L. (2), <i>Scutellaria</i> L. (2), <i>Teucrium</i> L. (1)

APPENDIX 1. Continued.

Families	Genera
Lardizabalaceae (1)	<i>Stauntonia</i> DC. (2)
Lauraceae (14)	<i>Actinodaphne</i> Nees (2), <i>Alseodaphne</i> Nees (2), <i>Beilschmiedia</i> Nees (7), <i>Camphora</i> Fabr. (1), <i>Cassytha</i> L. (1), <i>Cinnamomum</i> Schaeff. (9), <i>Cryptocarya</i> R. Br. (5), <i>Lindera</i> Thunb. (6), <i>Litsea</i> Lam. (21), <i>Machilus</i> Nees (1), <i>Neocinnamomum</i> H. Liu (1), <i>Neolitsea</i> (Benth.) Merr. (1), <i>Persea</i> Mill. (5), <i>Phoebe</i> Nees (8)
Lecythidaceae (1)	<i>Barringtonia</i> J. R. Forst. & G. Forst. (1)
Lemnaceae (3)	<i>Lemna</i> L. (2), <i>Spirodela</i> Schleid. (1), <i>Wolffia</i> Horkel ex Schleid. (1)
Lentibulariaceae (1)	<i>Utricularia</i> L. (7)
Liliaceae (19)	<i>Allium</i> L. (1), <i>Asparagus</i> L. (2), <i>Aspidistra</i> Ker Gawl. (1), <i>Campylandra</i> Baker (2), <i>Chlorophytum</i> Ker Gawl. (2), <i>Dianella</i> Lam. ex Juss. (1), <i>Disporopsis</i> Hance (1), <i>Disporum</i> Salisb. ex D. Don (2), <i>Dracaena</i> Vand. ex L. (4), <i>Gloriosa</i> L. (1), <i>Hemerocallis</i> L. (1), <i>Heterosmilax</i> Kunth (1), <i>Liriope</i> Lour. (1), <i>Ophiopogon</i> Ker Gawl. (7), <i>Paris</i> L. (1), <i>Peliosanthes</i> Andrews (1), <i>Polygonatum</i> Mill. (3), <i>Reineckea</i> Kunth (1), <i>Tupistra</i> Ker Gawl. (2)
Linaceae (2)	<i>Ixonanthes</i> Jack (1), <i>Reinwardtia</i> Dumort. (1)
Loganiaceae (6)	<i>Buddleja</i> L. (6), <i>Fagraea</i> Thunb. (1), <i>Gardneria</i> Wall. (2), <i>Gelsemium</i> Juss. (1), <i>Mitreola</i> L. (1), <i>Strychnos</i> L. (4)
Loranthaceae (6)	<i>Dendrophthoe</i> Mart. (1), <i>Elytranthe</i> (Blume) Blume (1), <i>Helixanthera</i> Lour. (4), <i>Macrosolen</i> (Blume) Blume (4), <i>Scurrula</i> L. (7), <i>Taxillus</i> Tiegh. (1)
Lythraceae (4)	<i>Ammannia</i> L. (3), <i>Lagerstroemia</i> L. (4), <i>Rotala</i> L. (2), <i>Woodfordia</i> Salisb. (1)
Magnoliaceae (9)	<i>Alcimandra</i> Dandy (1), <i>Illicium</i> L. (2), <i>Kadsura</i> Juss. (1), <i>Magnolia</i> L. (1), <i>Manglietia</i> Blume (2), <i>Michelia</i> L. (2), <i>Parakmeria</i> Hu & W. C. Cheng (1), <i>Paramichelia</i> Hu (1), <i>Schisandra</i> Michx. (3)
Malpighiaceae (2)	<i>Aspidopterys</i> A. Juss. ex Endl. (3), <i>Hiptage</i> Gaertn. (3)
