
Lectotypification of *Sambucus chinensis* (Caprifoliaceae) and a New Variety from Hunan, China

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ABSTRACT. Lectotypification is provided here for *Sambucus chinensis* Lindley (Caprifoliaceae), and the rare, new variety, *S. chinensis* var. *pinnatilobatus* G. W. Hu, from Hunan province in China, is described and illustrated from two populations. It differs from *S. chinensis* var. *chinensis* in leaflet shape, fruit and pyrene size, and the adaxial epidermis of the leaf blades. The new variety's leaflets on imparipinnate leaves are pinnatipartite or pinnatisect and some leaflet lobes are irregularly pinnatilobate; fruit diameters range from 3.3–3.8 mm (average 3.5 mm); pyrene lengths range from 1.5–1.9 mm (average 1.7 mm); and the epidermal cells of the adaxial leaf surface are irregularly shaped, with sinuous or sinuate anticlinal walls. In comparison, the autonymic variety's leaflets on imparipinnate leaves are not lobed and have serrate margins; fruit diameters range from 4.0–4.8 mm (average 4.3 mm); pyrene lengths range from 2.1–2.5 mm (average 2.2 mm); and the epidermal cells of the adaxial leaf surface are polygonal, with straight or arched anticlinal walls. A chromosome number of $2n = 36$ is reported for the new variety.

Key words: Caprifoliaceae, China, Hunan, IUCN Red List, *Sambucus*.

The genus *Sambucus* L. is composed of ca. 20 species, occurring in North America, Asia, Europe, northern Africa, the West Indies, and the Andean region of South America. It is reported that there are approximately five to seven species (four or five endemic) in the genus *Sambucus* in China (Hu, 1988), but Yang et al. (pers. comm.) only accepts four taxa for the upcoming *Flora of China* treatment. Two *Sambu-*

cus species are reported in Hunan province in central China: *S. chinensis* Lindley and *S. foetidissima* Nakai (Qi & Yu, 2002).

Sambucus chinensis is a large herb, widely distributed from central to southern China and also reported in Japan and Myanmar. When Lindley (1826: 297) originally described the taxon, he failed to designate a type, only mentioning "Plants of a species of Elder were imported by the Society in 1822, from China." Although many researchers since Lindley have studied the *Sambucus* species of Asia (Hara, 1983; Fukuoka, 1987; Bolli, 1994), no one has provided lectotypification for *S. chinensis*, which is therefore necessary (Art. 9.9; McNeill et al., 2006). To designate a lectotype for this species, one of the authors (GM), searched through the herbarium of the Department of Plant Sciences, University of Cambridge (CGE), where John Lindley's herbarium resides with its many species collected on 19th-century expeditions. She determined that only one specimen of *S. chinensis* existed in Lindley's herbarium. This specimen is in very good condition despite being collected in 1824 (Fig. 1). On it in Lindley's handwriting is "China. H. HS. 1824 Oct." and "*Sambucus chinensis* Lindl. [underline in original]," which indicates that it may be the exact specimen that Lindley used to describe this species in 1826. We designate it herein as lectotype.

In 2001, on Yuelu Mountain of Changsha (the capital city of Hunan province), we found a *Sambucus* plant population with imparipinnate leaves and pinnatipartite or pinnatisect leaflets. Otherwise, the *Sambucus* plants found were morphologically similar to *S. chinensis* Lindley. After searching the literature



Figure 1. Lectotype of *Sambucus chinensis* Lindley.

(Hu, 1988) and examining herbarium specimens in the Herbarium of Hunan Normal University (HNNU) and the Herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (KUN), we could not find any such herbaceous *Sambucus* with pinnatipar-

tite leaflets on compound leaves. Only one woody taxon of *Sambucus* with such leaflets had been previously reported in China as *S. sieboldiana* (Miquel) Blume ex Graebner var. *pinnatisecta* G. Y. Luo & P. H. Huang (Luo & Huang, 1987), and this

