

A REVISED CONSPECTUS OF *SARCOTHECA* (OXALIDACEAE)

I. M. Turner^{1,2} & R. C. K. Chung³

A synopsis of the Southeast Asian genus *Sarcotheca* (Oxalidaceae) is presented. The number of species recognised has increased from 11 in the last revision of the genus to 15, primarily due to the elevation of *Sarcotheca laxa* varieties to species rank. The first validation of the basionyms for three species has been changed, as the generic name *Connaropsis* was not validly published in the generally cited source. A lectotype is designated for *Connaropsis*, and seven species names are lectotypified, two of them at the second step. Additionally, *Sarcotheca laxa* is confirmed as part of Thailand's native flora.

Keywords. Indonesia, Malaysia, Thailand, typification.

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Introduction

Sarcotheca Blume is a genus native to Southeast Asia, specifically Sumatra, the Malay Peninsula, Borneo and Sulawesi (Veldkamp, 1971). The species are trees, some of which grow to a very large size. The genus is distinguished by its unifoliate or trifoliate leaves, paniculate inflorescences bearing flowers with dark red, adaxially papillate petals, and indehiscent fleshy fruits with two or fewer exarillate seeds per locule (Cocucci, 2004). The last revision of the genus was conducted by Veldkamp (1968 [1967]), recognising 11 species, with *Sarcotheca laxa* (Ridl.) Knuth represented by three varieties. Subsequently, a fourth variety of *Sarcotheca laxa* was described (Veldkamp, 1994), along with a new species from Sarawak (Veldkamp, 2008). Chung (1995) documented five species of *Sarcotheca* in the *Tree Flora of Sabah and Sarawak*.

During the preparation of accounts for Oxalidaceae in the *Flora of Singapore* and the *Flora of Peninsular Malaysia*, the taxonomic status of *Sarcotheca laxa* varieties was reassessed. Given their clear distinctions, they are now recognised as separate species. In light of this taxonomic change, along with nomenclatural concerns regarding authorship of some names and some incomplete typifications, we present a revised conspectus of the genus to consolidate this information in a single reference.

Materials and methods

The revisionary work was based largely on the material held in K and KEP herbaria (herbarium codes follow Thiers, [continuously updated](#)). Additionally, Singapore collections

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from SING were loaned to K, as was a small amount of material from BM and L. Photographs of materials deposited in BKF were also supplied to the authors. Inflorescence terminology follows Veldkamp (1968 [1967]), with the panicles consisting generally of an unbranched rachis bearing sessile or stalked cymes of flowers.

Synopsis

Sarcotheca Blume, Mus. Bot. 1(16): 241 (1851). – Type species: *Sarcotheca macrophylla* Blume.

Connaropsis Planch. ex Benth. & Hook.f., Gen. Pl. 1(1): 277 (1862). – Type species: *Connaropsis glauca* Hook.f. (= *Sarcotheca glauca* (Hook.f.) Hallier f.) (lectotype designated here).

The name *Sarcotheca* has one heterotypic synonym, *Connaropsis*. Most sources list *Connaropsis* as having been published by J. D. Hooker (Hooker, 1860). However, the generic name was not validated in the paper. Hooker did not provide a description of the genus, and the account does not qualify as a *descriptio generico-specifica* (ICN Article 38.5; Turland *et al.*, 2018), because Hooker included descriptive statements for more than one species of *Connaropsis*. Therefore, none of Hooker's designations relating to 'Connaropsis' was validly published in the paper.

The next validation of *Connaropsis* is by Bentham and Hooker (Bentham & Hooker, 1862). This included a detailed generic description, so *Connaropsis* was validated there.

Species descriptions

1. ***Sarcotheca brigittae*** (Veldkamp) I.M.Turner & R.C.K.Chung, **comb. et stat. nov.** – *Sarcotheca laxa* var. *brigittae* Veldkamp, Blumea 38: 459 (1994). – Type: [Indonesia], North Sumatra, Atjeh, S of Sibulussalam–Gelombang road, near Belintang, 30–60 m alt., 6 viii 1985, de Wilde & de Wilde-Duyfjes 20714 (holotype L [L 0018318], isotype L [L 0018319]).

Distribution. Sumatra (Figure 1).

Notes. Although known from only a few collections, *Sarcotheca laxa* var. *brigittae* differs from *S. laxa* var. *laxa* in several key characteristics. It has a calyx that is sparsely hairy outside rather than glabrous, much shorter side branches in the panicles (2 mm vs 10 mm or more), and seeds with transversely rugulose surface sculpturing, different from the sparsely verruculose seeds of *Sarcotheca laxa* var. *laxa*. Consequently, we elevate Veldkamp's variety to species rank.

Additional specimen examined. INDONESIA. **Sumatra:** Aceh, S of Sibulussalam–Gelombang road, near Belintang, 5 viii 1985, de Wilde & de Wilde-Duyfjes 20674 (L [L.2013476]).

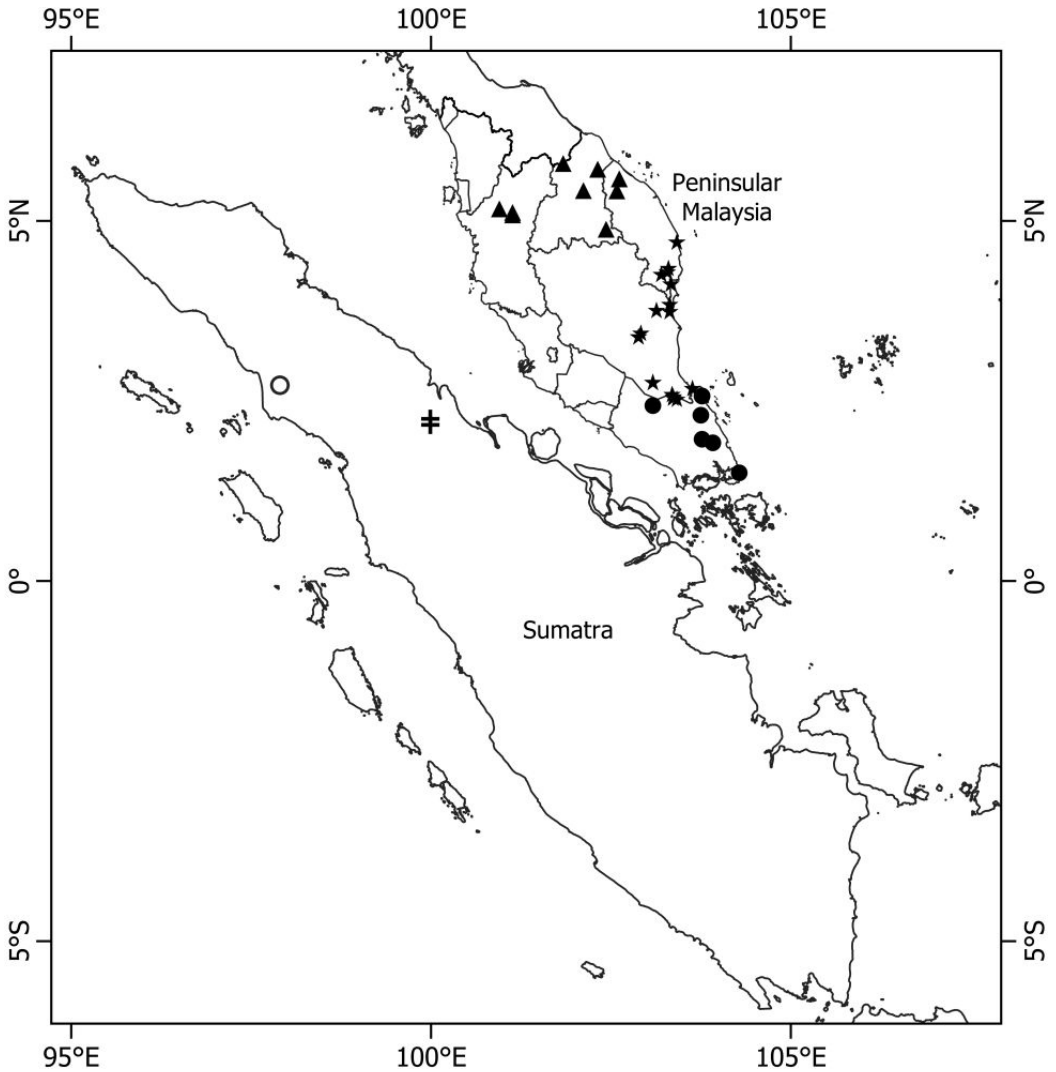


Figure 1. Distribution of *Sarcotheca brigittae* (white circle), *S. ferruginea* (plus signs), *S. johorensis* (black circles), *S. laxa* (black triangles) and *S. sericea* (black stars).

2. *Sarcotheca celebica* Veldkamp, Blumea 15: 537 (1968 ['1967']). – Type: [Indonesia], Celebes [Sulawesi], en Ond. Malili, Kampoeng Kawata, 18 xi 1930, *Neth. Ind. For. Service, Cel. /II.439* [leg. A.G. Waturandang] (holotype BO [BO-1305538]; isotypes A [A00100561], K [K000693163], L [L 0018310], SING [SING0055491]).

Distribution. Sulawesi ([Figure 2](#)).

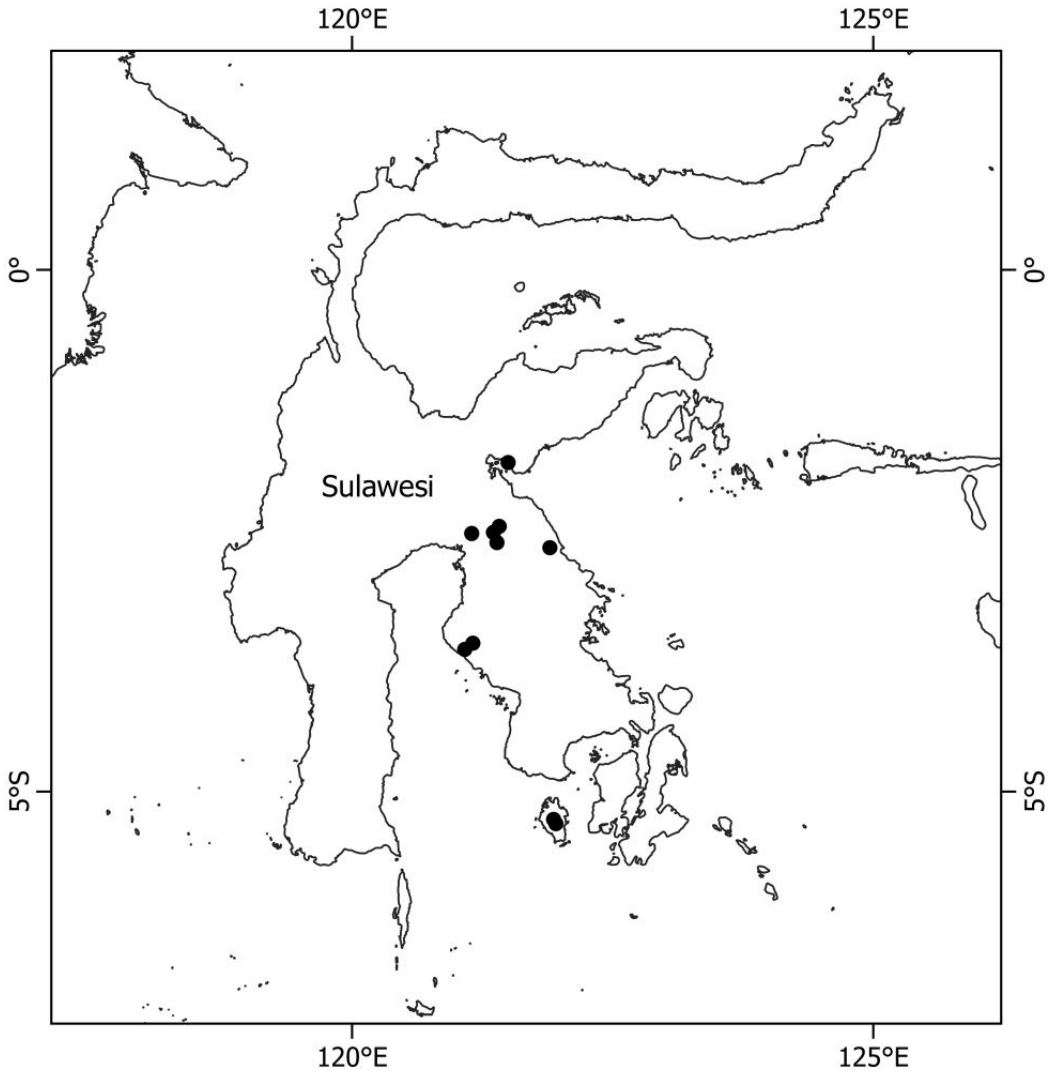


Figure 2. Distribution of *Sarcotheca celebica* (black circles).

