A Synopsis of the Bornean Species of *Microcos* L. (Tiliaceae)

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Abstract

In preparing the treatment of the family Tiliaceae for the Tree Flora of Sabah and Sarawak Project, a revision of the genus *Microcos* in Borneo was conducted resulting in 27 species being recognised for Borneo, of which 25 species occur in Sabah and Sarawak; two (*M. laurifolia* and *M. tomentosa*) are newly recorded, three (*M. creaghii*, *M. elmeri* and *M. ovato-lanceolata*) are reduced to synonymy and one (*M. longipetiolata*) is excluded from the genus. Fifteen species are endemic to Borneo. A complete list of exsiccatae, nomenclatural (typification and synonymy) and taxonomic notes and distribution of the recognised species are provided.

Introduction

The genus *Microcos* L. was founded by Linnaeus in 1753 based on the Sri Lankan species, *M. paniculata* L. In 1767, Linnaeus reduced *Microcos* to the synonymy of *Grewia* L. In the past few decades, the delimitation and taxonomic status of *Microcos* and *Grewia* have been the subject of controversy. Recently, Bayer *et al.* (1999), Chung (2002, 2003), Bayer & Kubitzki (2003) and Chung *et al.* (2003, 2005) recognised *Microcos* as distinct from *Grewia* based on morphological, wood anatomical, leaf epidermal, pollen morphological characters and combined analyses of plastid *atp*B and *rbc*L DNA sequences.

Microcos species are found mainly in the Malesian region, with their centre of distribution probably in Borneo. Burret (1926) using morphological characters of the flower (such as the pedicel length, stamen number, ovary shape, ovule number per locule, and style length) recognised two subgenera within *Microcos*: subgen. *Microcos* Burret (species from Africa, Asia and West Malesia) and subgen. *Eumeriandra* Burret (species

from the Moluccas and New Guinea).

Up to 2005, a total of 97 binomials for *Microcos* had been published, representing taxa from tropical Africa to Indo-Malesia (The International Plant Names Index, 2005). Twenty-one binomials have been published for plants occurring in Borneo (Merrill, 1921; Masamune, 1942; Anderson, 1980; Ashton, 1988; Whitmore *et al.*, 1990; Kessler *et al.*, 1992; Kessler & Sidiyasa, 1994; Coode *et al.*, 1996; Argent *et al.*, 1997). In this paper, we recognise 27 species as occurring in Borneo.

Microcos L.

Microcos L., Sp. Pl. 1 (1753) 514, Gen. Pl. ed. 5 (1754) 230; Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 756; Merrill, Univ. Calif. Publ. Bot. 15 (1929) 185; Masamune, En. Phan. Born. (1942) 449; Backer & Bakhuizen *f.*, Fl. Java 1 (1964) 393; Meijer, Bot. News Bull. Sandakan 7 (1967) 107; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Phengklai, Thai For. Bull., Bot. 16 (1986) 15, Fl. Thailand 6, 1 (1993) 33; Whitmore *et al.*, Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66; Kessler & Sidiyasa, Trees Balikpapan-Samarinda Area, Tropenbos ser. 7 (1994) 228; Turner, Gard. Bull. Sing. 47 (1995) 487; Coode *et al.*, Checkl. Flow. Pl. Gymno. Brunei (1996) 323; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 378. – *Grewia* L. subgen. *Microcos* (L.) J.R.Drumm. *in* Gamble, Fl. Madras 1, 1 (1915) 114. – *Grewia* L. sect. *Microcos* (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 1 (1834) 81; King, J. Roy. As. Soc. Beng. 60, 2 (1891) 109. **Type species:** *Microcos paniculata* L.

Arsis Lour., Fl. Cochinch. ed. 1, 1 (1790) 335. **Type species:** *Arsis rugosa* Lour., Indo-China (= *Microcos paniculata* L.).

Fallopia Lour., Fl. Cochinch. ed. 1, 1 (1790) 335. **Type species:** *Fallopia nervosa* Lour., China, Canton [= *Microcos nervosa* (Lour.) S.Y.Hu].

Omphacarpus Korth. *in* Temminck, Verh. Nat. Gesch. Ned. Bezitt., Bot. 6 (1842) 192, Verh. Nat. Gesch. Ned. Bezitt., Bot. 5 (1842) *t.* 42. – *Grewia* L. sect. *Omphacarpus* (Korth.) Miq., Fl. Ind. Bat. 1, 2, 2 (1859) 204; King, J. Roy. As. Soc. Beng. 60, 2 (1891) 109. **Type species:** *Omphacarpus opacus* Korth., Borneo, Kalimantan [= *Microcos opaca* (Korth.) Burret].