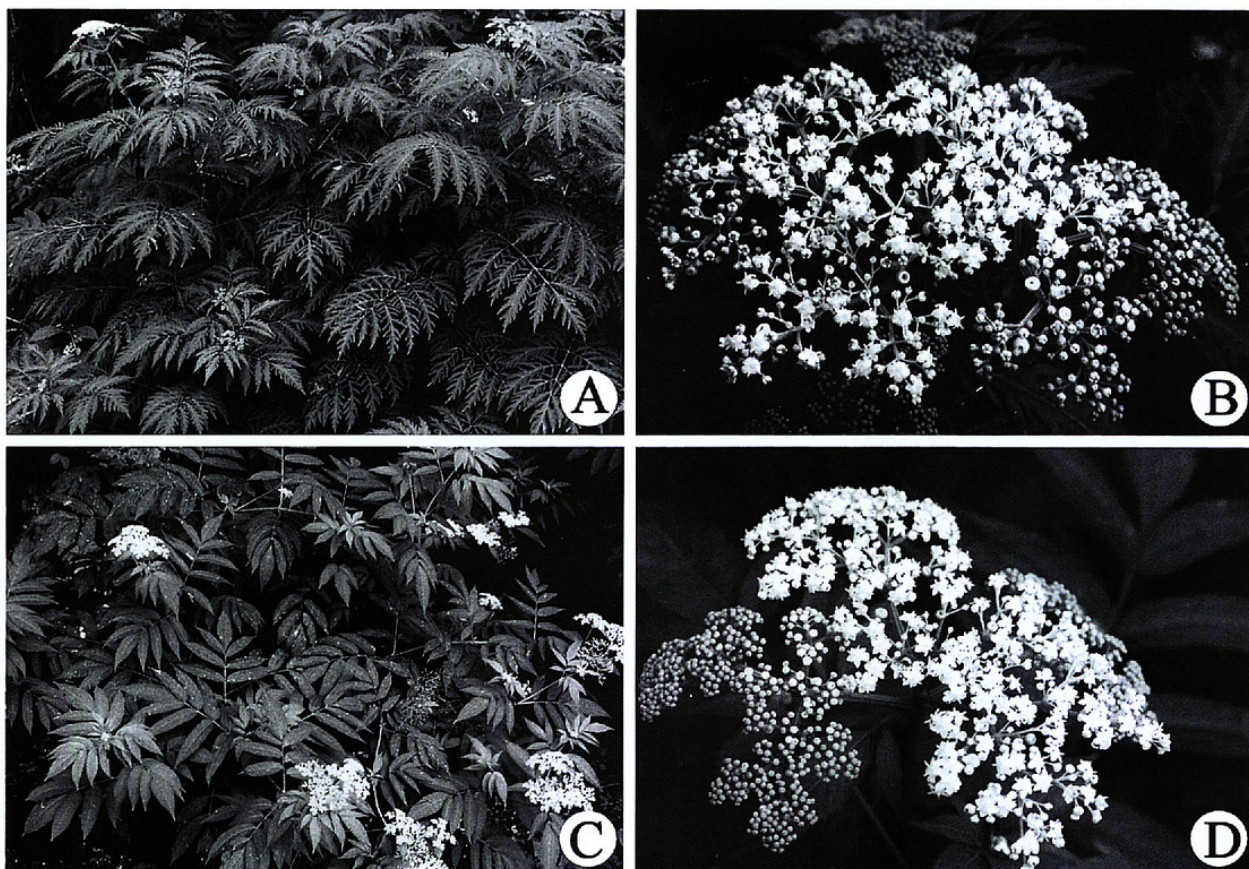


Figure 2. Habit and inflorescences for *Sambucus chinensis*. —A, B. *S. chinensis* var. *pinnatilobatus*. —C, D. *S. chinensis* var. *chinensis*.

differs by its woody stems and the lack of any cuplike sterile flowers. In 2002, we again collected specimens of this new variety with flowers or fruits from Yuelu Mountain. After morphological study and further literature searching (Samutina, 1986; Fukuoka, 1987; Bolli, 1994; Qi & Yu, 2002), as well as searches at PE and KUN, we conclude that these plants represent a new variety of *S. chinensis*. During a botanical survey we conducted in Taoyuan County (northern Hunan province) in August 2004, we found another population of this plant on Tiantishan Hill and also collected specimens.