Malvaceae (10)	<i>Abelmoschus</i> Medik. (5), <i>Abutilon</i> Mill. (2), <i>Cenocentrum</i> Gagnep. (1), <i>Hibiscus</i> L. (4), <i>Kydia</i> Roxb. (3), <i>Malva</i> L. (1), <i>Malvastrum</i> A. Gray (1), <i>Sida</i> L. (11), <i>Thespesia</i> Sol. ex Corrêa (1), <i>Urena</i> L. (5)
Marantaceae (3)	<i>Donax</i> Lour. (1), <i>Phrynium</i> Willd. (2), <i>Stachyphrynium</i> K. Schum. (1)
Melastomataceae (9)	<i>Allomorpha</i> Blume (2), <i>Cyphotheca</i> Diels (1), <i>Medinilla</i> Gaudich. ex DC. (4), <i>Melastoma</i> L. (3), <i>Memecylon</i> L. (3), <i>Osbeckia</i> L. (6), <i>Oxyspora</i> DC. (2), <i>Sonerila</i> Roxb. (5), <i>Styrophyton</i> S. Y. Hu (1)
Meliaceae (12)	<i>Aglaia</i> Lour. (2), <i>Amoora</i> Roxb. (7), <i>Aphanamixis</i> Blume (2), <i>Chisocheton</i> Blume (1), <i>Chukrasia</i> A. Juss. (2), <i>Cipadessa</i> Blume (1), <i>Dysoxylum</i> Blume (10), <i>Melia</i> L. (2), <i>Munronia</i> Wight (1), <i>Toona</i> (Endl.) M. Roem. (5), <i>Trichilia</i> P. Browne (2), <i>Walsura</i> Roxb. (2)
Menispermaceae (14)	<i>Aspidocarya</i> Hook. f. & Thomson (1), <i>Cissampelos</i> L. (1), <i>Cocculus</i> DC. (2), <i>Cyclea</i> Arn. ex Wight (6), <i>Diplocisia</i> Miers (1), <i>Eleutharrhena</i> Forman (1), <i>Hypserpa</i> Miers (1), <i>Pachygone</i> Miers (1), <i>Parabaena</i> Miers (1), <i>Pericampylus</i> Miers (1), <i>Pycnarrhena</i> Miers ex Hook. f. & Thomson (1), <i>Stephania</i> Lour. (9), <i>Tinomisium</i> Miers ex Hook. f. & Thomson (1), <i>Tinospora</i> Miers (3)
Menyanthaceae (1)	<i>Nymphoides</i> Ség. (1)
Moraceae (7)	<i>Antiaris</i> Lesch. (1), <i>Artocarpus</i> J. R. Forst. & G. Forst. (5), <i>Broussonetia</i> L'Hér. ex Vent. (2), <i>Ficus</i> L. (58), <i>Maclura</i> Nutt. (3), <i>Morus</i> L. (2), <i>Streblus</i> Lour. (2)
Musaceae (2)	<i>Ensete</i> Horan. (1), <i>Musa</i> L. (5)
Myricaceae (1)	<i>Myrica</i> L. (1)
Myristicaceae (3)	<i>Horsfieldia</i> Willd. (4), <i>Knema</i> Lour. (4), <i>Myristica</i> Gronov. (1)
Myrsinaceae (4)	<i>Ardisia</i> Sw. (10), <i>Embelia</i> Burm. f. (8), <i>Maesa</i> Forssk. (8), <i>Myrsine</i> L. (2)
Myrtaceae (2)	<i>Decaspermum</i> J. R. Forst. & G. Forst. (1), <i>Syzygium</i> P. Browne ex Gaertn. (22)
Najadaceae (1)	<i>Najas</i> L. (1)
Nyctaginaceae (1)	<i>Pisonia</i> L. (1)
Nymphaeaceae (2)	<i>Brasenia</i> Schreb. (1), <i>Nuphar</i> Sm. (1)
Nyssaceae (2)	<i>Campthoeca</i> Decne. (1), <i>Nyssa</i> L. (3)
