

# 征镒鹅掌柴（新种）

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*Schefflera zhengyiana* J. Wen, Frodin & Y.-M. Shui, a new species of Araliaceae from southwestern China and Vietnam, with taxonomic notes of its close relatives

ABSTRACT: A new species of *Schefflera* (Araliaceae) is described and illustrated as *Schefflera zhengyiana* J. Wen, Frodin & Y.-M. Shui. The new species is named in honor of Professor Zhengyi Wu as a small token of our deep respect for his tremendous contributions to understanding the plant diversity, biogeography and floristics of eastern Asia, at the occasion of the one-year anniversary of the world's loss of this giant in botany, biogeography, floristics and evolutionary biology. The new species occurs in the limestone areas in southwestern China (SE Yunnan and Guangxi) and northern Vietnam. This new taxon is compared with two morphologically similar congeners from the same region: *Schefflera hypoleuca* and *S. hypoleucoides* based on our field work and the examination of herbarium collections. Due to the taxonomic confusions concerning this group of taxa, we provide a revision of these three species.

Kew words: China, Araliaceae, *Schefflera zhengyiana* sp. nov., *S. hypoleuca*, *S. hypoleucoides*, Vietnam

At the occasion of the one-year anniversary of the world's loss of Professor Zhengyi Wu, a giant in botany, biogeography, floristics and evolutionary biology, we herein name a new species, *Schefflera zhengyiana* J. Wen, Frodin & Y.-M. Shui (Araliaceae) in honor of Professor Wu as a small token of our deep respect for his tremendous contributions to understanding the plant diversity, biogeography and floristics of eastern Asia. During our recent expeditions to southeast Yunnan, we collected specimens of this new species of *Schefflera* J. R. & G. Forst. in southeastern Yunnan, China. Examination of herbarium collections has revealed that the species also occurs in Vietnam. Morphologically *Schefflera zhengyiana* resembles *S. hypoleuca* (Kurz) Harms and *S. hypoleucoides* Harms and has been sometimes misidentified as *S. hypoleuca* (see Hoo & Tseng 1978). Below we describe the new species, and provide an enumeration of the three species and a taxonomic key to help differentiate them. *Schefflera hypoleuca* and *S. hypoleucoides* have been taxonomically difficult (see Li 1942; Xiang & Lowry 2007). We thus offer a detailed account of both species as well.

*Schefflera zhengyiana* J. Wen, Frodin & Y. M. Shui, sp. nov. TYPE: China (SE Yunnan), Hekou Xian, Nanxi community, Longyincong of Longdao, in the forests on the limestone hills, alt. 700-1000 m, flowers



white, 20 Dec, 2004, Y. M. Shui et al. 43808 (holotype, KUN; isotypes, MO, US). Figures 1 & 2.

Tree, 6-25 m tall. Leaves 7-9-foliolate, petioles glabrous, 16-36.5 cm long, leaflets thin coriaceous, with sparse white stellate hairs when young, glabrescent on both surfaces when mature, oblong to elliptic, 5.5-26 cm long, 3.3-12.0 cm wide, basal leaflets smaller, green on both surfaces, acuminate to emarginated at apex, rounded to rounded-truncate at base, serrate to entire, never pinnatifid at margin, basal leaflets often entire to very sparsely serrate, lateral veins 12-14, slightly curving toward the margin, prominent on both surfaces; petiolules 1-9.5 cm long, unequal in a given leaf. Inflorescence terminal, with a main axis 20-50 cm long, pubescent with white stellate hairs, primary branches 3-31, paniculately arranged on the main axis, conic in outline, umbels initially appearing to be capitata at young floral bud stage, tomentose then, each terminal umbel with 60-105 flowers, lateral umbels with 40-60 flowers, secondary bracts persistent, triangular to narrowly so, white tomentose, 2.5-7 mm long, 3-6 mm wide, bracteoles persistent, narrowly ovately lanceolate, 2-3.8 mm long, 0.9-1.3 mm wide, pubescent; pedicels pilose, 13-19 mm long on terminal umbels, 5-11 mm long on lateral umbels. Cupules obconic, white tomentose, calyx lobes 5, triangular, 0.5-0.8 mm in length and width, petals ovate, 2-2.3 mm long, 1.5-1.7 mm wide, stamens 5, 4.5-6.0 mm long, ovaries 5-locular, styles conspicuous, undivided but slightly enlarged at the tip, floral disc slightly projected. Fruits globose, 6.2-7.5 mm in diameter, with persistent styles, 2.5-3.3 mm long, undivided or only slightly divided at the tip.