Additional specimens examined. INDONESIA. **Sulawesi.** **South Sulawesi:** Soroako, edge of Lake Matano, 10 vi 1979, *Balgooy* 3641 (K [K005373575]); Soroako, Timampu, Kec. Nuha, 12 iv 1984, *Ramlanto* Ram. 174 (K [K005373569]); 5 km W of Malili, 9 xii 1994, *Leeuwenberg* et al. 14536 (K [K005373572]); N shore of Lake Mata NE of Nuha, 16 vi 1979, *de Vogel* 5816 (K [K005373568]); *ibid.*, 30 vi 1979, *de Vogel* 6028 (K [K005373565, K005373566]). **Central Sulawesi:** Morowali, 15 ii 1980, *Ert* 1401 (K [K005373570]); *ibid.*, 3 ii 1980, *Grimes* 1034 (K [K005373564, K005373573]); Morowali, Tarrongo, Morowali Nature Reserve, 2016, *Trethowan* 919 (K [K001910563]); Morowali, Kea Kea, Morowali Nature Reserve, 2016, *Trethowan* 839 (K [K001910558]); Eempuhu, Landschaft Balo, 26 x 1909, *Elbert* 3272 (K [K005373567]); E bank of Ranu River, 13 ii 1980, *Grimes* 1148 (K [K0005373571, K000537574]).

Southeast Sulawesi: Kabaena, G. Sabampolulu, 22 vii 1993, *McDonald & Ismail* 3852 (K [K005373563]); N Kolaka, Rante Angin, Tinukari, 11 vii 2010, *Widjaja* EAW 9092 (K [K001910392]).

3. *Sarcotheca diversifolia* (Miq.) Hallier f., Meded. Rijks-Herb. 1910: 2 (1911). – *Rourea diversifolia* Miq., Fl. Ned. Ind., Eerste Bijv.: 528 (1861). – *Connaropsis diversifolia* (Miq.) Kurz, J. Asiat. Soc. Bangal, Pt. 2, Nat. Hist. 39: 69 (1879). – *Santalodes diversifolium* (Miq.) Kuntze, Revis. Gen. Pl. 1: 155 (1891). – Type: [Indonesia], Sumatra, Sumatra occ., ad. litt., prope Sibolga, *Teijsmann* H.B. 706 (lectotype L [L 0018311], designated by Veldkamp, Blumea 15: 529 (1968 [‘1967’]; isoelectotype BO [BO-1305539]).

Connaropsis acuminata H. Pearson, Bull. Misc. Inform. Kew 1906: 2 (1906). – Type: Borneo, Sabah, Sandakan, xii 1897, *Ridley* 9057 (holotype K [K000693159], isotype SING [SING0055482]).

Sarcotheca subtripplinervis Hallier f., Beih. Bot. Centralbl. 34(2): 27 (1916). – Type: Borneo, Soeka Lanting, 29 ix 1893, *Hallier* B 237 (lectotype L [L 0018312], designated here; isoelectotypes BO [BO-1305541, BO-1305542], K [K000693160], L [L 0018313, L 0018314, L 0018315]).

Connaropsis grandiflora Ridl., Bull. Misc. Inform. Kew 1930: 75 (1930). – Type: Borneo, Sarawak, Kuching, 12 x 1892, *Haviland* 1786 (lectotype K [K000693158], designated here).

Distribution. Sumatra and Borneo (Sabah, Sarawak, Brunei and Kalimantan) ([Figure 3](#)).

Notes. There seems some confusion regarding the collection number of the type of *Rourea diversifolia*, with Veldkamp (1968 [‘1967’]) citing it as “HB 707 (= ? 706)”. The specimen in BO (BO-1305539) that Veldkamp cited as an ‘isotype’ is labelled as HB 707. As Miquel did not cite a number in the protologue, only a locality, there seem no grounds to reject the selection of the sheet in L as lectotype by Veldkamp.

Additional specimens examined. BORNEO. MALAYSIA. **Sabah:** s.loc., viii 1918, *Agama* 548 (K [K005373466]); s.loc., i–iii 1916, *Villamil* 149 (K [K005373477]). **Kudat Distr.:** Tinangol, Gumantung Hill, 20 iii 1964, *Ampuria* SAN 41516 (K [K005373437]); Loroh F.R., 16 iii 1964, *Ampuria* SAN 41504 (K [K005373436]); Tinangol, Jesseton–Kudat Road, Mile 97, Napui Hill below, 21 iii 1964, *Ampuria* SAN 41533 (K [K005373462]); Labuan F.R., 29 ii 1948, *Cuadra* B.N.B. Forestry Dept. No. A 1236 (K [K005373468], KEP [105353]). **Penampang Distr.:** Kg. Dingkahang, 5 ix 1985, *Madani & Ismail* SAN 111258 (K [K005373448]); Kg. Dungkahang, 10 ix 1987, *Madani & George* SAN 120827 (K [K005373450]). **Ranau Distr.:** Kg. Miruru, 23 v 1979, *Dewol & Petrus* SAN 89579 (K [K005373473]); Sepulut, Labang Sepulut F.R., 25 x 1988, *Sumbing* SAN 125275 (K [K001930213], KEP [105371]); Pandewan, Sg. Pementarian, 16 ii 1987, *Krispinus* SAN 119974 (K [K005373454], KEP [105383]). **Keningau Distr.:** Jalan Crocker Range, Batu 26, 16 viii 1978, *Nordin & Abas* SAN 85966 (K [K005373446], KEP [105378]). **Nabawan Distr.:** Jalan Nabawam–Pandewan, KM 18, 28 iii 1990, *Sumbing* SAN 128572 (K [K000271506]; KEP [105370]); Tongod, Sg. Binalik, Keramuak, 21 vi 1983, *Sundaling* SAN 97551 (K [K005373472]); Tiram River, 11 ix 1933, *Kamis* B.N.B. Forestry Dept. No. 3679 (K [K005373461]); Rashna Road, Mile 10, 12 viii 1976, *Sundaling* SAN 83818 (K [K005373474]; KEP [105379]). **Kota Kinabalu Distr.:** Gaya Island Park, 1 vii 1992, *Berhaman* et al. SAN 134608 (K [K005373451]). **Beaufort**

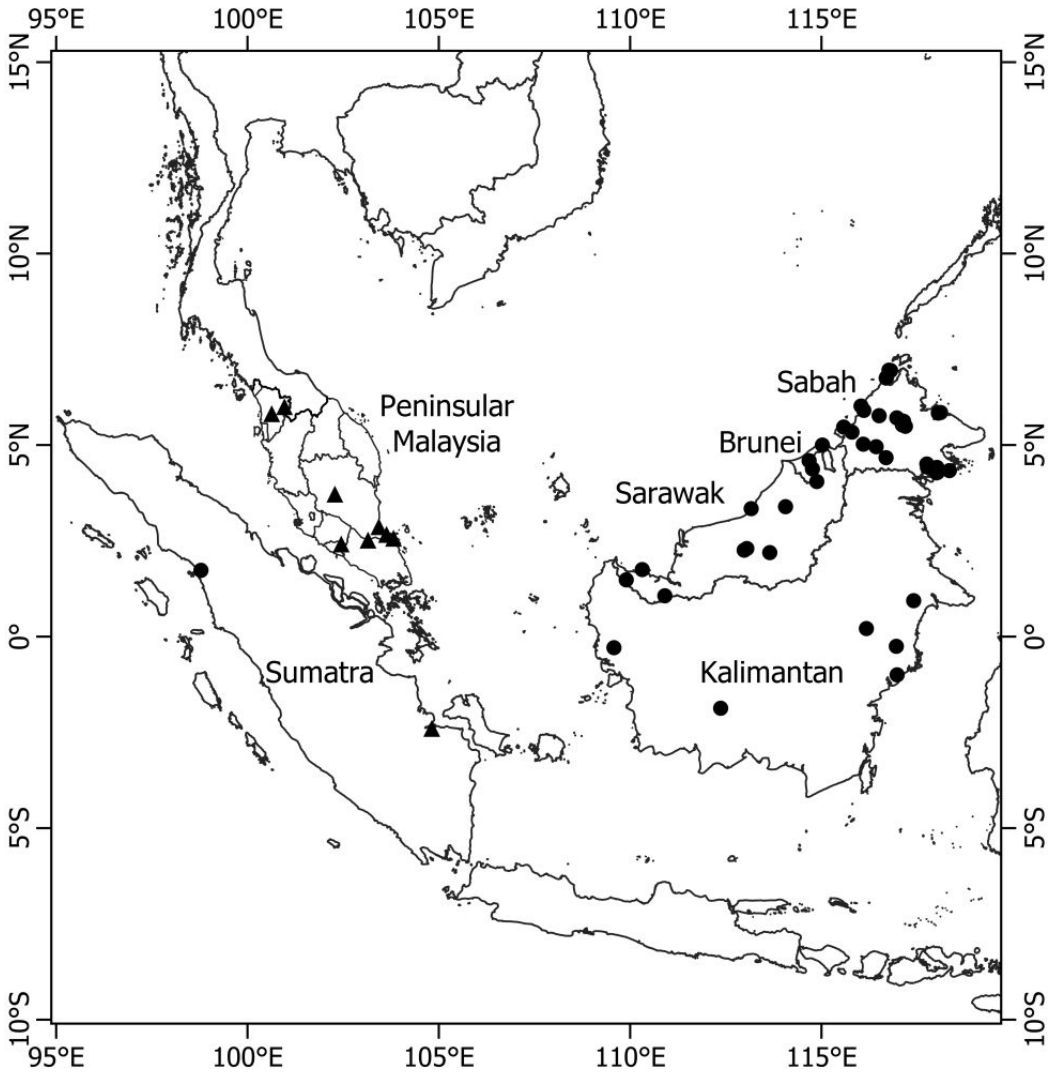


Figure 3. Distribution of *Sarcotheca diversifolia* (black circles) and *S. griffithii* (black triangles).

Distr.: Papar-Beaufort Road, Mile 16, 17 x 1962, *Lajangah* SAN 32256 (K [K005373442]; KEP [105363]); Beaufort Hill, 12 iii 1962, *Mikil* 28131 (K [K005373440]). **Tenom Distr.:** Mandalom F.R., 24 iv 1973, *Dewol & Karim* SAN 77542 (K [K005373433]). **Kuala Penyu Distr.:** Kapayan, 23 iii 1971, Lantoh SAN 67208 (K [K005373475]). **Sandakan Distr.:** Kinabatangan, Keruak F.R., Mt Tawai, 28 vii 1978, *Dewol & Alexis* SAN 88694 (K [K005373447], KEP [105389, 105390]); near Sabah Hotel, 22 v 1963, *Husin* SAN 36233 (K [K005373443]); Kg. Wonod Telupid, Sg. Taviwo, 20 iii 1974, *Aban & Saikah* SAN 79434 (K [K005373439]); Telupid, 9 iv 1994, *Zainudin* AZ 4991 (K [K005373438], KEP [67400]); Kinabatangan, Sg. Kun-Kun, 28 iii 1984, *Sigin et al.* SAN 56823 (K [K005373445], KEP [105384]); Laila F.R., 22 vii

1983, *Sign & Lee* SAN 96268 (K [K005373452], KEP [105382]); SE side Chinese cemetery, 27 iv 1937, *Keith* B.N.B. Forestry Dept. No. A 7151 (K [K005373470]); *ibid.*, 17 v 1937, *Keith* B.N.B. Forestry Dept. No. A 7152 (K [K005373471]); Telupid Road, Mile 83, 30 ix 1969, *Talip & Termiji* SAN 62432 (K [K005373476]); Telupid, Jalan Tangkulap, 26 i 2002, *Clement* SAN 144555 (K [K000271487]). **Lahad Datu Distr.:** Kalumpang, Mile 10½, 26 vii 1981, *Chai* SAN 25970 (K [K005373449], KEP [105362]). **Tawau Distr.:** Elphinstone Province, x 1922-iii 1923, *Elmer* 21370 (K [K005373456]); *ibid.*, *Elmer* 21327 (K [K005373467]); *ibid.*, *Elmer* 21351 (K [K005373464]); Apas Road, Mile 14, 16 x 1962, *Gibot* SAN 32448 (K [K005373441]); Apas Road, Mile 22, 15 v 1960, *Brand* SAN 21501 (K [K005373478]); Apas Road, Mile 8, 6 xi 1937, *Tandon* B.N.B. Forestry Dept. No. 8818 (K [K005373469]); Apas Road, Mile 12½, 23 vi 1959, *Meijer* SAN 19229 (K [K005373465]); Membalua F.R., 12 x 1964, *Gibot* SAN 47511 (K [K005373434, K005373435]); Maris Road, Mile 20, 3 iii 1961, *Brand* SAN 24485 (K [K005373460], KEP [105388]); Membalua F.R., *s.dat.*, *Singh* SAN 22795 (K [K005373459]); Baradaya F.R., 16 v 1962, *Aban* SAN 30046 (K [K005373458], KEP [105368]); Quoin Hill near Apas Balong, Mile 21½, 30 iii 1962, *Meijer* SAN 39465 (K [K005373455]); Marotai, 19 ix 1933, *Maidin* B.N.B. Forestry Dept. No. 3668 (K [K005373457]); Merotai Besar, 20 ix 1962, *Gibot* SAN 31321 (K [K005373453], KEP [105367]); Balong Laut, 15 vii 1963, *Gibot* SAN 36987 (K [K005373463]). **Sarawak. Kuching Div.:** Bau, G. Raya, 28 iv 1983, *Yii* S 45903 (K [K000271504], KEP [105380]); Sabal F.R., Ulu Sg. Sabal Aping, 7 ix 1977, *Paie* S 39232 (K [K005373420], KEP [105391]). **Miri Div.:** G. Mulu N.P., 26 ix 1976, *Lee* S 38058 (K [K005373416], KEP [105381]); Bkt. Sekiwa, Tubau Bintulu, 25 viii 1986, *Mohtar* et al. S 52744 (K [K000517835]); Bintulu, Simalajau N.P., Sg. Kebalak, 16 v 1990, *Mohtar & Othman* S 59532 (K [K000271473], KEP [105394]). **Kapit Div.:** Kapit, Melinau, Ulu Sampurau, Bkt. Batu Semakan Cave, 17 viii 1967, *Paie* S 25823 (K [K005373419]); Ulu Kapit, Pelagus Protected Forest, 14 ix 1973, *Tong & Paie* S 33130 (K [K005373431], KEP [105360]).