Oleaceae (3)	<i>Erythralum</i> Blume (1), <i>Olex</i> L. (1), <i>Schoepfia</i> Schreb. (1)
Oleaceae (7)	<i>Chionanthus</i> L. (1), <i>Fraxinus</i> L. (2), <i>Jasminum</i> L. (10), <i>Ligustrum</i> L. (4), <i>Linociera</i> Sw. ex Schreb. (1), <i>Olea</i> L. (3), <i>Osmanthus</i> Lour. (2)
Onagraceae (2)	<i>Epilobium</i> L. (1), <i>Ludwigia</i> L. (5)
Opiliaceae (2)	<i>Opilia</i> Roxb. (1), <i>Urobotrya</i> Stapf (1)
Orchidaceae (94)	<i>Acampe</i> Lindl. (2), <i>Acanthephippium</i> Blume ex Endl. (2), <i>Acriopsis</i> Blume (1), <i>Aerides</i> Lour. (2), <i>Agrostophyllum</i> Blume (1), <i>Ania</i> Lindl. (3), <i>Anoectochilus</i> Blume (3), <i>Anthogonium</i> Wall. ex Lindl. (1), <i>Aphyllorchis</i> Blume (2), <i>Apostasia</i> Blume (1), <i>Arachnis</i> Blume (1), <i>Arundina</i> Blume (1), <i>Ascocentrum</i> Schltr. ex J. J. Sm. (1), <i>Brachycorythis</i> Lindl. (1), <i>Bulbophyllum</i> Thouars (40), <i>Calanthe</i> R. Br. (5), <i>Callostylis</i> Blume (1), <i>Cephalantheropsis</i> Guillaumin (1), <i>Ceratostylis</i> Blume (1),

APPENDIX 1. Continued.

Families	Genera
	<i>Cheirostylis</i> Blume (2), <i>Chiloschista</i> Lindl. (1), <i>Chrysoglossum</i> Blume (1), <i>Cleisostoma</i> Blume (10), <i>Coelogyne</i> Lindl. (9), <i>Corymborchis</i> Thouars (1), <i>Cymbidium</i> Sw. (10), <i>Dendrobium</i> Sw. (43), <i>Diploprora</i> Hook. f. (1), <i>Epipactis</i> Zinn (1), <i>Epipogium</i> J. F. Gmel. ex Borkh. (2), <i>Eria</i> Lindl. (22), <i>Eriodes</i> Rolfe (1), <i>Erythrodes</i> Blume (1), <i>Esmeralda</i> Rehb. f. (1), <i>Eulophia</i> R. Br. ex Lindl. (1), <i>Flickingeria</i> A. D. Hawkes (6), <i>Galeola</i> Lour. (2), <i>Gastrochilus</i> D. Don (5), <i>Gastrodia</i> R. Br. (1), <i>Geodorum</i> Jacks. (2), <i>Goodyera</i> R. Br. (3), <i>Habenaria</i> Willd. (12), <i>Hemipilia</i> Lindl. (1), <i>Herminium</i> L. (1), <i>Hetaeria</i> Blume (1), <i>Holcoglossum</i> Schltr. (2), <i>Hygrochilus</i> Pfitzer (1), <i>Kingidium</i> P. F. Hunt (1), <i>Lecanorchis</i> Blume (1), <i>Liparis</i> Rich. (11), <i>Luisia</i> Gaudich. (4), <i>Malaxis</i> Sol. ex Sw. (9), <i>Nervilia</i> Commons ex Gaudich. (2), <i>Oberonia</i> Lindl. (13), <i>Ornithochilus</i> (Lindl.) Wall. ex Benth. (1), <i>Otochilus</i> Lindl. (2), <i>Panisea</i> Lindl. (1), <i>Paphiopedilum</i> Pfitzer (2), <i>Papilionanthe</i> Schltr. (2), <i>Parapteroceras</i> Aver. (1), <i>Pecteilis</i> Raf. (2), <i>Pelatantheria</i> Ridl. (3), <i>Pennilabium</i> J. J. Sm. (1), <i>Peristylus</i> Blume (4), <i>Phaius</i> Lour. (6), <i>Phalaenopsis</i> Blume (1), <i>Pholidota</i> Lindl. ex Hook. (4), <i>Phreatia</i> Lindl. (1), <i>Platanthera</i> Rich. (1), <i>Pleione</i> D. Don (1), <i>Podochilus</i> Blume (1), <i>Polystachya</i> Hook. (1), <i>Porpax</i> Lindl. (1), <i>Pteroceras</i> Hasselt ex Hassk. (1), <i>Rhynchostylis</i> Blume (1), <i>Robiquetia</i> Gaudich. (1), <i>Sarcoglyphis</i> Garay (1), <i>Schoenorchis</i> Blume (2), <i>Spathoglottis</i> Blume (1), <i>Spiranthes</i> Rich. (1), <i>Staurochilus</i> Ridl. ex Pfitzer (2), <i>Sunipia</i> Lindl. (5), <i>Taeniophyllum</i> Blume (2), <i>Tainia</i> Blume (2), <i>Thelasis</i> Blume (1), <i>Thrixspermum</i> Lour. (2), <i>Thunia</i> Rehb. f. (1), <i>Trichoglottis</i> Blume (1), <i>Tropidia</i> Lindl. (2), <i>Uncifera</i> Lindl. (1), <i>Vanda</i> R. Br. (4), <i>Vandopsis</i> Pfitzer (2), <i>Vanilla</i> Plum. ex Mill. (1), <i>Zeuxine</i> Lindl. (3)
Orobanchaceae (1)	<i>Aeginetia</i> L. (1)
Oxalidaceae (3)	<i>Averrhoa</i> L. (1), <i>Biophytum</i> DC. (3), <i>Oxalis</i> L. (1)
Pandanaceae (1)	<i>Pandanus</i> Parkinson (1)
Papaveraceae (1)	<i>Argemone</i> L. (1)
Passifloraceae (2)	<i>Adenia</i> Forssk. (2), <i>Passiflora</i> L. (4)
Pinaceae (1)	<i>Pinus</i> L. (1)
Piperaceae (3)	<i>Peperomia</i> Ruiz & Pav. (5), <i>Piper</i> L. (27), <i>Zippelia</i> Blume (1)
Pittosporaceae (1)	<i>Pittosporum</i> Banks ex Gaertn. (6)
Plantaginaceae (1)	<i>Plantago</i> L. (3)
Poaceae (63)	<i>Acroceras</i> Stapf (1), <i>Apluda</i> L. (1), <i>Arthraxon</i> P. Beauv. (1), <i>Arundinella</i> Raddi (2), <i>Arundo</i> L. (1), <i>Bambusa</i> Schreb. (3), <i>Bothriochloa</i> Kuntze (1), <i>Brachiaria</i> (Trin.) Griseb. (1), <i>Cenotothea</i> Desv. (1), <i>Cephalostachyum</i> Munro (2), <i>Chimonobambusa</i> Makino (2), <i>Chloris</i> Sw. (1), <i>Chrysopogon</i> Trin. (1), <i>Coix</i> L. (1), <i>Cymbopogon</i> Spreng. (2), <i>Cynodon</i> Rich. (2), <i>Cyrtococcum</i> Stapf (1), <i>Dendrocalamus</i> Nees (20), <i>Digitaria</i> Haller (4), <i>Echinochloa</i> P. Beauv. (2), <i>Eleusine</i> Gaertn. (2), <i>Eragrostis</i> Wolf (6), <i>Erianthus</i> Michx. (1), <i>Eriochloa</i> Kunth (1), <i>Fargesia</i> Franch. (1), <i>Gigantochloa</i> Kurz