1. ***Sambucus chinensis*** Lindley, Trans. Hort. Soc. London 6: 297. 1826. TYPE: China. Cultivated by the Horticultural Society of London, Oct. 1824, *Herb. J. Lindley s.n.* (lectotype, designated here, CGE). Figure 1.

Sambucus chinensis is widely distributed from central to southern China and is also known from Japan and Myanmar. Populations of *S. chinensis* distributed in Taiwan have been treated as another species, *S. formosana* Nakai (Li, 1978), or as a variety, *S. chinensis* var. *formosana* (Nakai) H. Hara. However, this is treated as conspecific with *S. chinensis* (Yang & Chiu, 1998; Yang et al., pers. comm.).

- 1a. ***Sambucus chinensis* var. *pinnatilobatus*** G. W. Hu, var. nov. TYPE: China. Hunan: Yuelu Mtn., suburb of Changsha City, 70 m, on roadside and under forest, 6 Aug. 2002 (fl), G. W. Hu 219172 (holotype, HNU; isotypes, KUN, MO). Figures 2A, B, and 3.

Ab *Sambuco chinensi* Lindley var. *chinensi* differt pinnis varie pinnatifidis vel pinnatipartitis vel pinnatisectis (non lobis carentibus et marginibus serratis), lobis pinnae irregulariter pinnatilobatis vel integris.

Perennial large herb, 1–2 m tall, with horizontal rhizomes; stems erect, 0.6–1.2 cm diam., 8-ridged with white, porous pith inside. Leaves imparipinnate, opposite, 20–40 × 10–25 cm; stipules small, linear-lanceolate or often degenerated to yellow glands; leaflets 5 to 11 per leaf, opposite or nearly opposite, narrowly ovate, 6–17 × 4–7 cm, usually with short petiolules; leaflet pinnatipartite or pinnatisect with 6 to 10 pairs of lobes, the basal lobes usually with short petiolules, lobes (especially the basal ones) sometimes pinnatilobate, irregularly or sparsely serrate, sometimes one or a pair of basal lobes degenerated to yellow glands. Inflorescence a terminal compound cyme, large, 15 to 25 cm diam., flat-topped, of 900 to 1500 flowers, with 3 primary rays, leaflike bracts