BRUNEI. Sampil, 9 x 1992, *Bernstein* JHB 234 (K [K005373423]); Bkt. Pasir Puteh, 25 vii 1957, *Ashton* BRUN 295 (K [K005373422], KEP [105372]); Pulau, Ulu Tutong, 11 x 1938, *Hamid* KEP 37062 (K [K005373421], KEP [105386, 105392]); Tutong, Rambai, Kg. Tasek Merimbun, Pulau Nundong, 23 v 1998, *Rahman* BRUN 18834 (K [K001910575, K001910576]).

INDONESIA. Kalimantan. East Kalimantan: Samarinda Distr., 1957, *Kostermans* M 34 (K [K005373418]); NW of Samarinda, Sobylu, 9 viii 1973, *Kuswata* 1163 (K [K005373417]); Wanariset, off Km 3.5 Wanariset-Semai Road, 28 x 1991, *Ambriansyah & Arifin* W 965 (K [K000271501]); Wanariset, off Km 3.5 Wanariset-Semai Road, 21 xi 1991, *Ambriansyah & Arifin* W 973 (K [K005373424, K005373428]); Wanariset, off Km 3.5 Wanariset-Semai Road, 13 xii 1991, *Ambriansyah & Arifin* W 994 (K [K000271502]); Mouth of Mahakan River, Tg. Bangko, 24 v 1954, *Kostermans* 9503 (K [K005373429], KEP [105374]); Ulu Mahakam, Belayan River area, 22 vi 1999, *Sidiyasa & Ambriansyah* 1669 (K [K000271508]); KPC area Bengalon, 30 iii 1996, *Ambri* et al. AA 1588 (K [K005373425]). **Central Kalimantan:** Sintang, HPH Km 84, 26 iv 1994, *Church* et al. 1162 (K [K005373426]).

4. *Sarcotheca ferruginea* Merr., Pap. Michigan Acad. Sci. 19: 160 (1934). – Type: Sumatra, Marbau, Bilah, near Bilah Pertama (Parbasiran), ii–iii 1928, *Rahmat Si Toroos* [*Rahmat Si Boeeea*] 358 (holotype NY [NY00385437]; isotypes A [A00100562], L [L 0018316, L 0018317], MICH [MICH1192587], SING [SING0055492]).

Distribution. Sumatra (see [Figure 1](#)).

Notes. This species is known only from the type collection.

5. *Sarcotheca glauca* (Hook.f.) Hallier f., Meded. Rijks-Herb. 1910: 2 (1911). – *Connaropsis glauca* Hook.f. in Anon., Gen. Index Trans. Linn. Soc. London: 48 (1867). – Type: Borneo, hills at Bruni, 1857, *T. Lobb* s.n. (lectotype K [K000693161], first step designated by Veldkamp, Blumea 15: 536 (1968 [1967])), second step designated here; isolectotype K [K000693162]).

Distribution. Borneo (Sabah, Sarawak and Brunei) (Figure 4).

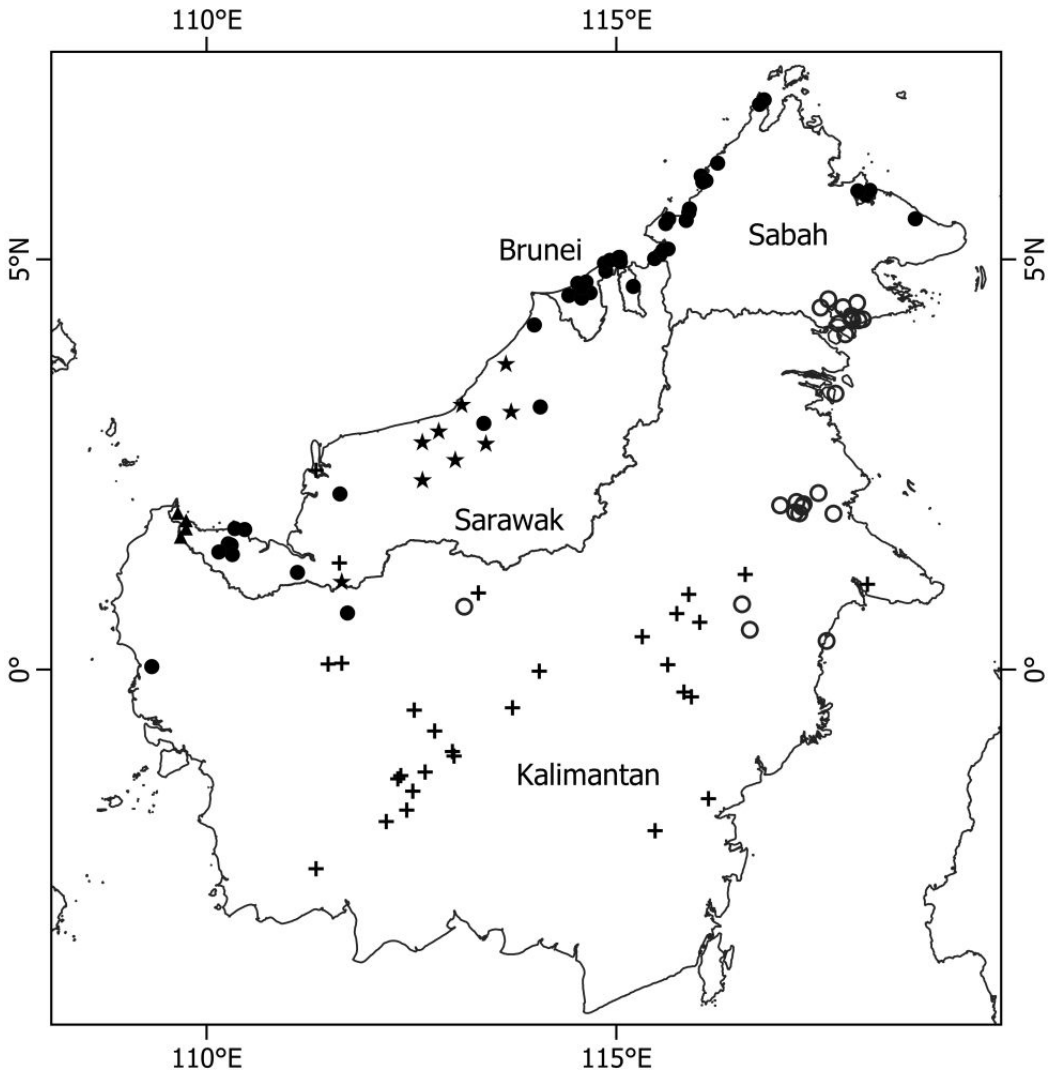


Figure 4. Distribution of *Sarcotheca glauca* (black circles), *S. lunduensis* (black triangles), *S. macrophylla* (plus signs), *S. ochracea* (black stars) and *S. rubrinervis* (white circles).

Notes. As noted above, the generic name *Connaropsis* was not validated until 1862, and the three species designations in Hooker's 1860 paper were not validly published. *Connaropsis glauca* Hook.f. was validated in the cumulative index to the Transactions of the Linnean Society published in 1867, because the anonymous compiler of the index listed the name and referred to Hooker's original paper, which included a description. Both the name and the description were attributed to Hooker, so the authority for the binomial is Hook.f.

Additional specimens examined. [INDIA. Lobb s.n. (K [K000693151]) [surely wrongly localised].

BORNEO. MALAYSIA. **Sabah:** s.loc., s. dat, *Creagh* s.n. (K [K005373535]); s.loc., iv 1895, *Creagh* s.n. (K [K005373534]). **Kudat Distr.:** Labuan, 4 iv 1935, *Valera* North Borneo Forestry Dept. No. 4706 (K [K005373537]); Kitaki F.R., 15 ii 1948, *Cuadra* North Borneo Forestry Dept. No. A 1195 (K [K005373528], KEP [105603]). **Kota Kinabalu Distr.:** viii 1923, *Bateson* 76 (K [K005373526]); Pulau Gaya F.R., 3 iii 1964, *Apuria* SAN 41391 (K [K005373514]); Pulau Gaya, 15 ii 1966, *Kanis & Kuripin* SAN 56110 (K [K00537518], KEP [105631]); *ibid.*, 11 xi 1964, *Sinanggul* SAN 40125 (K [K000271507, K005373521]); Bkt. Kepyang, 23 v 1961, *Shah & Kadim* MS 999 (K [K005373519]); Bkt. Padang, 15 ii 1961, *Meijer* SAN 23831 (K [K005373542]); Bkt. Padang, 2 viii 1983, *Beaman* 6787 (K [K005373527]); Tg. Aru, 25 xii 1932, *Tandom* B.N.B. Forestry Dept. No. 2945 (K [K005373531]). **Tuaran Distr.:** 2 i 1934, *Clemens* 51319 (K [K005373540]); Lumas F.R., 28 iii 1963, *Mujin* SAN 33822 (K [K005373515]). **Papar Distr.:** Mandahan F.R., 20 iii 1974, *Dewol & Karim* SAN 78008 (K [K005373520]); Kimanis F.R., 3 ii 1963, *Lajansah* SAN 33612 (K [K005373516], KEP [105620]); Bogawan, 13 xi 1938, *Pingkun* North Borneo Forestry Dept. No. 10248 (K [K005373536]); Bundu, 20 ii 1931, *Goklin* B.N.B. Forestry Dept. No. 2060 (K [K005373532]). **Beaufort Distr.:** vii 1930, *Taha* B.N.B. Forestry Dept. No. 2022 (K [K005373533]); Singgangau F.R., 10 ii 1988, *Amin* SAN 115541 (K [K005373513]); H.S. Singgangau, 17 viii 1989, *Amin* SAN 105162 (K [K001892263]); Telok Brunei, 12 xii 1992, *Amin* SAN 132007 (K [K000271480], KEP [105635]); Ulu Sg. Lingkungan, 12 xi 1969, *Gibot* SAN 66601 (K [K005373523]); Membakut, Binsulok, 23 ix 1985, *Sigon* SAN 102832 (K [K000272156], KEP [105602]); Membakut, Binsulok F.R., 16 i 1988, *Amin* SAN 114767 (K [K001930214], KEP [105605]); *ibid.*, 25 iv 1986, *Amin* SAN 102567 (K [K000272152], KEP [105393]); Membakut, Kuala Membakut, 26 ii 1989, *Amin* SAN 126786 (K [K001892262], KEP [105399]); Beaufort, Kepyang, Kuala Penyu, 28 v 1968, *Binideh* SAN 55766 (K [K000271505], KEP [105630]). **Kuala Penyu Distr.:** Mepakul, Bayong, 18 x 1933, *Tandom* B.N.B. Forestry Dept. No. 4234 (K [K005373530]). **Sipitang Distr.:** Malalia F.R., 20 iii 1981, *Marsal & Heya* SAN 86211 (K [K000272153]); Marintaman, 4 xi 1984, *Leopold & Amin* SAN 86241 (K [K000272155]); Marintaman F.R., 22 ix 1972, *Saikeh* SAN 72350 (K [K005373525]); Kuala Mengalong Sebalah Utara, 24 iv 1971, *Saikeh* SAN 73174 (K [K005373524]); H.S. Kuala Mengalong, 24 viii 1991, *Sigun* SAN 106038 (K [K001892264], KEP [31660]); H.S. Mesapol, 22 iv 1997, *Kulip* et al. SAN 133581 (K [K005373493], KEP [44743, 213075]). **Sandakan Distr.:** 2 iii 1936, *Puasa* North Borneo Forestry Dept. No. 5484 (K [K005373538]); Batu Sapi, 29 ix 1963, *Elleh* SAN 38816 (K [K005373511], KEP [105611]); Leila F.R., 2 iv 1963, *Elleh* SAN 35657 (K [K005373517]; KEP [105628]); *ibid.*, *Muroh* SAN 73598 (K [K005373522]); Kebun Cina, 20 v 1990, *Meijer* SAN 130282 (K [K005373512]); Leila, below wireless, 15 iv 1962, *J.S. & D.B.* SAN 34711 (K [K005373541]); Kertam, Sg. Kulamba, 9 iv 1984, *Sundaling* SAN 56000 (K [K000272154], KEP [105614]); Mile 8, 14 i 1934, *Radin* B.N.B. Forestry Dept. No. 4196 (K [K005373629]); Kabili-Sepilok F.R., 9 ii 1939, *Enggoh* North Borneo Forestry Dept. No. 10171 (K [K005373539]). **Sarawak. Kuching Div.:** Bako N.P., 23 ii 1976, *Othman* et al. S 37163 (K [K000271494]; KEP [105616]); Santubong, Ulu Sg. Jaong, 21 iii 1973, *Paie* S 33096