ex Munro (6), <i>Hackelochloa</i> Kuntze (1), <i>Hymenachne</i> P. Beauv. (1), <i>Hyparrhenia</i> Andersson ex E. Fourn. (1), <i>Imperata</i> Cirillo (1), <i>Indosasa</i> McClure (3), <i>Isachne</i> R. Br. (1), <i>Ischaemum</i> L. (1), <i>Leptochloa</i> P. Beauv. (1), <i>Lophatherum</i> Brongn. (1), <i>Melocalamus</i> Benth. (3), <i>Microstegium</i> Nees (1), <i>Miscanthus</i> Andersson (1), <i>Neyraudia</i> Hook. f. (1), <i>Oplismenus</i> P. Beauv. (2), <i>Oryza</i> L. (2), <i>Panicum</i> L. (3), <i>Paspalidium</i> Stapf (1), <i>Paspalum</i> L. (5), <i>Phyllostachys</i> Siebold & Zucc. (3), <i>Pleioblastus</i> Nakai (1), <i>Poa</i> L. (1), <i>Pogonatherum</i> P. Beauv. (1), <i>Pseudochinolaena</i> Stapf (1), <i>Pseudostachyum</i> Munro (1), <i>Rottboellia</i> L. f. (1), <i>Saccharum</i> L. (2), <i>Sacciolepis</i> Nash (3), <i>Schizostachyum</i> Nees (3), <i>Setaria</i> P. Beauv. (4), <i>Sorghum</i> Moench (2), <i>Sporobolus</i> R. Br. (1), <i>Stenotaphrum</i> Trin. (1), <i>Themeda</i> Forssk. (5), <i>Thyrsostachys</i> Gamble (2), <i>Thysanolaena</i> Nees (1), <i>Urochloa</i> P. Beauv. (1), <i>Yushania</i> Keng f. (1)
Podocarpaceae (3)	<i>Dacrycarpus</i> (Endl.) de Laub. (1), <i>Nageia</i> Gaertn. (2), <i>Podocarpus</i> L'Hér. ex Pers. (1)
Podostemaceae (2)	<i>Cladopus</i> H. Möller (1), <i>Hydrobryum</i> Endl. (1)
Polygalaceae (4)	<i>Polygala</i> L. (13), <i>Salomonina</i> Lour. (4), <i>Securidaca</i> L. (1), <i>Xanthophyllum</i> Roxb. (2)
Polygonaceae (4)	<i>Fagopyrum</i> Mill. (1), <i>Polygonum</i> L. (16), <i>Reynoutria</i> Houtt. (1), <i>Rumex</i> L. (1)
Pontederiaceae (1)	<i>Monochoria</i> C. Presl (3)
Portulacaceae (2)	<i>Portulaca</i> L. (1), <i>Talinum</i> Adans. (1)
Potamogetonaceae (1)	<i>Potamogeton</i> L. (2)
Primulaceae (1)	<i>Lysimachia</i> L. (9)
Proteaceae (2)	<i>Helicia</i> Lour. (6), <i>Heliciopsis</i> Sleumer (2)
Rafflesiaceae (1)	<i>Sapria</i> Griff. (1)
Ranunculaceae (4)	<i>Anemone</i> L. (2), <i>Clematis</i> L. (9), <i>Naravelia</i> Adans. (1), <i>Ranunculus</i> L. (2)
Rhamnaceae (9)	<i>Berberchia</i> Neck ex DC. (3), <i>Chaydaia</i> Pit. (1), <i>Gouania</i> Jacq. (4), <i>Hovenia</i> Thunb. (1), <i>Rhamnus</i> L. (2), <i>Sageretia</i> Brongn. (2), <i>Scutia</i> (Comm. ex A. DC.) Brongn. (1), <i>Ventilago</i> Gaertn. (5), <i>Ziziphus</i> Mill. (6)

APPENDIX 1. Continued.