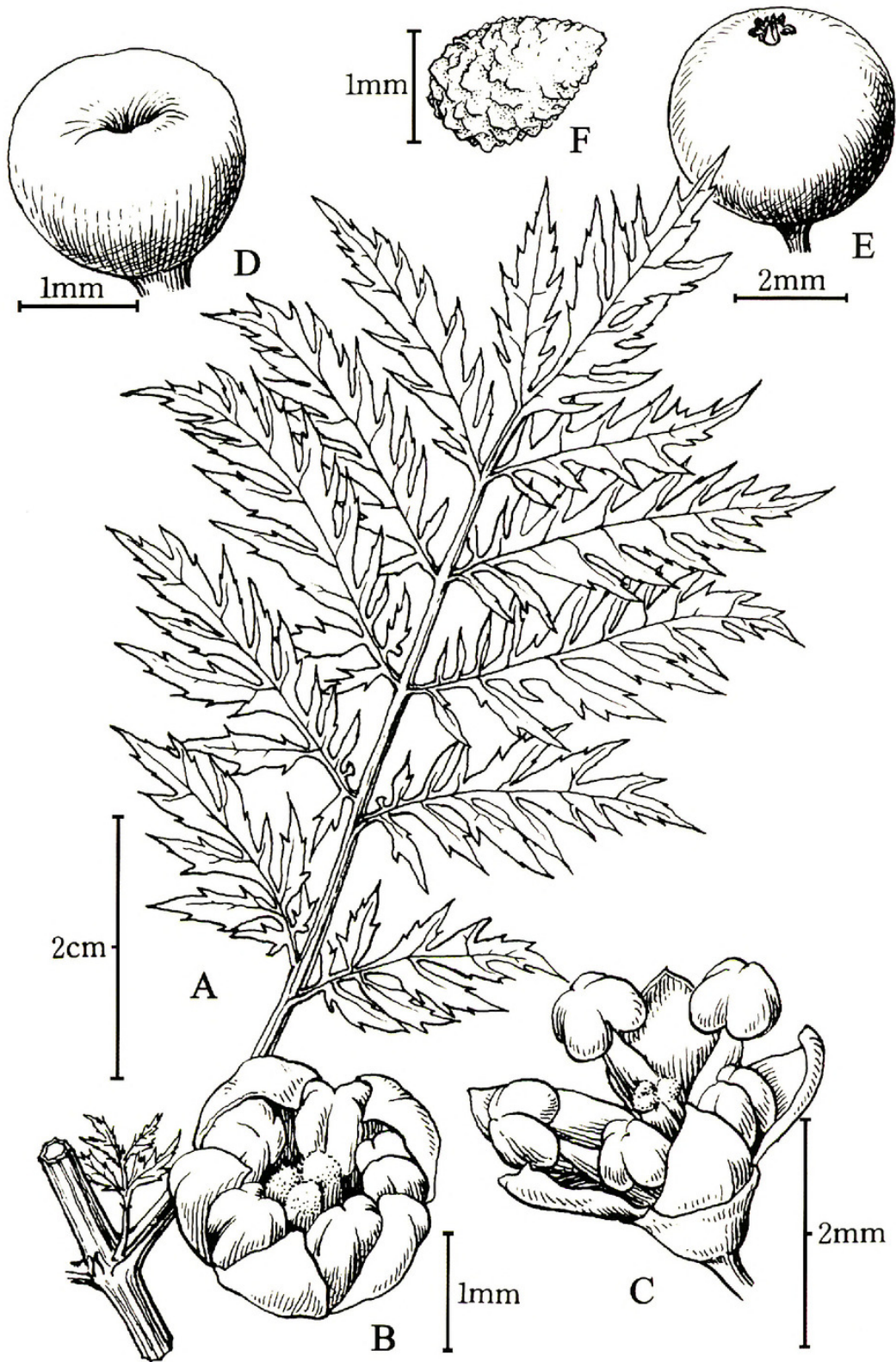


Figure 3. *Sambucus chinensis* var. *pinnatilobatus* G. W. Hu. —A. Leaf. —B. Pre-anthesal flower. —C. Anthesal flower. —D. Cuplike gland developed from sterile flower. —E. Fruit. —F. Pyrene. A–D from G. W. Hu 219172 (HNNU); E, F from G. W. Hu 219212 (HNNU).

presented at the base of peduncle; 30 to 50 persistent, yellow or green, cuplike sterile flowers as first flowers of the lowest cyme units. Flowers bisexual, small, 3–4 mm diam.; calyx ca. 0.5 mm, 5-lobed, lobes triangular, tube cuplike; corolla white, fused at base,

ca. 1.5 mm; stamen slightly shorter than corolla, the versatile anther dark purple, slit axially, pollen yellow; ovary inferior, 3-locular; style short; stigma 3-lobed. Fruits spherical, orange-red when mature, 3.3–3.8 mm diam., with (2)3(4) pyrenes; pyrene