(K [K005373510]; KEP [105601]); Stapok F.R., Batu Kawa Road, Mile 4½, 14 ii 1975, *Mamit* S 35048 (K [K005373509], KEP [105621]); Stapok, 1 iv 1963, *Brunig* S 17532 (K [K005373508]); outside Tg. Umbang F.R., 5 iii 1959, *Brunig* S 10343 (K [K005373506]); Santubong, 28 i 1959, *Corner & Brunig* S 10454 (K [K005373505]); Semengoh F.R., Arboretum, iv 1962, *Arshid* S 16225 (K [K005373507]); near Kuching, 3 xii 1892, *Haviland* 1957 (K [K005373496]); *ibid.*, 6 ii 1892, *Haviland* 1001 (K [K005373501]); Kuching, 13 ii 1893, *Haviland & Hose* s.n. (K [K005373499]); near Kuching, 17 xii 1894, *Haviland & Hose* 3350 (K [K005373502]); Kuching, vii 1893, *Ridley* 11761 (K [K005373498]); Santubong, 20 iii 1967, *Chew* 1423 (K [K005373495]); Bau, base of G. Senggai near Buso, 10 iii 1949, *Sinclair* SFN 38483 (K [K005373494]); **Sarikei Div.**: Binatang, Lassa P.F., 3 miles SE of Matu, 12 iii 1960, *Anderson* S 12436 (K [K005373504]). **Sri Aman Div.**: Simanggang, 1 mile from Triso, 13 iv 1960, *Anderson* 9798 (K [K005373492]). **Bintulu Div.**: Baram District, Miri River, i 1895, *Hose* 68 (K [K005373500]).

BRUNEI. *s.loc.*, 24 i 1959, *Ashton* BRUN 5160 (K [K005373481], KEP [105617]). **Muara Distr.**: Brunei Bay off Jalan Muara Kapok Kanan, 22 iii 1993, *Coode* 7310 (K [K005373486]); Kilanas, Kg. Kilanas, Wasai Kandal, 18 ii 1992, *Dransfield* JD 7095 (K [K005373490], KEP [105622]); Jerudong, Bkt. Shahbandar, 10 iii 1988, *Wong* WKM 193 (K [K005373489], KEP [105636]). **Tutong Distr.**: Rambai, Tasek Merimbun, 24 i 2013, *Low et al.* LYW 513 (K [K001910391], KEP [225327, 225328]); Tg. Maya, Bkt. Udai, Bkt. Kukup, 22 xii 1994, *Osman* BRUN 16476 (K [K000271474], KEP [150717]); Telisai, Pengkalan Dalai, 14 ix 1991, *Kalat* ARK 87 (K [K000271478]); Muara-Tutong highway Km 40, 13 iv 1994, *Joffre* BRUN 15388 (K [K000271472]). **Belait Distr.**: Badas, near Lumut, 2 iv 1990, *Coode* MC 6453 (K [K005373485]; KEP [105609, 105610]); Bkt. Sawat, Merangking, Kg. Merangking, 6 v 1995, *Nangkat* BRUN 16632 (K [K000271475]); Sg. Liang, Andulau F.R., 2 iii 1992, *Dransfield* JD 7247 (K [K005373491], KEP [105623, 105624]). **Temburong Distr.**: Batu Apoi, Selapon, Bkt. Tempedak, 28 i 1994, *Dransfield* JD 7469 (K [K005373488], KEP [105634]); Berakas F.R., 22 v 1956, *Anderson* S 2160 (K [K005373484]); Sg. Dua west of Sg. Belait, 2 ix 1960, *Sinclair* 10528 (K [K005373483]); Telamba, Bkt. Pasir Puteh, 30 xii 1959, *Ashton* BRUN 5017 (K [K005373482], KEP [105613]); Berakas F.R., 12 v 1957, *Ashton* BRUN 7850 (K [K005373480], KEP [105625]); Tasik Merimbun, 7 iv 1988, *Wong* WKM 336 (K [K005373487], KEP [105615]).

INDONESIA. **Kalimantan.** **E Kalimantan.** Sanggomo, 31 x 1893, *Hallier* B 889 (K [K005373562]). **W Kalimantan:** Pontianak, 13 iii 1931, *Abondi* 28 (K [K005373561]); G. Kenepai, 27 xii 1893, *Hallier* 1640 (K [K005373560]).

6. *Sarcotheca glomerula* Veldkamp, *Blumea* 15: 532 (1968). – *Connaropsis macrophylla* King, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 62: 201 (1893). – *Dapania macrophylla* (King) R.Knuth, *Bot. Jahrb. Syst.* 50(Suppl.): 234 (1914). – Type: Peninsular Malaysia, Penang, Pulau [Pulo] Jerajah, iii 1886, *C. Curtis* 474 (lectotype K [K000501053], designated here).

Figure 5.

Distribution. Peninsular Malaysia (Figure 6).

Notes. There are other specimens in K and SING of *Curtis* 474, but these have different collecting localities indicated. *Curtis* was clearly using taxon rather than collection numbers, so these additional specimens cannot be considered isoelectotypes.

Additional specimens examined. MALAYSIA. **Peninsular Malaysia.** **Kedah:** Baling, 10 v 1938, *Kiah* SFN 35389 (K [K005373346], KEP [104765]); 48th mile Jenaing Road, 28 x 1938, *Kiah* SFN 36166 (K



Figure 5. *Sarcotheca glomerula*. A, Flowering leafy twig with open flowers and young flower buds; B, mature buds and developing fruits; C, panicle. Photographs: A, Siti Eryani Suterisno; B and C, Lim Chung Lu.

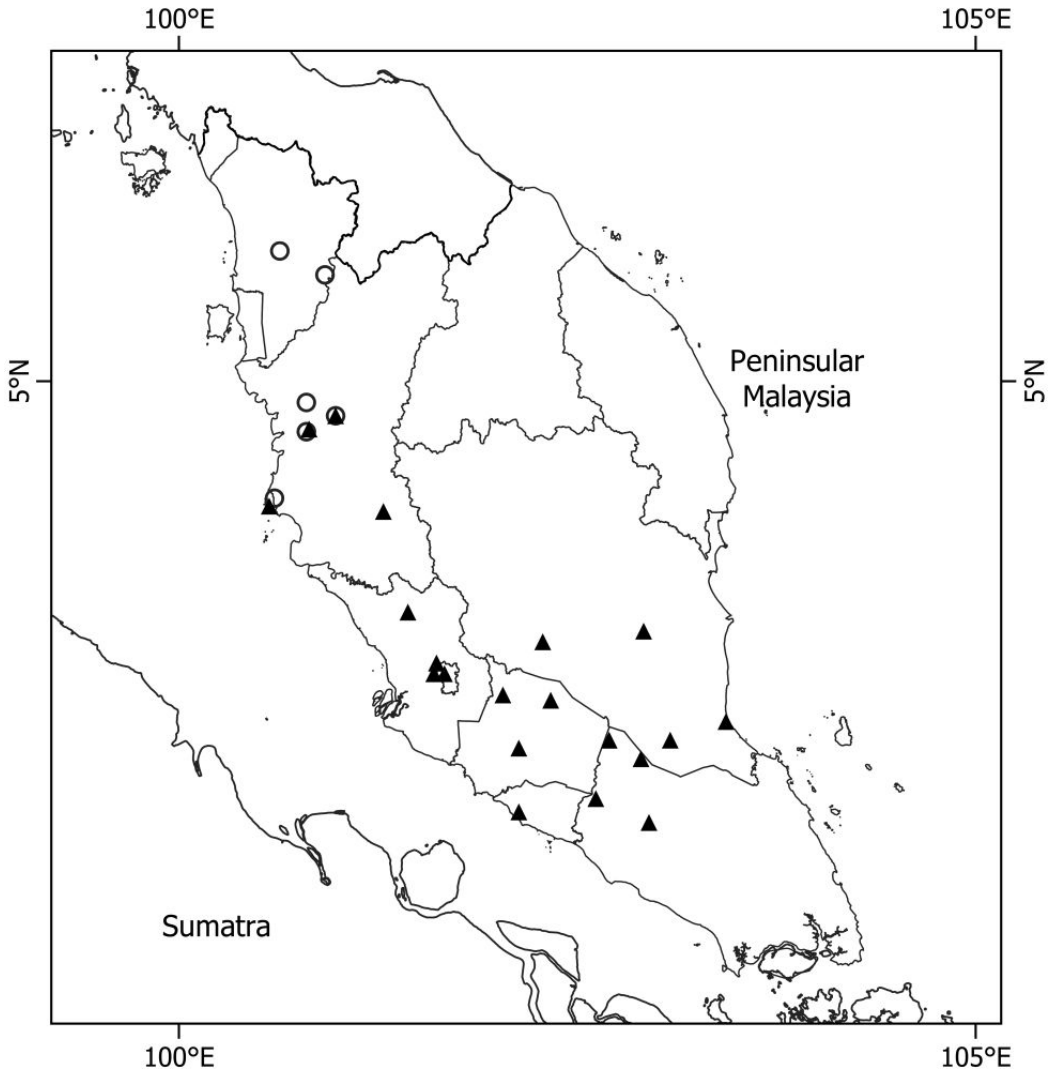


Figure 6. Distribution of *Sarcotheca glomerula* (white circles) and *S. monophylla* (black triangles).

[K005373341, K005373345], KEP [104763]). Perak: Dindings, Telok Kopia F.R., 22 ii 1967, Whitmore FRI 3113 (K [K005373342], KEP [104764]); Lumut, ii 1892, Ridley 3087 (K [K000693152]); Gunong Bubu, Sg. Wang, 30 viii 1968, Selvaraj FRI 6567 (K [K000272229], KEP [104778]); Gunong Bubu via Trong, 22 ii 1970, Suppiah FRI 11926 (K [K005373347, K005373348], KEP [104766]); Gunong Bubu F.R., about 18½ mile south of K. Kangsar, 1 xi 1958, Sinclair 9915 (K [K005373344]); Gunong Bubu F.R., logging road from Trong to G. Bubu, 24 ii 1970, Everett FRI 13954 (K [K000272248]); Batu Gajah, Kledang Saiong F.R., 3 iv 1968, Ng FRI 6003 (K [K000272230], KEP [104769]); Batu Gajah, Parit F.R., 9 I 1990, Damahuri FRI 36697 (K [K000272250]); Pulau Pangkor, i 1888, Curtis 1384 (K [K005373340]); Maxwell's Hill,

between 8th and 9th mile, 19 ix 1949, *Sinclair* SFN 38826 (K [K005373339]); Maxwell Hill, 27 ii 1983, *Khairuddin* FRI 31834 (K [K005373350], KEP [104784]); Bkt Larut, road to summit, 29 ii 1989, *Khairuddin* FRI 35413 (K [K000272247]); Goping, viii 1880, *King's Collector* 433 (K [K000693153]); Lalang Perah, vii 1882, *King's Collector* 3124 (K [K000693154]); Ipoh, Parit F.R., 11 viii 1959, *Allen & Kadim* 470 (K [K005373349]); Kinta, viii 1885, *Wray* 627 (K [K005373343]).