Distribution. SE Yunnan and Guangxi of China, and N Vietnam.

Phenology. Flowering in December to January.

Ecology. In forests of limestone areas; 700-1690 m.

Additional specimens examined. China. GUANGXI: Tianlin Xian, Laoshan, in forest, alt. 600 m, small tree 5 m tall, 25 Nov 1957, fl, Chao-Chien Chang 10966 (KUN); YUNNAN: Gejiu City, Maohao community, Niupeng to Potou, in evergreen forests on summit of limestone hills, 17 Nov 2000, in young flowers, Y. M. Shui et al. 14289 (KUN). Maguan, Gulinqing community, Laofangzi village, in the mossy evergreen broad-leaved forests on limestone hills, 1600 m, 20 Jun 2003, without fl. and fr., Y. M. Shui et al. s.n. (KUN); same county and community, Kashang village, in the dense limestone forests, 1400 m, 10 Oct 2002, without fl. and fr., Y. M. Shui et al. s.n. (KUN). Mengzi, Mentze, 5000 ft, tree 15 ft, flowers white, A. Henry 9654 (K, 2 sheets, one an inflorescence, the other containing two leaves); Mentze(Mengzi), rock mts, 5000' , tree 15 ft, A. Henry 11382 (K); Mengzi Xian, Wulichong reservoir, along the stiff slope, on the limestone hills, alt. 1690 m, 17 Nov, 2003, Y. M. Shui et al. M5 (KUN). Xichou Xian, Dadou community, N23° 22' 54.8" , E104° 46' 52.6" , in the limestone evergreen broad-leaved forests, tree 10 m, 7 Dec, 2007, in flower, Y. M. Shui et al. 80848 (KUN); Xichou Xian, Dadi, 1000 m, in dense forest, tree 6 m, floral buds white, 10 Nov 1939, floral buds, C.-W. Wang 81392 (KUN, 2 sheets). Vietnam. LAO CAI: Sa Pa, on the way from Oquiho to Sa Pa, 1600 m, tree 15 m, 9 Dec 1964, fl, Sino-Vietnam Expedition 242 (KUN). HOA BINH: Pa Co, 1150 m, tree 20-25 m, 15 Dec 1969, in flower, I. V. Grushvitzky et al. 94 (HN, HNPM, K, 2 sheets, LE).

*Schefflera zhengyiana* differs from *S. hypoleucoides* by its green leaflets on both surfaces (vs. glaucous lower leaflet surface in *S. hypoleucoides*) as well as its undivided styles (divided styles nearly to the base in *S.*



*hypoleucoides*). Both species appear to occur in the same region.

Our new species was first noted by Dunn, who designated it as a variety of *Schefflera hypoleuca* var. *hypochlora* in the herbarium and annotated two collections, Henry 9654 and Henry 9654 A as the variety. Feng (1979) described it as *Schefflera hypoleuca* var. *hypochlora* Dunn ex K. M. Feng, in *Flora Yunnanica* (2: 443). Frodin (in Frodin & Govaerts 2003) raised it to the rank of species as *Schefflera hypochlora* (Dunn ex Feng) Frodin. Feng (1979) designated Henry 9654 A (China. Yunnan, Mentze, 5000 ft, tree 15', flowers white, A. Henry 9654 A, lectotype, A!, isolectotype, K!) as the type of *Schefflera hypoleuca* var. *hypochlora*. We noted that A. Henry 9654 A (K) is a mixed collection, with the leaves of *Brassaiopsis floribunda* and the inflorescence perhaps of our new species, *Schefflera zhengyiana*. Because Feng's basis of the new variety was that the leaflets are green on the lower surface, the leaf specimen should be the lectotype of his new variety, which needs to be placed as a synonym of *Brassaiopsis floribunda*.