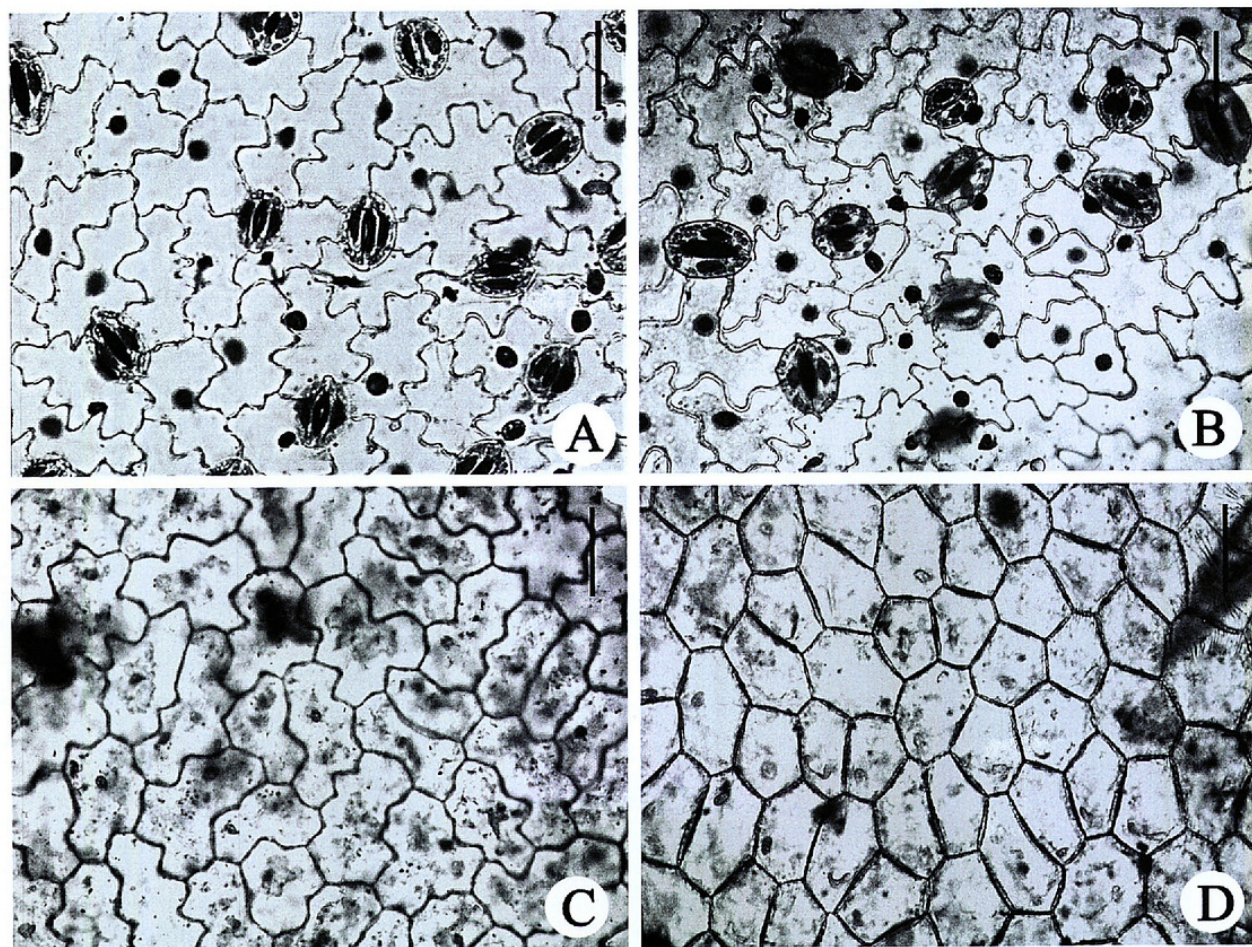


Figure 4. Epidermis characters for leaves in the two varieties of *Sambucus chinensis*. —A. Abaxial epidermis in *S. chinensis* var. *pinnatilobatus*. —B. Abaxial epidermis in *S. chinensis* var. *chinensis*. —C. Upward epidermis character of leaf in *S. chinensis* var. *pinnatilobatus*. —D. Adaxial epidermis in *S. chinensis* var. *chinensis*. Scale bars at upper right = 100 μ m.

ovoid, ca. 1.7 mm, with verrucose surface. Chromosome number $2n = 36$.

Distribution. *Sambucus chinensis* var. *pinnatilobatus* is rare and has only been found on Yuelu Mountain of Changsha City and Taoyuan County in Hunan province, China. Plants intermediate between this new variety and *S. chinensis* var. *chinensis* have not been encountered.

IUCN Red List category. Following IUCN Red List criteria (IUCN, 2001), *Sambucus chinensis* var. *pinnatilobatus* can be provisionally assigned to the category of EN (Endangered) B1a and B2a (extent of occurrence less than 5000 km²; area of occupancy less than 500 km²; known to exist at no more than five locations and severely fragmented).

Phenology. Flowering from July to September; fruiting from August to October (pers. obs.).