7. *Sarcotheca griffithii* (Planch. ex Edgew. & Hook.f.) Hallier f., Meded. Rijks-Herb. 1910: 2 (1911). – *Connaropsis griffithii* Planch. ex Edgew. & Hook.f., Fl. Brit. India 1(2): 440 (1874). – Type: Peninsular Malaysia, Melaka [Malacca], *Griffith* HEIC 946 (lectotype K [K001419245], designated by Veldkamp, *Blumea* 15: 531 (1968 [1967]); isolectotype P [P02440429]). **Figure 7.**

Distribution. Sumatra, Peninsular Malaysia and Singapore (see **Figure 3**).

Etymology. The name *Connaropsis griffithii* was first validated by Edgeworth & Hooker (1874) in the *Flora of British India*.

Notes. The Kew sheet has two specimens on it. The upper left specimen bears a slip in the hand of J.E. Planchon, who was William Hooker's assistant at Kew in the period 1844–1848. The lower right material is a specimen from the Griffith material from India House that Joseph Hooker distributed from Kew in 1861–1862 [as indicated on the label] and would not have been available to Planchon before then. As Veldkamp cited the 946 number, this is taken to apply to the lower specimen.

Additional specimens examined. INDONESIA. **Sumatra:** Palembang, Banjoeasni en Koeboestrecken, s. dat., *Grashoff* 953 (K [K005373479]).

MALAYSIA. Peninsular Malaysia. Kedah: 48th mile, Jeniang Road, 27 x 1932, *Henderson* SFN 36160 (K; KEP [104789]); Ulu Muda, 17 i 1969, *Bray* FRI 11542 (K; KEP [105007]). **Pahang:** Menchali F.R., 4 v 1982, *Vethevelu* FRI 29669 (K; KEP [105006]); Krau Game Reserve, Kuala Lompat, 19 iv 1970, *Soepadmo* ES 771 (K [K000272236], KEP [105012]). **Melaka:** s. loc., 17 iv 1867, *Maingay* 1667 [Kew Distrib. No. 274] (K); s.loc., 18 iii 1868, *Maingay* 1667A [Kew Distrib. No. 274] (K); Bkt. Senggah F.R., 9 iv 1940, *Kiah* SFN 37217 (K; KEP [104799]). **Johor:** Mersing, Arong F.R., 25 iv 1967, *Ng* FRI 5204 (K [K000272235]; KEP [104788]); Labis F.R., 19 iii 1970, *Everett* FRI 14097 (K; KEP [105009]); *ibid.*, 23 iii 1968, *Ogata* KEP 110352 (K; KEP [105014]); Johor Bahru, Istana Gardens, 2 iii 1939, *Henderson* SFN 36260 (K; KEP [104793]).

SINGAPORE. Bkt. Timah N.R., 24 ix 2019, *Niissalo & Choo* SING 2019-935 (SING [SING0296117]); *ibid.*, 12 xii 2008, *Khoo & Nik Faizu* KMS 39 (SING [SING0123530]).

8. *Sarcotheca johorensis* I.M.Turner & R.C.K.Chung, *nom. et stat. nov.* – *Sarcotheca laxa* var. *hirsuta* Veldkamp, *Blumea* 15: 535 (1968 [1967]). – Type: Peninsular Malaysia, Johor [Johore], Mawai-Jamalar Road, Sg. Kayu Ara, 8 ii 1935, *Corner* SFN 29009 (holotype L [L 0018320]; isotypes A [A00100563], BM [BM000797432], BO, E, K [K000501050, K000501051], SING [SING0055493]).

Distribution. Peninsular Malaysia (see **Figure 1**).

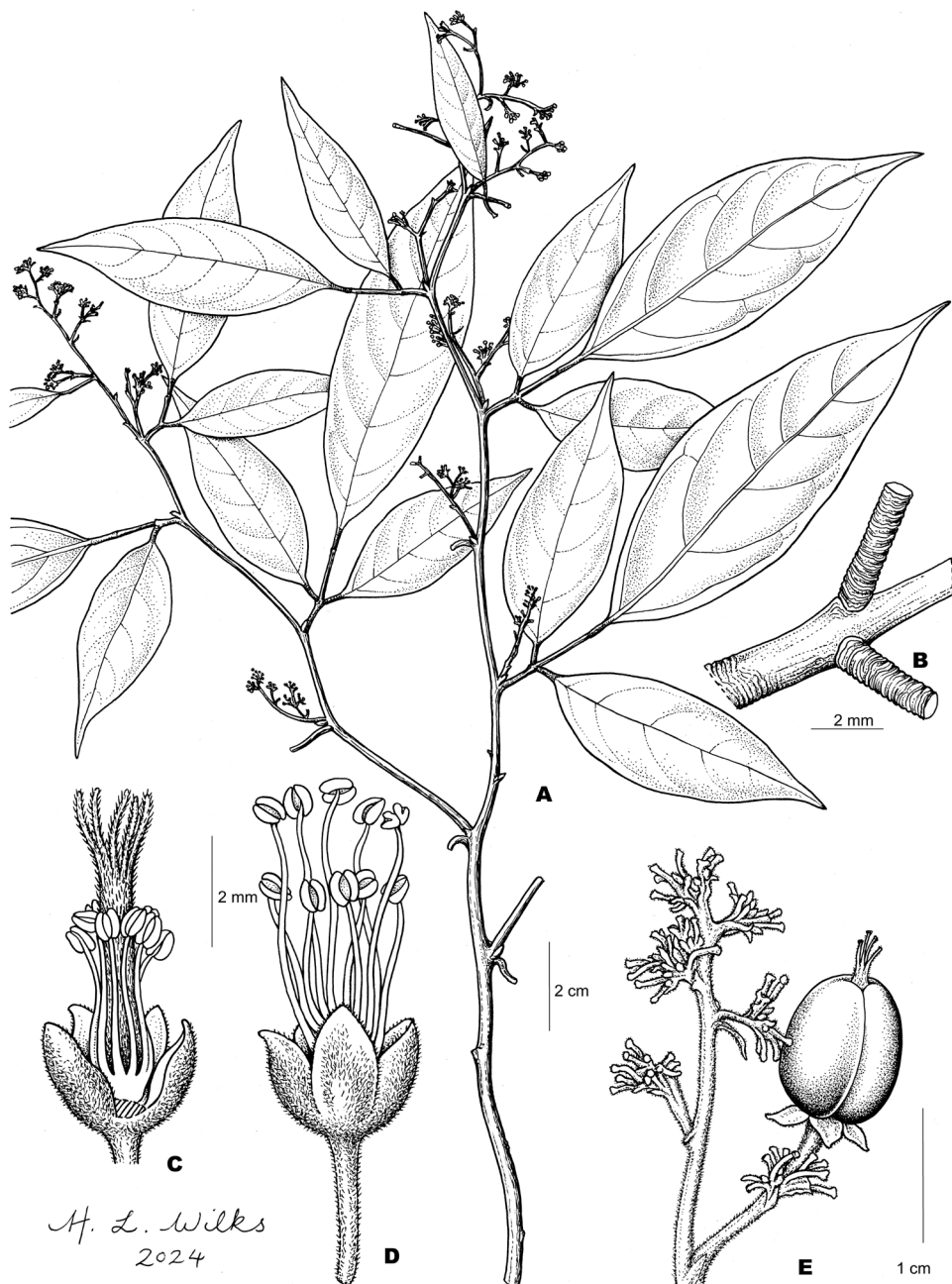


Figure 7. *Sarcotheca griffithii*. A, Habit; B, detail of articulation between leaflets and rachis; C, long-styled flower with one sepal removed; D, short-styled flower; E, part of infructescences with one mature fruit attached. A and B, FRI 14097; C, SFN 36260; D, Maingay 274; E, SFN 37217. Drawn by Hazel Wilks.

Notes. The densely tomentose twigs and generally velvety undersurface to the leaves readily distinguish Veldkamp's *Sarcotheca laxa* var. *hirsuta* from the three other varieties of *S. laxa* that he recognised. In fact, it seems closer to *Sarcotheca ferruginea* than to *S. laxa*. We recognise this taxon at species rank and propose a change of name to reflect the restriction of the species to the Malaysian state of Johor.

Additional specimens examined. MALAYSIA. **Peninsular Malaysia.** **Johor:** 47th mile from Kluang from Mersing, 16 vii 1975, *Teo & Pachiapan* KL 3171 (K [K000272263]); Lenggong F.R., 14 viii 1973, *Teo & P* KL 3091 (K [K000272264]); Mersing F.R., 19 ix 1970, *Whitmore* FRI 15607 (K [K005373356], KEP [105028]); Mawai–Kuala Sedili new road, 4 iii 1960, *Sinclair* 10165 (K [K005373354]); 14th mile Mawai–Jemaluang Road, 9 ii 1935, *Corner* SFN 29025 (K [K005373353], K005373357, KEP [105024]); 15th mile, Mawai–Jemaluang Road, 30 ix 1936, *Corner* SFN 31929 (K [K005373351]); Sg. Kayu Ara, Mawai–Jemaluang Road, 5 v 1935, *Corner* SFN 29380 (K [K005373359], KEP [107609]); North of G. Arong F.R., 20 i 1954, *Wyatt-Smith* KEP 54248 (K [K005373352], KEP [105025]); G. Arong, 23 vii 1957, *Kochummen* KEP 77878 (K [K005373358], KEP [105022]); G. Arong F.R., 13 ix 1969, *Kochummen* FRI 2767 (K [K005373360], KEP [105023]); Mersing, behind Rest House, 14 ix 1969, *Kochummen* FRI 2777 (K [K005373361], KEP [105021]); Ulu Sg. Sedili Besar, 29 i 1970, *Everett* FRI 13881 (K [K005373362], KEP [105020]); Tg. Penawar, 23 ii 1968, *Cockburn* FRI 7631 (K [K005373363], KEP [105026]); Endau, Kg. Hubong, 18 vii 1959, *Kadim & M. Noor* 367 (K [K005373355]).

9. *Sarcotheca laxa* (Ridl.) R.Knuth in Engler (ed.), Pflanzenr., IV, 130: 422 (1930). –

Connaropsis laxa Ridl., J. Straits Branch Roy. Asiat. Soc. 75: 9 (1917). – Type: Peninsular Malaysia, Perak, Larut, ix 1881, *King's Coll.* 2384 (lectotype K [K000501052], designated by Veldkamp, Blumea 15: 533 (1968 [‘1967’]). [Figure 8](#).

Connaropsis glabra Ridl., J. Straits Branch Roy. Asiat. Soc. 75: 9 (1917). – *Sarcotheca glabra* (Ridl.) R.Knuth in Engler (ed.), Pflanzenr., IV, 130: 422 (1930). – Type: Peninsular Malaysia, Perak, Hermitage Hill, xii 1887, *Curtis* 1345 (lectotype K [K000693155], designated here; isolectotype SING [SING0055483]).

Distribution. Peninsular Thailand and Peninsular Malaysia (see [Figure 1](#)).

Notes. *Sarcotheca laxa* var. *laxa*, as recognised by Veldkamp, differs from the other three varieties in its seed surface sculpturing, glabrous abaxial calyx, and lax inflorescence with relatively long side branches. Given the clear distinctions among the four varieties, we have chosen to treat them as separate species.

Veldkamp (1968 [‘1967’]) was the first to treat *Sarcotheca glabra* as a synonym of *S. laxa*, thereby establishing the priority of *Connaropsis laxa* over *C. glabra*. In his 1970 work, Veldkamp did not record any species of *Sarcotheca* in Thailand. However, Gardner et al. (2018) reported the presence of *Sarcotheca laxa* in peat swamp forest, known only from Narathiwat. Their study included some photographs, but no voucher specimens were cited. The Forest Herbarium in Bangkok (BKF) holds several collections of *Sarcotheca laxa sensu stricto*, all originating from the Waeng District of Narathiwat Province.