The specimen Chao-Chien Chang 10966 (KUN) from Guangxi is cited as our new species. The specimen is not very well preserved bearing only one leaflet. The lower leaflet surface has sparse stellate hairs. Nevertheless, its floral and pedicel morphology is consistent to that of *S. zhengyiana*.

*Schefflera hypoleuca* (Kurz) Harms in H. G. A. Engler & K. A. E. Prantl, *Nat. Pflanzenfam.* 3(8): 38. 1894. *Heptapleurum hypoleucum* Kurz, *Forest Fl. Burma* 1: 539. 1877. Type: Myanmar. Not infrequent in the drier hill forests of Martaban, at 6000 ft, also Ava, Khakyen hills (holotype: Kurz collection, possibly at CAL, not located yet).

*Schefflera trevesioides* Harms, *Notizbl. Bot. Gart. Berlin-Dahlem* 13: 451. 1937. Type. Vietnam. Prov. Lao Cai, Chapa, Foit Claire, 1500 m, Feb 1931, Petelot 4576 (holotype, P!; isotype, L!), synonym nov.

Tree, 4-10 m tall. Leaves 5-7 (-9)-foliolate, petioles glabrous to slightly pilose, 17-65 cm long, leaflets thick papery to thin coriaceous, more or less pubescent with stellate hairs beneath, oblong to elliptic, undivided to pinnatifid, 11-30 cm long, 4-15 cm wide, green above, glaucous beneath, acuminate at apex, rounded to acute at base, entire to minutely sparse-serrulate, to pinnatifid at margin, often pinnatifid and less pubescent when young, lateral veins 10-15, prominent on both surfaces; petiolules (2-) 4-9 cm long. Inflorescence terminal, with a main axis of 15-45 cm long, pubescent, primary branches 8-30, paniculately arranged on the main axis, umbels initially appearing to be capitate at the floral bud stage, densely tomentose then, terminal umbels with 30-65 flowers, lateral umbels with 20-35 flowers, bracts persistent, triangular, densely tomentose, 3-7 mm long, 3-5 mm wide, bracteoles persistent, narrowly triangular, tomentose-setulose, 2.3-3 mm long, 1-1.3 mm wide; pedicels more or less pubescent, 7-15 mm long. Cupules cup-shaped, yellowish tomentose, calyx lobes 5, triangular, ca. 0.5 mm in length and width, petals ovate, 3-3.2 mm long, 1.8-2.2 mm wide, stamens 5, 4-5 mm long, ovaries 5-locular, styles conspicuous, slightly divided at the tip, floral disc flat. Fruits globose, 6.2-7.5 mm in diameter, with persistent styles, 2.5-3.3 mm long, slightly divided at the tip.

Vernacular names. Dieng-la-tymphu (Khasia); Tirrhu (Naga Hills).



Distribution. India (Assam, Manipur, Meghalaya and Nagaland), Myanmar to W China (Yunnan and Xizang).

Phenology. Flowering in October to December; fruiting in January to April.

Ecology. In forests; 950-2700 m.