Relationships. *Sambucus chinensis* var. *pinnatilobatus* distinctly differs from the autonymic variety in its leaflet shape, although the two varieties otherwise share an imparipinnate leaf arrangement. These

leaflets on an odd-pinnately compound leaf are pinnatipartite or pinnatisect, and some lobes of leaflets are irregularly pinnatilobate (Fig. 2A, B). In comparison, the leaflets on the odd-pinnately compound leaf of *S. chinensis* are not lobed and have a serrate margin (Fig. 2C, D). Although the fruit and pyrene shape and color for this new variety are similar to those of the autonymic variety, their size is significantly smaller. In order to compare the size of the fruit and pyrene between the new and autonymic variety, we collected and measured mature fruits from Yuelu Mountain. The average diameter of 100 normal fresh fruits of this new variety was 3.5 mm with a range from 3.3–3.8 mm, while the average of the autonymic variety was 4.3 mm with a range from 4.0–4.8 mm. The average length of its fresh pyrenes was 1.7 mm with a range from 1.5–1.9 mm, while the average of the autonymic variety was 2.2 mm with a range from 2.1–2.5 mm. One thousand dry pyrenes of the new variety weighed 1.04 g, while that of the autonymic variety weighed 1.33 g. We also observed and compared the epidermal characters of mature leaves in both taxa under a light microscope. In 2004,

Table 1. Comparative differences between *Sambucus chinensis* var. *chinensis* and *S. chinensis* var. *pinnatilobatus*. Sample sizes for fruits equal 1000 for both varieties.

	<i>S. chinensis</i> var. <i>chinensis</i>	<i>S. chinensis</i> var. <i>pinnatilobatus</i>
Leaflet margin	serrate	pinnatipartite or pinnatisect and some lobes irregularly pinnatilobate
Fruit diameter (mm)	average 4.3, range 4.0–4.8	average 3.5, range 3.3–3.8
Pyrene length (mm)	average 2.2, range 2.1–2.5	average 1.7, range 1.5–1.9
Adaxial leaf epidermis	polygonal, with straight or arched anticlinal walls	irregularly shaped, with sinuous or sinuate anticlinal walls

plant material of the two varieties was collected at the type location and under similar conditions as the type collection on Yuelu Mountain. In 2007, collections of the two varieties were made from plants that had been transplanted from Changsha to a location in Kunming, Yunnan province, in 2005. We observed that the two varieties share similar epidermal cells of the abaxial leaf surface, with both having irregular-shaped epidermal cells and anomocytic stomata (Fig. 4A, B). However, their adaxial epidermis characters of leaves are distinctively different. In *S. chinensis* var. *pinnatilobatus*, the adaxial epidermal cells are irregularly shaped, and their anticlinal walls are sinuous or sinuate (Fig. 4C), while in *S. chinensis* var. *chinensis* the adaxial epidermal cells have a polygonal shape, and their anticlinal walls are straight or arched (Fig. 4D). The comparative differences between *S. chinensis* var. *chinensis* and *S. chinensis* var. *pinnatilobatus* can be found in Table 1. The chromosome report of $2n = 36$ for the new variety is in agreement with our count for the autonymic variety (Hu, pers. obs.).

In February 2004, we performed experiments in reproducing *Sambucus chinensis* var. *pinnatilobatus* with seeds and rhizomes. Our results yielded no seedlings from seeds while reproduction occurred easily with the rhizomes. In December 2005, we transplanted two rhizomes to Kunming from Changsha (each rhizome ca. 30 cm long). Each transplanted rhizome reproduced more than 10 young plants. Our surveys on Yuelu Mountain from 2001 to 2004 also did not reveal any apparent seedlings from seeds in the wild. We assume that vegetative propagation by rhizomes is the predominant reproductive strategy in *S. chinensis* var. *pinnatilobatus*. This inherent limitation of spreading only by rhizome growth may restrict the new variety’s distribution.

Paratypes. CHINA. **Hunan:** Yuelu Mtn., suburb of Changsha City, 70 m, on roadside & under forest, 8 Oct. 2003 (fr), G. W. Hu 219212 (HNNU); Taoyuan Co., Tiantishan Hill, 200 m, on roadside & in bush, 29 Aug. 2004 (fr), G. W. Hu 219248 (HNNU).

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