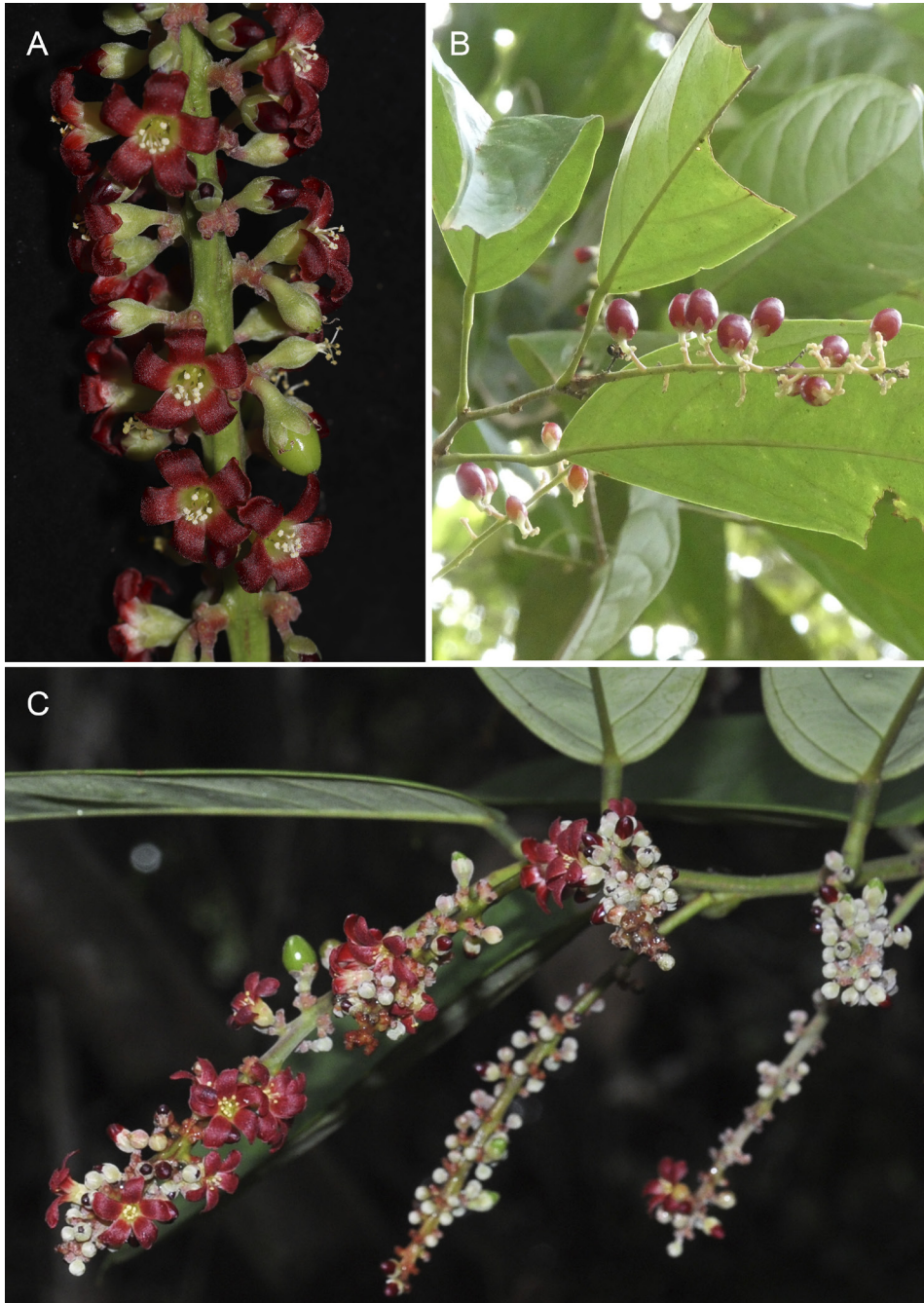


Figure 8. *Sarcotheca laxa*. A, Open flowers and young fruit; B, fruiting leafy twig with mature red fruits; C, flowering leafy twig with terminal and axillary panicles. Photographs: A, Rafidah Abdul Rahman; B, Siti Eryani Suterisno; C, Yao Tze Leong and Lim Chung Lu.

Additional specimens examined. MALAYSIA. **Peninsular Malaysia.** **Pulau Pinang:** s.loc., v 1909, *Haniff* 3996 (K [K005373545]). **Perak:** road to Tea Gardens, x 1892, *Curtis* 2896 (K [K005373544, K005373547, K0053735590]); Larut, ix 1883, *King's Coll.* 4887 (K [K005373546]); Bintang Hijau F.R. 23 xi 1966, *Ismail* KEP 98544 (K [K005373543], KEP [105041]); Kuala Kangsar, Chioh F.R., 11 vii 1967, *Ismail* KEP 99832 (K [K005373554], KEP [105045]); Kuala Kangsar, Piah F.R., 17 vii 1967, *Kochummen* FRI 2475 (K [K005373549], KEP [105051]); Gunong Bubu F.R., Manong, 31 x 1958, *Sinclair* 9897 (K [K005373555]); East of Trong, tributary of S. Trong W of Bubu massif, 27 ii 1970, *Everett* FRI 13986 (K [K000272249]); Larut, ix 1883, *King's Coll.* 4887 (K [K005373558]). **Kelantan:** Ulu Sat F.R., 13 vi 1968, *Suppiah* KEP 104812 (K [K005373550], KEP [105048]); *ibid.*, 17 vi 1968, *Suppiah* KEP 104580 (K [K005373548], KEP [105049]); Pasir Putih, Cabang Tongkat F.R., 3 vi 1995, *Zainudin* 5586 (K [K000272262]); Sg. Lebir, 1½ miles S. of Kuala Teryna, 4 ix 1967, *Cockburn* KEP 115993 (K [K005373557], KEP [105036]); Sg. Galas nr. Sg. Merbau, 30 x 1967, *Cockburn* FRI 7491 (K [K005373556], KEP [105052]). **Terengganu:** Jerteh, G. Tebu F.R., 10 x 1971, *Sohadi* FRI 17915 (K [K005373551], KEP [105034]); G. Tebu, Besut, 6 vii 1969, *Selvaraj* FRI 11199 (K [K005373552], KEP [105037]); Ulu Besut F.R., 3 v 1968, *Cockburn* FRI 8316 (K [K005373553], KEP [105040]).

THAILAND. **Narathiwat:** Bala-Hala, Sirindhorn Waterfall, 26 vi 2000, *Niyomdham* et al. 6301 (BKF [SN 139211]); Waeng, 10 viii 2002, *Niyomdham* 6868 (BKF [SN 184663, SN 184664]); Waeng, Bala-Hala Wildlife Sanctuary, 24 viii 2006, *Poopath* et al. 114 (BKF [SN 189721, SN 189722]); Waeng, Lo Jud, Ban Bala, Hala-Bala Wildlife Sanctuary, 8 iii 2005, *Poopath* 195 (BKF [SN 190771]); Waeng, Bala-Hala, 18 vi 2003, *Niyomdham & Puudjaa* 7149 (BKF [SN 200186]); *ibid.*, 6 iv 2005, *Niyomdham & Puudjaa* 7333 (BKF [SN 204391, SN 204392]); *ibid.*, 11 v 2005, *Niyomdham & Puudjaa* 7400 (BKF [SN 205193, SN 205194]); *ibid.*, 20 vii 2006, *Niyomdham & Puudjaa* 7767 (BKF [SN 207858, SN 207859]); Waeng, Hala-Bala Wildlife Sanctuary, 18 v 2005, *Korkaew* 22 (BKF [SN 217558]).

10. *Sarcotheca lunduensis* Veldkamp, Gard. Bull. Singapore 60: 70 (2008). – Type: Borneo, Sarawak, Kuching Division, Ladang DAFA, Biawak, 28 vii 1988, *Munting Eja* S56383 (holotype L [L 0823250]; isotype K [K000693167], KEP [32508], MO, SAN, SAR).

Distribution. Borneo (Sarawak) (see [Figure 4](#)).

Additional specimens examined. BORNEO. MALAYSIA. **Sarawak.** **Kuching Div.:** Lundu, Bkt. Batu, 2 iii 2000, *Enjah* et al. S 84561 (K [K001622418]); Biawak, Ladang DAFA, 28 vii 1988, *Eja* S 56384 (K [K005373669], KEP [32511]); Sematan, Badaun, 9 iv 1994, *Othman* et al. S 65450 (K [K005373668], KEP [43498]); Lundu, Sematan, Siru Pueh, Sg. Labuhan, 6 ii 1996, *Teo & Enjah* S 68057 (K [K001910577]).

11. *Sarcotheca macrophylla* Blume, Mus. Bot. 1(16): 242 (1851). – *Roucheria macrophylla* (Blume) Miq., Fl. Ned. Ind. 1(2): 136 (1858). – Type: Borneo, *Anon.* s.n. (lectotype L [L 0018321], designated by Veldkamp, Blumea 15: 542 (1968 [1967])).

Distribution. Borneo (Sarawak and Kalimantan) (see [Figure 4](#)).

Notes. Veldkamp (1968 [1967]) referred to the lectotype sheet by its Leiden accession number (908.126– 971, as “908/126/971”). The barcode number for the sheet is reported here.

Additional specimens examined. BORNEO. MALAYSIA. **Sarawak:** s.loc., 1865–1868, *Beccari* P.B. 3166 (K [K005373649]). **Sri Aman Div.:** Sri Aman, Skerang, Entalun, 5 iii 1986, *Paie* S 51890 (K

[K001910378], KEP [60281]). **Sarikei Div.:** Anap, Ulu Muput Kanan, Bkt. Kamantan, 11 x 1963, *Paie* S 19515 (K [K005373632]). **Bintulu Div.:** Miri, Bintulu, Nyabau catchment area, 16 vi 1966, *Luang* S 24571 (K [K005373633], KEP [105665]); Sg. Tubau above Tubau village, 3 iv 1963, *Ashton* S 18368 (K [K005373634, K005373635]); N Setungan, Ulu Segan, 4 xi 1964, *Ashton* S 22017 (K [K005373636]); Bintulu, Buan F.R., 21 ix 1972, *Ilias* et al. S 32174 (K [K005373637]); Bintulu, Labang, Ulu Stirau, 21 iii 1963, *Ashton* S 18065 (K [K005373631]); Bintulu, Simalajau N.P., Sg. Likau, 11 v 1990, *Mohtar & Othman* S 59404 (K [K000271481], KEP [39909]). **Miri Div.:** Suai, 24 vii 1977, *Paie* S 39197 (K [K005373638], KEP [105664]).

INDONESIA. Kalimantan. East Kalimantan: W Kutei, Belajan River near Gunungsari, 15 viii 1956, *Kostermans* 13519 (K [K005373663]); Sangkulirang Distr., Karangan R., 24 viii 1957, *Kostermans* 13537 (K [K005373666]); Gunong Saheri, Belajan River, 17 viii 1956, *Forman* 458 (K [K005373653]); Gunong Runcing, 12 vi 1996, *Ambriansyah* AA 1887 (K [KK000271500]); Central Kutei, Belajan R., G. Kelopak near Tabang, 13 iv 1955, *Kostermans* 10442 (K [K005373643]); Berau, Tdg Redeb, 5 ix 1963, *Kostermans* 21087 (K [K005373642]); PT ITCL, road Kenangan to Penajam, km 7, 25 iii 1995, *Kessler* et al. PK 872 (K [K005373648, K005373647]); road from Jemang Danau to Damai, Sg. Pesing, 20 iii 1997, *Kessler* et al. PK 2185 (K [K005373639]). **Central Kalimantan:** Samba, 20 i 1995, *Jarvie & Ruskandi* 5043 (K [K005373552]); ODA-Kayu Mas logging area, 24 x 1996, *Kessler* et al. PK 1480 (K [K005373654]); BCT Area, 28 x 1996, *Kessler* et al. PK 1520 (K [K005373655]); Km 80 from Sangai, Sg. Mentaya, Kab. Kotawaringin Timur, 2 ii 1993, *Argent & Saridan* 9343 (K [K005373656]); Km 60 N of Sangai, Sg. Mentaya, Kab. Kotawaringin Timur, 30 i 1993, *Argent & Saridan* 9310 (K [K005373657]); Camp 92 ODA Sangai area, 3 ii 1996, *Ambriansyah* AA 11539 (K [K005373658]); Upper Katingan River, 20 xii 1982, *Mogea & de Wilde* 4235 (K [K005373659]); *ibid.*, 16 xi 1982, *Mogea & de Wilde* 3458 (K [K000605571]); Bkt. Raya and Upper Katangan, 18 xi 1982, *Mogea & de Wilde* 3518 (K [K000271495]); Kota Waringin Lama, Riam Durian, vii 1998, *Riswan* et al. B-25 (K [K000271483, K005373651]); Km 92 from Sangai, xi 1993, *Tuke* P13 177 (K [K000271497]); *ibid.*, xi 1993, *Tuke* P2 372 (K [K000271498]); Sampit R. region near Kuala Kuajan, 25 vii 1953, *Kostermans* 7928 (K [K005373640]); Barito Ulu, 6 vi 1990, *Sidiyasa* PBU 340 (K [K005373645]). **West Kalimantan:** Betung Kerihum N.P., Putussibau, Sebang River, 22 ii 2000, *Ambriansyah* et al. AA 2234 (K [K000271485]); Sintang, 12 x 2000, *Albertus & Sidiyasa* 2201 (K [K000271489]); Serawai, Desa Jelundung, 2 x 1995, *Church* et al. 2178 (K [K000271496]); Serawai, 3 km SW of Nanga Jelundung, 31 x 1995, *Church* et al. 2832 (K [K005373641]); Kresik Luwei, Kecamatan Melak, 6 vii 1975, *Wiriadinata* 862 (K [K005373661]); Melaham, Mahakam Ulu, 12 km SE Long Bagun, 26 vi 1975, *Wiriadinata* 629 (K [K005373660, K005373662]); Melahan, Sampit region, near Kuala Penjahuan, iii 1948, *Kostermans* 4703 (K [K005373664]) Tusschen S. Djemela & G. Klam, 28 i 1894, *Hallier* B 2269 (K [K005373665]); Matalibaoe Long Iram, 16 v 1983, *Rahayu* 123 (K [K005373667]); Bkt. Raya, 19 xii 1982, *Nooteboom* 4373 (K [K000271499]); Hayoep, 5 vi 1908, *Winkler* 2282 (K [K005373644]); Headwater of S. Kahayan, near Tumbangsan c.15 km N of Tumbangiri on S. Miri, 15 iv 1988, *Burley* et al. NGS 659 (KEP [105639]); Headwaters of S. Kahayan, 5 km NE of Haruwu village, 14 iv 1988, *Burley* et al. NGS 660 (K [K005373646], KEP [105641]).