Representative specimens examined: China. YUNNAN: 1875, D. J. Anderson s.n. (CAL); Yunnan, G. Forrest 9790 (K); G. Forrest 12223, in fl (K); Midwest Yunnan, shrub 20-25 ft tall, flowers yellow, in thickets on rocky slopes, 7000 ft, in fl, 1924, G. Forrest 26176 (K, 2 sheets); Yunnan, Howang-tsaopa, 1919, J. Cavalerie 4575 (E). XIZANG: Medog, on the way from Medog to Renqinpeng, in forest, small tree, 1700 m, 15 Apr 1993, fr, H. Sun et al. 5155 (KUN); Medog, Dergong, Beiben, in forest, small tree, 1750 m, 24 Dec 1992, fl, H. Sun et al. 2378 (KUN, 2 sheets). India. ASSAM: G. Mann s.n. (CAL); Mynang, 24 Mar 1892, fr, D. Prain 107 (K); Jawai, 4000 ft, Nov 1892, fl, Dr. King's Collectors s.n. (K); Delei Valley, 28° 5' N, 96° 30' E, 2000 ft, 28 Mar 1925, sterile, F. Kingdon-Ward 7997 (K, 3 sheets). MANIPUR: Bishenput Hill, 5-6000 ft., Nov 1907, A. Meebold 6407 (CAL); tree, D. B. Deb s.n. (CAL, 2 sheets); Mon, 5500 ft., 27 Oct 1885, C. B. Clarke 41785 (CAL); on the way to Lingli, 2500 ft., 6 Jan 1882, G. Watt 5016 (CAL, K). MEGHALAYA: Khasia, Griffith s.n. (K), Griffith 2673 (CAL, K, 2 sheets); road to Jarain, 4000 ft., 15 Oct 1913, U. Kanjilal 2713 (CAL); Rambrai, 4000 ft, 10 Nov 1871, fl, C. B. Clarke 15339E (K); Borporni, 2000 ft., 22 Feb 1885, C. B. Clarke 37097A (K), 37097D (CAL); Maodadora, 4000 ft., 2 Feb 1886, C. B. Clarke 42901A (CAL); Mont Khasia, J. D. Hooker & T. Thomson s.n. (CAL); Khasia, 5-6000 ft, J. D. Hooker & T. Thomson s.n. (K, 5 sheets); Nayramwood, 4500 ft., Khasia, 5 Nov 1871, C. B. Clarke 16664E (CAL); Shillong, 4000 ft., 28 Jul 1886, C. B. Clarke 44336A (CAL); Shillong, 6000 ft., 4 Sep 1886, C. B. Clarke 44843A (CAL); Surareen, 5000 ft., 6 Oct 1886, C. B. Clarke 45183B (CAL); 5000 ft, 28 Oct 1871, C. B. Clarke 16444C (CAL), 16444A (K). NAGALAND: Naga Hills, 14 Jul 1898, collector unknown 10684 (CAL). Myanmar. Loko, S. Kurz 386 (CAL, 3 sheets); Tenasserim, Moogett, 5000 ft., 20 Mar 1877, G. Gattaly 420 (CAL).

The lower leaflet surface is generally more conspicuously pubescent in *S. hypoleuca* than in *S. hypoleuoides*. *Schefflera hypoleuca* is a close relative of *S. elata*. Both have triangular and persistent bracts and bracteoles, pubescent inflorescence, long and slightly divided styles, and flat floral disc. They differ in the larger and heteromorphic leaflets and larger fruits in *S. hypoleuca*.

*Schefflera hypoleuoides* Harms, Repert. Spec. Nov. Regni Veg. 16: 246. 1919. Type. China. Yunnan, Yuanchiy, 6000 ft, tree 30 ft, white flowers, A. Henry 13301 (Lectotype: K, here designated; isolectotypes: A, E, MANCH, MO)

*Schefflera hypoleuoides* var. *truncata* C. B. Shang, Acta Phytotax. Sin. 18(1): 91. 1980. Type: China. Guangxi, Fengshan, Chao-Chien Chang 11293 (holotype: IBK)

Tree, (2) 5-20 m tall. Leaves 5-7-(8)-foliolate, petioles slightly pilose to glabrescent, 20-38.5 cm long, leaflets papery to thick papery, sparsely pubescent with stellate hairs on both surfaces when young, becoming glabrescent, elliptic to oblong, usually undivided when mature, and sometimes pinnatifid when