Families	Genera
Rhizophoraceae (2)	<i>Carallia</i> Roxb. (1), <i>Pellacalyx</i> Korth. (1)
Rosaceae (18)	<i>Agrimonia</i> L. (2), <i>Cerasus</i> Mill. (1), <i>Chaenomeles</i> Lindl. (1), <i>Dichotomanthes</i> Kurz (1), <i>Docynia</i> Decne. (1), <i>Duchesnea</i> Sm. (2), <i>Eriobotrya</i> Lindl. (2), <i>Laurocerasus</i> Duhamel (4), <i>Neillia</i> D. Don (1), <i>Photinia</i> Lindl. (5), <i>Potentilla</i> L. (3), <i>Pygeum</i> Gaertn. (3), <i>Pyracantha</i> M. Roem. (1), <i>Pyrus</i> L. (2), <i>Rosa</i> L. (1), <i>Rubus</i> L. (10), <i>Sorbus</i> L. (5), <i>Stranvaesia</i> Lindl. (1)
Rubiaceae (45)	<i>Aidia</i> Lour. (2), <i>Borreria</i> G. Mey. (1), <i>Brachytome</i> Hook. f. (2), <i>Canthium</i> Lam. (3), <i>Cephalanthus</i> L. (1), <i>Chassalia</i> DC. (1), <i>Dentella</i> J. R. Forst. & G. Forst. (1), <i>Diplospora</i> DC. (2), <i>Duperrea</i> Pierre ex Pit. (1), <i>Gardenia</i> J. Ellis (1), <i>Geophila</i> D. Don (1), <i>Hedyotis</i> L. (14), <i>Hymenodictyon</i> Wall. (3), <i>Hypitanthera</i> Wight & Arn. (1), <i>Ixora</i> L. (6), <i>Knoxia</i> L. (1), <i>Lasianthus</i> Jack (12), <i>Litosanthes</i> Blume (1), <i>Metadina</i> Bakh. f. (1), <i>Mitragyna</i> Korth. (1), <i>Morinda</i> L. (3), <i>Mussaenda</i> L. (7), <i>Mycetia</i> Reinw. (9), <i>Myrioneuron</i> R. Br. ex Kurz (1), <i>Neanotis</i> W. H. Lewis (4), <i>Neolamarckia</i> Bosser (1), <i>Neonauclea</i> Merr. (3), <i>Ophiorrhiza</i> L. (13), <i>Oxyceros</i> Lour. (3), <i>Paederia</i> L. (2), <i>Pavetta</i> L. (4), <i>Prismatomeris</i> Thwaites (1), <i>Psychotria</i> L. (6), <i>Randia</i> L. (1), <i>Rubia</i> L. (2), <i>Saprosma</i> Blume (1), <i>Schizomussaenda</i> H. L. Li (1), <i>Sinoadina</i> Ridsdale (1), <i>Spiradiclis</i> Blume (2), <i>Tarenna</i> Gaertn. (1), <i>Tarennoidea</i> Tirveng. & Sastre (2), <i>Uncaria</i> Schreb. (5), <i>Urophyllum</i> Jack ex Wall. (1), <i>Wendlandia</i> Bartl. ex DC. (11), <i>Xeromphis</i> Raf. (1)
Rutaceae (14)	<i>Acronychia</i> J. R. Forst. & G. Forst. (1), <i>Atalantia</i> Corrêa (1), <i>Boenninghausenia</i> Rehb. ex Meisn. (1), <i>Citrus</i> L. (1), <i>Clausena</i> Burm. f. (5), <i>Euodia</i> J. R. Forst. & G. Forst. (8), <i>Fortunella</i> Swingle (1), <i>Glycosmis</i> Corrêa (6), <i>Micromelum</i> Blume (3), <i>Murraya</i> J. König ex L. (2), <i>Paramignya</i> Wight (1), <i>Skimmia</i> Thunb. (1), <i>Toddalia</i> Juss. (1), <i>Zanthoxylum</i> L. (8)
Sabiaceae (2)	<i>Meliosma</i> Blume (5), <i>Sabia</i> Colebr. (3)
Salicaceae (1)	<i>Salix</i> L. (1)
Santalaceae (5)	<i>Dendrotrophe</i> Miq. (1), <i>Osyris</i> L. (1), <i>Phacellaria</i> Benth. (2), <i>Pyrularia</i> Michx. (1), <i>Scleropyrum</i> Arn. (1)