12. *Sarcotheca monophylla* (Planch. ex Edgew. & Hook.f.) Hallier f., Meded. Rijks-Herb. 1910: 2 (1911). – *Connaropsis monophylla* Planch. ex Edgew. & Hook.f., Fl. Brit. India 1(2): 440 (1874). – *Dapania monophylla* (Planch. ex Edgew. & Hook.f.) R.Knuth, Bot. Jahrb. Syst. 50 (Suppl.): 234 (1914). – Type: Peninsular Malaysia, Melaka [Malacca], *H.*

Cuming 2324 (lectotype K [K000693156], designated by Veldkamp, *Blumea* 15: 537 (1968 [1967]); isolectotype K [K000693157]). [Figure 9](#).

Distribution. Peninsular Malaysia (see [Figure 6](#)).

Notes. The name *Connaropsis monophylla* was first validated by Edgeworth & Hooker (1874) in the *Flora of British India*. There are two specimens of *Cuming* 2324 mounted on one sheet in K. Veldkamp indicated on the sheet which he was designating as type.

Additional specimens examined. MALAYSIA. **Peninsular Malaysia**. **Perak**: *s.loc, s.dat.*, *Scortechini* 1032 (K [K005373376]); *s.loc, s.dat.*, *Scortechini* 1974 (K [K005373379]); Kuala Kangsar, Kledang Saiong F.R., 26 ix 1989, *Damahuri* FRI 36682 (K [K005373375], KEP [6368]); Keledang Saiong F.R., 23 ii 1982, *Kochummen* FRI 29444 (K [K005373391], KEP [105141]); Chanderang, iii 1884, *King's Coll.* 5772 (K [K005373380]); Gopeng, vi 1883, *King's Coll.* 4487 (K [K005373377]); Gopeng, vi 1883, *King's Coll.* 4396 (K [K005373393]); 5 miles from Tapah, ii 1911, *Burn-Murdoch* 387 (K [K005373378], KEP [105103]); Tapah at Kalindie, x 1894, *Curtis* 3110 (K [K005373390]); logging road running into G. Bubu massif from Kg. Ayer, 19 ii 1970, *Everett* FRI 13895 (K [K005373388], KEP [105145]); logging road running into G. Bubu massif from Kg. Ayer, 22 ii 1970, *Everett* FRI 13930 (K [K005373409], KEP [105153]); Pangkor Is., Teluk Gedong, 10 vii 1955, *Burkill* HMB 291 (K [K005373402]); Sg. Pangkor F.R., 21 ii 1967, *Whitmore* FRI 3092 (K [K000272233], KEP [105150]). **Selangor**: Daman Sara, 20 viii 1970, *Teo & P* KL 2910 (K [K005373387]); Sg. Buloh F.R., 31 iii 1967, *Kochummen* FRI 2269 (K [K000272231]; KEP [105146]); Sg. Buloh, 18 i 1966, *Hardial & Sidek* 420 (K [K005373407]); Sg. Buloh, R.R.T. exp. station, 18 i 1966, *Ng* KEP 100034 (K [K005373398], KEP [105095]); Sg. Buloh, R.R.I.E.E., 24 xi 1956, *Burkill & Shah* HMB 1083 (K [K005373396]); Sg. Buloh Res., 17 iii 1919, *Forest Guard Abu* Forest Department F.M.S. Field No. 3305 (K [K005373406], KEP [105088]); Bkt. Belata Tambahan F.R., 14 iv 2016, *Chew et al.* FRI 73062 (K [K001910579]; KEP [254085]); Kuala Lumpur, 3 iii 1915, *Ridley* s.n. (K [K005373405]); Kuala Lumpur, Maxwell Road, 27 ix 1919, *Forest Guard Ahmad* Forest Department F.M.S. Field No. 4928 (K [K005373404], KEP [105114]); Kuala Lumpur, University Campus, 4 ii 1964, *Poore* 1388 (K [K005373408], K000272237); *ibid.*, 8 vii 1964, *Rajab* 623 (K [K005373415]); *ibid.*, 8 vii 1964, *Rajab* 1618 (K [K005373414]); Bkt. Lagong F.R., 21 x 1954, *Sow* KEP 75992 (K [K005373403]; KEP [105116]); *ibid.*, 29 x 1959, *Kochummen* KEP 93469 (K [K00537401]; KEP [105113]). **Negeri Sembilan**: Gunong Angsi F.R., Padas, 21 ii 1971, *Sohadi* FRI 14657 (K [K005373395], KEP [105149]); Pasoh F.R., 29 iv 2005, *Samad* FRI 40366 (K [K000272227], KEP [100213]); *ibid.*, 6 v 1975, *Asri* FRI 21868 (K [K000272234], KEP [105147]). **Melaka**: *s.loc., s.dat.*, *Griffith* s.n. [HEIC 947] (K [K005373384]); *s.loc., s.dat.*, *Griffith* s.n. (K [K005373389]); *s.loc.*, 1845, *Griffith* s.n. (K [K005373381]); *s.loc.*, 1865–1866, *Maingay* 1015 [Kew Distrib. No. 273] (K [K005373386]); Merlimau Reserve, viii 1889, *Derry* 302 (K [K005373382]); Merlimau, xi 1893, *Goodenough* 1622 (K [K005373385]); Ayer Panas, v 1900, *Curtis* 3110 (K [K005373383]); Sg. Udang, 18 vi 1966, *Ng* FRI 1245 (K [K005373399]; KEP [105099]). **Johor**: G. Ledang, 26 xi 1971, *Loh* FRI 19218 (K [K005373394], KEP [105143]); Bkt. Badak, Layang Layang, 27 i 1959, *Hassan & Kadim* H 47 (K [K005373397]); Ma'okil F.R., 24 xi 1968, *Kochummen* FRI 2625 (K [K005373413], KEP [105136]); Segamat Wildlife Reserve, 2 vi 1970, *Loh* FRI 17134 (K [K005373412], KEP [105096]); Segamat Wildlife Sanctuary, Kuala Palong F.R., 31 v 1970, *Everett* FRI 14252 (K [K005373411], KEP [105135]); *ibid.*, 2 vi 1970, *Everett* FRI 14287 (K [K005373410], KEP [105115]). **Pahang**: Menchali F.R., 3 v 1982, *Kochummen* FRI 32520 (K [K005373374], KEP [105140]); Chini F.R., South of Tasek Chini, 13 viii 1970,



Figure 9. *Sarcotheca monophylla*: A, habit. *Sarcotheca griffithii*: B, fluted bole; C, young leaves. Photographs: A–C, Yao Tze Leong and Lim Chung Lu.

Loh FRI 17269 (K [K005373392], KEP [105148]); Mentakab, Kemansul F.R., 8 v 1962, *Anon.* KEP 99576 (K [K005373400], KEP [105104]); Lesong F.R., 11 vi 1979, *Kamarudin* FRI 28365 (K [K000272232]; KEP [105139, 105142]).

SINGAPORE. Bkt. Timah, 1893, *Ridley* 4423 (BM [BM015176542]).

13. *Sarcotheca ochracea* Hallier f., *Beih. Bot. Centralbl.* 34(2): 28 (1916). – Type: Borneo, Sarawak, Bintulu, iv 1893, *Haviland* 2343 (holotype L [L 0018331]; isotypes BM [BM000797433], K [K000693165, K000693166], SING [SING0055494]).

Distribution. Borneo (Sarawak and Kalimantan) (see [Figure 4](#)).

Notes. Hallier's use of "Herb. L.-B." in the protologue refers to the Rijksherbarium (L), then often referred to as Museum Botanicum Lugduno-Batavum.

Additional specimens examined. BORNEO. MALAYSIA. **Sarawak.** **Sri Aman Div.:** Lubok Antu, Engkilili, Bkt. Tangga Saran, 6 v 1982, *Lee* S 44530 (K [K005373623], KEP [105644]). **Mukah Div.:** Balingian, Ulu Arip, Bkt. Iju, 20 vii 1965, *Luang* S 23232 (K [K005373626]). **Bintulu Div.:** Bintulu, Ulu Segan, 26 vi 1968; *Wright* S 27958 (K [K005373620]); Tatau, Ulu Anap, 21 vi 1982, *Mokhtar* S 44887 (K [K005373622]); Bintulu, Nyabau F.R., xi 1962, *Tada* S 14484 (K [K005373625, K005373628]); *ibid.*, x 1962, *Tada* S 15919 (K [K005373627]); Tatau, Btg. Anap, Ulu Sg. Kana, 12 vi 1982, *Mokhtar* S 41766 (K [K005373624]); Sana, Sg. Tau, 28 v 1956, *Purseglove* P 5104 (K [K005373621]).

INDONESIA. **Kalimantan.** **East Kalimantan:** N Kutai, Batu Ampar, 26 xi 1994, *Sidiyasa* 1238 (K [K005373629, K005373630]).

14. *Sarcotheca rubrinervis* Hallier f., *Beih. Bot. Centralbl.* 34(2): 29 (1916). – Type: Borneo, Samenggaris, xii 1912, *Amdjah* 1082 (lectotype L [L 0018335], first step designated by Veldkamp, *Blumea* 15: 539 (1968 [1967]), second step designated here; isolectotypes BO [BO-1305521, BO-1281443], L [L 0018336]).

Sarcotheca oblongifolia Merr., *Univ. Calif. Publ. Bot.* 15: 111 (1929). – Type: Borneo, British North Borneo [Sabah], Tawau [Tawao], Elphinstone Province, x 1922 – iii 1923, *A.D.E. Elmer* 20406 (lectotype UC [UC290127], designated here; isolectotypes A [A00100564], BISH [BISH1003135], BM [BM01576544], BO [BO-1305520], BR [BR000005290680], CM [CM1135], F [F0047683F], GH [GH00100565], HBG [HBG507570], K [K000693164], L [L 0018332], M [M0274759], NY [NY00385438], P [P02440427], PH [PH00022278], S [S-G-5642], U [U0005435]).

Distribution. Borneo (Sabah and Kalimantan) (see [Figure 4](#)).

Additional specimens examined. BORNEO. MALAYSIA. **Sabah.** **Tawau Distr.:** *s.loc.*, v–ix 1917, *Villamil* 372 (K [K005373584]); Mt Paton, 19 xii 1963, *Gibot* SAN 37031 (K [K005373596]); Marutai, Simpang Tiga, 29 iv 1932, *Agullana* B.N.B. Forestry Dept. No. 1782 (K [K005373594]); Ulu Sg. Serudong, 25 viii 1962, *Aban* SAN 31169 (K [K005373601, K005373602]); Ulu Sg. Selimpupon, 12 v 1961, *Bakar* SAN 24990 (K [K005373600], KEP [105661]); Membalua F.R., 19 ix 1960, *Singh* SAN 22807 (K [K005373599]); *ibid.*, 16 ix 1960, *Singh* SAN 22763 (K [K005373598], KEP [105662]); Sg. Kimamis, Sabatik, 10 vii 1959, *Meijer* SAN 19506 (K [K005373597]); Merotai Besar, 15 iv 1963, *Gibot* SAN 35809 (K [K005373606]);

ibid., 19 ix 1962, *Gibot* SAN 31311 (K [K005373605], KEP [105660]); ibid., 15 ix 1962, *Gibot* SAN 31267 (K [K005373603], KEP [105659]); Gemok Hill, 13 ix 1963, *Sinanggul* SAN 40512 (K [K005373604]); Sumandalan, 27 x 1949, *Tangulon* North Borneo Forestry Dept. No. A 1597 (K [K005373582]; KEP [105654]); Sebalik Island, 28 ix 1949, *Cuadra* North Borneo Forestry Dept. No. A 2425 (K [K005373583], KEP [105652]); Tanjong F.R., 3 iii 1965, *Singh* et al. SAN 48865 (K [K005373590]); 3 mile Brantian, 27 xi 1978, *Fedilis & Sumbing* SAN 89124 (K [K005373592]); Mile 9, Apas Road, 7 iv 1977, *Krispinus* SAN 86622 (K [K005373591], KEP [105655, 105656]); Membalua F.R., 26 ix 1964, *Gibot* SAN 47429 (K [K005373588, K005373589]); Sallah Road, 4 xi 1937, *Tandon* North Borneo Forestry Dept. No. 8817 (K [K005373581]); Brentian, Kelau Road, 26 v 1968, *Bengau* SAN 63088 (K [K005373579]); Gomok Hill F.R., 23 iv 1992, *Madani* et al. SAN 133946 (K [K000271482], KEP [44690]); Bkt. Gemok F.R., 11 vi 1997, *Diwol* et al. SAN 135261 (K [K000271479], KEP [47396]); Brantian F.R., 18 xii 1973, *Minjulu* SAN 79066 (K [K000271503], KEP [105657]); Elphinstone Province, x 1922 – iii 1923, *Elmer* 20842 (K [K005373585]); Kalabakan, Sg. Geminchou, 13 xi 1984, *Krispinus* SAN 107034 (K [K005373444]); Marutai, 4 viii 1932, *Mail* B.N.B. Forestry Dept. No. 2423 (K [K005373595]); ibid., 2 viii 1932, *Maidin* B.N.B. Forestry Dept. No. 2431 (K [K005373586]); Apas, 15 xi 1932, *Mail* B.N.B. Forestry Dept. No. 2723 (K [K005373593]); Tg. Batu, 3 iii 1934, *Kamis* B.N.B. Forestry Dept. No. 3765 (K [K005373580]).