young, 11-24.5 cm long, 5.2-11.5 cm wide, green above, glaucous beneath, acuminate at apex, rounded to truncate or broadly cuneate at base, entire to sparsely serrulate at margin, often pinnatifid when young, lateral veins 11-14, prominent on both surfaces; petiolules 1.5-6 cm long. Inflorescence terminal, with a main axis of 15.5-40 cm long, brownish pubescent to pubescent, primary branches 10-35, paniculately arranged on the main axis, umbels initially not appearing to be capitate at the floral bud stage, tomentose then, terminal umbels with 30-58 flowers, lateral umbels with 20-30 flowers and usually aborted when mature, bracts persistent, triangular, tomentose, 5-11 mm long, 4-8 mm wide, mostly falling off at fruiting stage, bracteoles persistent, narrowly triangular, tomentose, 1.8-2 mm long, 1-1.2 mm wide; pedicels pubescent, 8-19 mm long. Cupules cup-shaped, light yellowish tomentose when young, becoming nearly glabrescent, calyx lobes 5, inconspicuous, triangular, 0.3-0.5 mm in length and width, petals ovate, 2.5-3.0 mm long, 1.7-2.0 mm wide, stamens 5, 3.5-5 mm long, ovaries 5-locular, styles conspicuous, divided to the base or at least to the middle, floral disc flat. Fruits globose, 7-8 mm in diameter, purplish black, with persistent styles 2-2.5 mm long, recurved.

Vernacular names. Pao-tong-shu, Ya-jiao-bai (SE Yunnan).

Distribution. Yunnan and Guangxi provinces of China, northern Thailand, and Vietnam.

Phenology. Flowering November to February; fruiting March to April.

Ecology: in forests; 1500-2400 m.

Representative specimens examined. China. YUNNAN: Jingdong Xian, Taizhong, Huiyaoqing, 1580 m, 8 Mar 1982, fr, tree 5 m, Collector unknown 786 (KUN, 2 sheets). Jinping Xian, Febshuiling, N22-46-52.1, E 102-18-04.2, alt. 1993, in mossy evergreen broad-leaved forests, tree 5 m, flowers white, 29 Nov, 2009, Y. M. Shui et al. 80571 (KUN). Luchun, Huanglianshan, in the lower part of broadleaf forests, 2200-2400 m, tree ca. 4 m, 16 Oct 1973, floral buds, D. D. Tao 924 (KUN); Huanglianshan, Sha-du-ya-kou, 1900-2500 m, 25 Oct 1995, floral buds, S. K. Wu et al. 248 (KUN); Shuiwenzhan, alt. 1600-1700 m, along th river sides, tree 6 m, fruits green-white, 9 Mar, 2006, Y. M. Shui et al. 70150 (KUN); Shuiwenzhan, same habitat, tree 19 m, fruits green-white, 6 Mar, 2006, Y. M. Shui et al. 70241 (KUN); Shuiwenzhan, same habitat, tree 4 m, fruits white, 9 Mar, 2006, Y. M. Shui et al. 70271 (KUN); Shuiwenzhan, same habitat, tree 6 m, fruits red, 11 Mar, 2006, Y. M. Shui et al. 70275 (KUN); Shuiwenzhan, same habitat, tree 4 m, fruits white, 10 Mar, 2006, Y. M. Shui et al. 70286 (KUN); Shuiwenzhan, same habitat, tree 20 m, fruits red, 11 Mar, 2006, Y. M. Shui et al. 70332 (KUN); Shuiwenzhan, same habitat, tree 2 m, fruits green, 16 Mar, 2006, Y. M. Shui et al. 70404 (KUN); Shuiwenzhan, same habitat, tree 3 m, fruits black, 31 Mar, 2006, Y. M. Shui et al. 70451 (KUN); Shuiwenzhan, same habitat, tree 6 m, fruits black, 1 Apr, 2006, Y. M. Shui et al. 70475 (KUN); Shuiwenzhan, same habitat, tree 18 m, fruits black, 1 Apr, 2006, Y. M. Shui et al. 70467 (KUN); Mengzi, Mengtze, 25-25 Dec, in fl., A. Henry 11435 (NY, 3 sheets; K, inflorescence and large leaflet only, leaf with smaller leaflets belonging to *S. heptaphylla* Frodin); Mengtze, forests, 6000 ft, tree 20 ft, white flowers, A. Henry 11840 (K); Mengzi Xian, Wulichong reservoir, in the lax forest of a valley, alt. 1300m, 19 Nov, 2003, Y. M. Shui et al. M7 (KUN). Pingbian Xian, Sha-tien-jau, 1300 m, height 2 m, flowers white, 7 Dec 1939, fl, C. W. Wang 82960 (KUN, 2 sheets); Xingxian Xiang, Shalishu, Nanshan, 1500 m, 23° 05' N, 103° 30' E, tree ca. 8 m tall, inflorescence terminal, flowers greenish white,