Sapindaceae (11)	<i>Allophylus</i> L. (3), <i>Arytera</i> Blume (1), <i>Cardiospermum</i> L. (1), <i>Dodonaea</i> Mill. (1), <i>Harpullia</i> Roxb. (1), <i>Litchi</i> Sonn. (1), <i>Mischocarpus</i> Blume (1), <i>Nephelium</i> L. (1), <i>Pometia</i> J. R. Forst. & G. Forst. (1), <i>Sapindus</i> L. (1), <i>Xerospermum</i> Blume (1)
Sapotaceae (3)	<i>Pouteria</i> Aubl. (1), <i>Sarcosperma</i> Hook. f. (4), <i>Xantolis</i> Raf. (3)
Saururaceae (2)	<i>Houttuynia</i> Thunb. (1), <i>Saururus</i> L. (1)
Saxifragaceae (3)	<i>Bergenia</i> Moench (1), <i>Itea</i> L. (2), <i>Tiarella</i> L. (1)
Scrophulariaceae (15)	<i>Adenosma</i> R. Br. (3), <i>Alectra</i> Thunb. (1), <i>Bacopa</i> Aubl. (1), <i>Brandisia</i> Hook. f. & Thomson (2), <i>Centranthera</i> R. Br. (2), <i>Dopatrium</i> Buch.-Ham. ex Benth. (1), <i>Limnophila</i> R. Br. (4), <i>Lindenbergia</i> Lehm. (2), <i>Lindernia</i> All. (10), <i>Mazus</i> Lour. (1), <i>Microcarpaea</i> R. Br. (1), <i>Picria</i> Lour. (1), <i>Torenia</i> L. (2), <i>Veronica</i> L. (1), <i>Wightia</i> Wall. (1)
Simaroubaceae (3)	<i>Ailanthus</i> Desf. (2), <i>Brucea</i> J. F. Mill. (2), <i>Picrasma</i> Blume (1)
Smilacaceae (1)	<i>Smilax</i> L. (15)
Solanaceae (4)	<i>Lycianthes</i> (Dunal) Hassl. (6), <i>Nicandra</i> Adans. (1), <i>Physalis</i> L. (2), <i>Solanum</i> L. (15)
Sonneratiaceae (1)	<i>Duabanga</i> Buch.-Ham. (1)
Sparganiaceae (1)	<i>Sparganium</i> L. (1)
Sphenocleaceae (1)	<i>Sphenoclea</i> Gaertn. (1)
Stachyuraceae (1)	<i>Stachyurus</i> Siebold & Zucc. (1)
Staphyleaceae (2)	<i>Tapiscia</i> Oliv. (1), <i>Turpinia</i> Vent. (4)
Stemonaceae (1)	<i>Stemona</i> Lour. (2)
Sterculiaceae (12)	<i>Ambroma</i> L. f. (1), <i>Byttneria</i> Loefl. (3), <i>Eriolaena</i> DC. (4), <i>Erythropsis</i> Lindl. ex Schott & Endl. (2), <i>Helicteres</i> L. (6), <i>Heritiera</i> Aiton (1), <i>Melochia</i> L. (1), <i>Pterospermum</i> Schreb. (5), <i>Pterygota</i> Schott & Endl. (1), <i>Reevesia</i> Lindl. (3), <i>Sterculia</i> L. (5), <i>Waltheria</i> L. (1)
Stylidiaceae (1)	<i>Stylidium</i> Sw. ex Willd. (1)
Styracaceae (4)	<i>Alniphyllum</i> Matsum. (1), <i>Bruinsmia</i> Boerl. & Koord. (1), <i>Huodendron</i> Rehder (1), <i>Styrax</i> L. (4)
Symplocaceae (1)	<i>Symplocos</i> Jacq. (9)
Taccaceae (1)	<i>Tacca</i> J. R. Forst. & G. Forst. (1)
Theaceae (9)	<i>Adinandra</i> Jack (1), <i>Anneslea</i> Wall. (1), <i>Camellia</i> L. (6), <i>Eurya</i> Thunb. (5), <i>Gordonia</i> J. Ellis (1), <i>Pyrenaria</i> Blume (3), <i>Schima</i> Reinw. ex Blume (2), <i>Sladenia</i> Kurz (1), <i>Ternstroemia</i> Mutis ex L. f. (2)
Thymelaeaceae (2)	<i>Aquilaria</i> Lam. (1), <i>Eriosolena</i> Blume (1)
Tiliaceae (5)	<i>Colona</i> Cav. (2), <i>Corchorus</i> L. (3), <i>Grewia</i> L. (6), <i>Microcos</i> L. (2), <i>Triumfetta</i> L. (4)
Trapaceae (1)	<i>Trapa</i> L. (1)
Ulmaceae (5)	<i>Aphananthe</i> Planch. (2), <i>Celtis</i> L. (3), <i>Gironniera</i> Gaudich. (1), <i>Trema</i> Lour. (3), <i>Ulmus</i> L. (1)

APPENDIX 1. Continued.