INDONESIA. **Kalimantan. East Kalimantan:** W Kutei, Kalindjau River region near Bentuk, 28 vi 1954, *Kostermans* 9686 (K [K005373613]); W Koetai, near Benrawataewa, 22 vi 1925, *Endert* 1589 (K [K005373614]); W Koetai, near M. Wakau, 7 viii 1925, *Endert* 2391 (K [K005373615]); Telok Kaba, North of Samarinda, 26 v 1970, *Reksodihardjo* 93 (K [K005373617]); Long Lees, Kecamatan Muara Ancalong, 2 iii 1978, *Wiriadinata* 1091 (K [K005373619]); ibid., 3 iii 1978, *Wiriadinata* 1068 (K [K005373618]); Berau, Makajang, 30 iv 1998, *Adriansyah & Boestani* AA 2195 (K [K000271486]; KEP [55731]); Berau, Km 17, Labanan to Samarinda Road, 24 ix 1997, *Kessler* et al. Berau 662 (K [K000271477]); Berau, Km 16, Labanan to Samarinda Road, 29 ix 1997, *Kessler* et al. Berau 746 (K [K005373607]); Berau, Km 17, Labanan to Samarinda Road, 25 ix 1997, *Kessler* et al. Berau 685 (K [K000271488]); Berau, Km 15, 20 ix 1997, *Ambriansyah & Arbainsyah* Berau 599 (K [K000271476]); Berau, km 11, 18 x 1998, *Kessler & Arbainsyah* B 1414 (K [K000271510]); Berau, Labanan, 3 iii 2000, *Kessler* et al. B 1574 (K [K000271484]); Berau, Km 14, xi 1998, *Kessler* et al. B 1475 (K [K000271509]); Berau, Labanan, 31 iii 2003, *Ambriansyah* et al. AA 2528 (K [K000271490]); Berau, Swakelola, Labanan, 10 xii 1997, *Ambriansyah & Arifin* Berau 1055 (K [K005373609]); ibid., 10 x 1994, *Kessler* et al. Berau 188 (K [K005373608]); ibid., 5 x 1996, *Kessler* et al. Berau 108 (K [K005373610]); Berau, Labanan, 1 x 1996, *Arbainsyah & Adriansyah* AA 2036 (K [K005373611]); Tarakan, Amal path, 14 xii 1953, *Meijer* 2529 (K [K005373612]); Sebatik Isl. near coast, 28 xii 1953, *Kostermans* 9142 (K [K005373577]). **West Kalimantan:** Nanga Era-Putusiasibau, 24–30 iv 1983, *Afriastini* 902 (K [K005373616]).

15. *Sarcotheca sericea* (Ridl.) R.Knuth in Engler (ed.), Pflanzenr., IV, 130: 424 (1930). – *Connaropsis sericea* Ridl., J. Fed. Malay States Mus. 10: 131 (1920). – *Sarcotheca laxa* var. *sericea* (Ridl.) Veldkamp, Blumea 15: 535 (1968 [‘1967’]). – Type: Peninsular Malaysia, Pahang, Endau, Pianggu, viii 1917, *I.H.N. Evans* s.n. (lectotype K [K000501049], designated by Veldkamp, Blumea 15: 535 (1968 [‘1967’]); isolectotypes SING [SING0055487, SING0055488, SING0055489].

Connaropsis simplicifolia Ridl., Fl. Malay Penins. 1: 334 (1922). – *Sarcotheca simplicifolia* (Ridl.) R.Knuth in Engler (ed.), Pflanzenr., IV, 130: 424 (1930). – Type: [Peninsular

Malaysia], Pahang, Kuantan [Kuantan], Galing F.R., 16 vi 1919, *Forest Guard Mahamud Forest Department F.M.S. Field No. 2776* (holotype K [K001419236], isotype KEP [105087]).

Distribution. Peninsular Malaysia and Singapore (see [Figure 1](#)).

Notes. *Sarcotheca laxa* var. *sericea* is readily distinguished from the three other varieties recognised by Veldkamp. Its sericeous indumentum, elongated oblong leaflets with seven or more pairs of lateral nerves, and relatively long pendulous panicles with relatively short side branches are notable distinguishing characters. Therefore, we revert to recognising this taxon at species rank, for which there is a name available.

Veldkamp referred to “*Evans FMS 13265* (K)” as the type of *Connaropsis sericea*. However, the only relevant sheet at K does not bear the FMS number. Ridley did not cite this number in the protologue, but the specimen is annotated in his handwriting, so it is accepted as the lectotype designated by Veldkamp. Meanwhile, the SING sheets from the same collecting locality and date do bear the FMS number.

Additional specimens examined. MALAYSIA. **Peninsular Malaysia.** **Terengganu:** Dungun, 10 iii 1963, *Anon.* s.n. (K [K005373365]); Dungun, 10 iii 1963, *Anon.* 5141 (K [K005373364]); Dungun, Bkt. Bauk, 29 vi 1989, *Kamarudin* FRI 34564 (K [K000272243]; KEP [105059, 105060]); 20th mile from Dungun towards Jerangau, 31 vii 1980, *Teo & P* KL 3262 (K [K005373371]); Bkt. Bauk, 19 xi 1978, *Suppiah* FRI 28308 (K [K000272239]; KEP [105042]); Bkt. Bauk F.R., Mile 52½ Dungun–Paka road, 11 vii 1953, *Sinclair* SFN 39894 (K [K005373370]); Bkt. Bauk F.R., 18 vi 1967, *Chelliah* KEP 104351 (K [K000272242]; KEP [105057]); Kemaman Hills, 3 miles SW Kg. Ayer Puteh near Sg. Buaya, 20 viii 1971, *Whitmore* FRI 20374 (K [K000272241]; KEP [105070]); Ulu Kemaman, 10 viii 1977, *Chan* FRI 23991 (K [K000272244]; KEP [105056, 104783]); Rasau Kerteh VJR, Kemaman, 4 ix 1973, *Chan* FRI 16856 (K [K000272240]; KEP [105064]). **Pahang:** Baloh F.R., 25 vii 1966, *Ismail* KEP 97917 (K [K000272259]; KEP [105068]); Bkt. Beserah F.R., Bkt. Perlindungan, 15 v 1967, *Whitmore* FRI 3736 (K [K000272260]; KEP [105080]); Lesong F.R., 5 v 1982, *Khairuddin* FRI 31755 (K [K000272253]; KEP [104780]); *ibid.*, 5 v 1982, *Vethevelu* FRI 29675 (K [K000272252]; KEP [104775]); *ibid.*, 9 vi 1979, *Kamarudin* FRI 28029 (K [K000272251]; KEP [104776]); *ibid.*, 11 vi 1979, *Kamarudin* FRI 28359 (K [K000272257]; KEP [104779]); Bkt. Sulai, 12 miles W of Kuantan, 16 v 1967, *Whitmore* FRI 3771 (K [K000272258]; KEP [105062]); Chini F.R., S of Tasek Chini, 13 viii 1970, *Loh* FRI 17268 (K [K000272254]; KEP [105078]); Chini F.R., 3 x 1968, *Cockburn* FRI 11050 (K [K000272255]; KEP [105067]); *ibid.*, 5 x 1968, *Bray* FRI 11626 (K [K000272256]; KEP [104777]); Chini Reserve, area around Sg. Gombek, 9 x 1968, *Bray* FRI 11647 (K [K005373367]); Kuantan, Telok Chempedak, 14 v 1967, *Whitmore* FRI 3700 (K [K000272261]; KEP [105081]); Balok F.R., 3 ix 1966, *Ding* 757 (K [K005373369]; KEP [105083]). **Johor:** H.S. Labis, confluence of Sg. Marong & Sg. Jasin, 26 v 1986, *Wong* FRI 32465 (K [K000272245]; KEP [105061]); Ulu Endau, Labis F.R., 22 iii 1968, *Cockburn* FRI 7870 (K [K005373373]; KEP [105084]); *ibid.*, 23 iii 1968, *Ogata* KEP 110373 (K [K005373372]; KEP [105076]); H.S. Labis, Buaya Sangkut, 27 v 1986, *Saw* FRI 34248 (K [K005373368]; KEP [72095]); Ulu Endau, 1 mile W of Kg. Chegar Rambutan, 28 iii 1968, *Cockburn* FRI 7978 (K [K005373366]; KEP [105082]); Endau-Rompin Wildlife Reserve, Sg. Kinchin, 23 viii 1988, *Saw* FRI 36343 (K [K000272246]; KEP [105072]).

Key to *Sarcotheca* species

- 1a. Leaves trifoliolate. Fruits ripening yellow-green _____ 2
- 1b. Leaves unifoliolate. Fruits ripening red _____ 3
- 2a. Calyx pale puberulous to glabrous outside, not persisting in fruit ____ 3. *S. diversifolia*
- 2b. Calyx brown puberulous outside, persisting in fruit _____ 7. *S. griffithii*
- 3a. Leaf lamina glaucous beneath _____ 5. *S. glauca*
- 3b. Leaf lamina not glaucous beneath _____ 4
- 4a. Leaf lamina lower surface bearing hairs _____ 5
- 4b. Leaf lamina lower surface glabrous _____ 8
- 5a. Young twigs glabrous to sparsely hairy _____ 15. *S. sericea*
- 5b. Young twigs densely tomentose _____ 6
- 6a. Panicles typically > 15 cm long, some cymes with stalk > 10 mm long. Fruits with conspicuous papillose episeptal furrows _____ 13. *S. ochracea*
- 6b. Panicles < 15 cm long, cymes with stalk < 10 mm long. Fruits with inconspicuous episeptal furrows lacking papillae _____ 7
- 7a. Panicles to 7.5 cm long, cymes to 2 mm long _____ 4. *S. ferruginea*
- 7b. Panicles generally > 7.5 cm long, some cymes on a panicle > 2 mm long
8. *S. johorensis*
- 8a. Calyx glabrous outside, except for ciliate margins of sepals _____ 9
- 8b. Calyx tomentose outside _____ 10
- 9a. Leaves with 4–6 lateral nerves per side. Cymes with stalk to 10 mm long ____ 9. *S. laxa*
- 9b. Leaves with 8–13 lateral nerves per side. Cymes sessile _____ 6. *S. glomerula*
- 10a. Panicles typically > 15 cm long at anthesis _____ 11
- 10b. Panicles up to 10 cm long at anthesis _____ 12
- 11a. Twigs markedly angled. Leaves drying brown above _____ 11. *S. macrophylla*
- 11b. Twigs more or less terete. Leaves drying greyish above _____ 14. *S. rubrinervis*
- 12a. Inflorescence axis, cymes, pedicels and calyx with scattered pale hairs ____ 1. *S. brigittae*
- 12b. Inflorescence axis, cymes, pedicels and at least lower calyx brown tomentose ____ 13
- 13a. Inflorescence with some cymes > 5 mm long. Petals < 3 mm long ____ 10. *S. lunduensis*
- 13b. Inflorescences with cymes to 4 mm long. Petals 3 mm long or more _____ 14
- 14a. Cymes bearing 1–5 flowers. Seeds rugulose _____ 2. *S. celebica*
- 14b. Cymes bearing > 5 flowers. Seeds smooth _____ 12. *S. monophylla*

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