pith unchambered, 19 Nov 2004, fl, J. Wen et al. 8457 (US). Wenshan, Laojunshan, Changpufang, 1800 m, in dense forest in the valley, tree about 10 m tall, 20 Jun 1962, fr, K. M. Feng 22212 (KUN); Wenshan Hsien, 1900 m, in ravine, small tree, 30 ft, 15 Jan 1933, young fr, H. T. Tsai 51538 (KUN); Wen-shan Hsien, 2000 m, in ravine, tree 50 ft, 13 Jan 1933, fl, H. T. Tsai 51505 (KUN). Yuanchiay, 6000 ft, tree 30 ft, white flowers, A. Henry 13301 (K). Thailand. CHIANGMAI: Doi Nang Ka, 10 Nov 1930, floral buds, Put 3420 (K, 2 sheets); Doi Angka, Pa Ngem S peak, 2250 m, 16 Feb 1931, fl, tree 40 ft high, gerth 62 cm, wood white, leaves on flowering branches much less dissected than others, H. B. G. Garrett 642 (K, 2 sheets, one bearing inflorescence, and the other from a sapling showing the more dissected leaflets, as the collector noted); Doi Angka, 2180 m, 5 Apr 1925, fr, Winit 1429 (K).

Harms (1919) cited two specimens (Henry 13301 and 11435) as the types when describing *S. hypoleuroides*. With the types at the Berlin herbarium destroyed during WWII, we herein designate Henry 13301 at K as the lectotype. This sheet in flowering condition well represents the morphology of *S. hypoleuroides*.

Key to *Schefflera zhengyiana*, *S. hypoleuca*, and *S. hypoleuroides*

1. Lower leaflet surface green, leaflets never pinnatifid; styles undivided or only slightly divided at mature fruiting stage ..... *S. zhengyiana*
1. Lower leaflet surface glaucous, leaflets often pinnatifid at sapling stage; styles more or less divided ..... 2
2. Fruits with style only slightly divided at tip; petals yellow ..... *S. hypoleuca*
2. Fruits with styles deeply divided to below the middle to near the base; petals white ..... *S. hypoleuroides*

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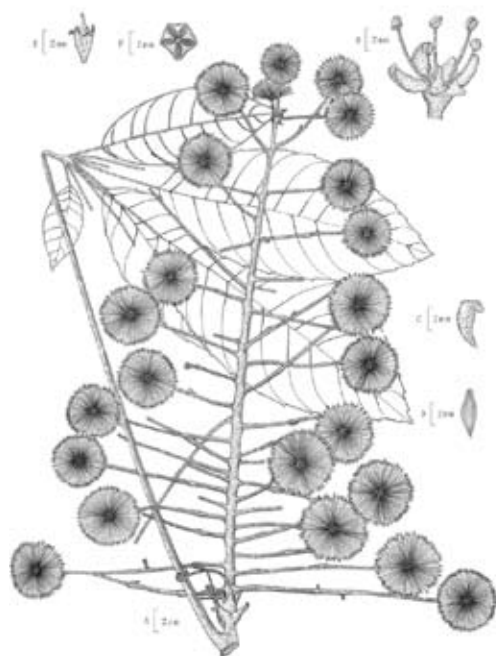


Fig. 1. *Schefflera zhengyiana* J. Wen, Frodin & Y.-M. Shui (Y. M. Shui et al. 43808, holotype)— A. Plant; B. Side view of flower, showing petals, stamens and style; C. External surface of bracteole; D. Internal surface of bracteole; E. Young fruit; F. Cross-section of young fruit. Drawn by K. Wen.



Fig. 2. *Schefflera zhengyiana* J. Wen, Frodin & Y.-M. Shui (Y. M. Shui et al. 80848).— A. Inflorescence; B. Leaves; C. Part of an umbel showing face view and side view of flowers. D. Branch with leaves and infructescence. E. Fruits. Photographed by Y. M. Shui.