Families	Genera
Urticaceae (14)	<i>Boehmeria</i> Jacq. (13), <i>Debregeasia</i> Gaudich. (4), <i>Dendrocnide</i> Miq. (3), <i>Elatostema</i> J. R. Forst. & G. Forst. (14), <i>Girardinia</i> Gaudich. (1), <i>Gonostegia</i> Turcz. (1), <i>Maoutia</i> Wedd. (1), <i>Oreocnide</i> Miq. (3), <i>Pellionia</i> Gaudich. (6), <i>Pilea</i> Lindl. (17), <i>Poikilospermum</i> Zipp. ex Miq. (2), <i>Pouzolzia</i> Gaudich. (4), <i>Procris</i> Comm. ex Juss. (1), <i>Urtica</i> L. (2)
Valerianaceae (1)	<i>Triplostegia</i> Wall. ex DC. (1)
Verbenaceae (11)	<i>Callicarpa</i> L. (11), <i>Caryopteris</i> Bunge (1), <i>Clerodendrum</i> L. (14), <i>Congea</i> Roxb. (2), <i>Garrettia</i> H. R. Fletcher (1), <i>Gmelina</i> L. (1), <i>Phyla</i> Lour. (1), <i>Premna</i> L. (8), <i>Sphenodesme</i> Jack (1), <i>Symphorema</i> Roxb. (1), <i>Vitex</i> L. (7)
Violaceae (1)	<i>Viola</i> L. (9)
Viscaceae (2)	<i>Korthalsella</i> Tiegh. (1), <i>Viscum</i> L. (6)
Vitaceae (7)	<i>Ampelopsis</i> Michx. (4), <i>Cayratia</i> Juss. (4), <i>Cissus</i> L. (9), <i>Leea</i> D. Royen ex L. (7), <i>Tetrastigma</i> (Miq.) Planch. (16), <i>Vitis</i> L. (4), <i>Yua</i> C. L. Li (1)
Xyridaceae (1)	<i>Xyris</i> L. (2)
Zingiberaceae (17)	<i>Alpinia</i> Roxb. (11), <i>Amomum</i> Roxb. (14), <i>Boesenbergia</i> Kuntze (1), <i>Cautleya</i> Hook. f. (1), <i>Costus</i> L. (3), <i>Curcuma</i> L. (9), <i>Curcumorpha</i> A. S. Rao & D. M. Verma (1), <i>Etingera</i> Giseke (1), <i>Globba</i> L. (4), <i>Hedychium</i> J. König (7), <i>Kaempferia</i> L. (3), <i>Paramomum</i> S. Q. Tong (1), <i>Pommerschea</i> Wittm. (2), <i>Rhynchanthus</i> Hook. f. (1), <i>Siliquamomum</i> Baill. (1), <i>Stahlianthus</i> Kuntze (1), <i>Zingiber</i> Mill. (11)
Zygophyllaceae (1)	<i>Tribulus</i> L. (1)