Inodaphnis Miq., Fl. Ind. Bat., Suppl. 3 (1861) 357. **Type species:** *Inodaphnis lanceolata* Miq., Sumatra [= *Microcos lanceolata* (Miq.) Burret].

Grewia L. *p.p.*: King, J. Roy. As. Soc. Beng. 60, 2 (1891) 108; *p.p.* (*excl. G. umbellata* Roxb.); Ridley, Fl. Malay Penins. 1 (1922) 299, *p.p.* (*excl. G. umbellata* Roxb.); Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973)

396, *p.p.* (*excl. G. acuminata* Juss., *G. viminea* Wall. *ex* Burret *et G. sclerophylla* Roxb. *ex* Don); Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 732, *p.p.* (*excl. G. umbellata* Roxb.).

Distribution: The genus comprises about 80 species occurring in tropical Africa (not Madagascar), India, Sri Lanka, Myanmar, Indo-China, S China, Hainan, Thailand, and throughout Malesia (except Lesser Sunda Islands). In Malesia, some 42 species are known with two centres of diversity: 36 species in the West Malesia and 16 species in the Moluccas and New Guinea. In Borneo there are 27 species with 15 endemics; Sarawak has 22 species with one endemic; Sabah 18 species with one endemic; Brunei 16 species (none endemic) and Kalimantan 16 species (none endemic).

Notes: Two basic inflorescence types are seen in *Microcos* (Chung 2001, 2003): Type A panicle where only first-order branches are conspicuous, and Type B panicle where at least two orders of branching are conspicuous.

Two domatia types, pocket- or sac-type, are found on the abaxial leaf surface either in the axils of basal pair of secondary veins or of other secondary veins in some species of *Microcos*.

Four main types of non-glandular trichomes were observed in *Microcos* (Chung, 2002), namely, simple, tufted (branched from the base upwards), stellate (star-shaped) and cushioned stellate trichomes.

1. Microcos antidesmifolia (King) Burret

Microcos antidesmifolia (King) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 780; Turner, Gard. Bull. Sing. 47 (1995) 487; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323. – *Grewia antidesmifolia* King, J. As. Soc. Beng. 60, 2 (1891) 113; Ridley, Fl. Malay Penins. 1 (1922) 302; Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973) 397, *p.p.* (*excl. syn. G. antidesmifolia* King var. *hirsuta* King); Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 733; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 441, *p.p.* (*excl. syn. G. antidesmifolia* King var. *hirsuta* King and *M. subepetala* Stapf *ex* Ridl.); Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 355; Kochummen, Tree Fl. Pasoh (1997) 428. **Type:** *King's Collector 4029*, Peninsular Malaysia, Perak, Larut (lecto K., here designated).

Distribution: Peninsular Malaysia and Borneo.

Notes: In leaf shape, distance of the basal pair of secondary veins, and

fruit, *Microcos antidesmifolia* is closely related to *M. triflora* but differs in the leaf texture (chartaceous vs. subcoriaceous), basal pair of secondary veins running parallel to midrib at the base (absent vs. present), domatia type in the axil of basal pair (pocket-type vs. sac-type), petiole (not swollen vs. swollen), and the floral characters.

A species with two recognised varieties, in Borneo only var. *hirsuta* is known. The other, var. *antidesmifolia*, occurs in Peninsular Malaysia.

var. hirsuta (King) Burret

Microcos antidesmifolia var. *hirsuta* (King) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 780. – *Grewia antidesmifolia* King var. *hirsuta* King, J. As. Soc. Beng. 60, 2 (1891) 113; Ridley, Bull. Misc. Inform., Kew (1933) 489. **Type:** *King's Collector 10185*, Peninsular Malaysia, Perak (lecto K, here designated).

Microcos elmeri Merr., Univ. Calif. Publ. Bot. 15 (1929) 186; Masamune, En. Phan. Born. (1942) 450; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323, *p.p.*, ***syn. nov.*** – *Grewia elmeri* (Merr.) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 443; Anderson, Checkl. Trees Sarawak (1980) 338; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 356. **Type:** *Elmer 20911*, Borneo, Sabah, Tawau (A, BO, GH, K, L, NY, SING, UC).

Microcos creaghii Ridl., Bull. Misc. Inform., Kew (1933) 490, ***syn. nov.***; Masamune, En. Phan. Born. (1942) 449. **Type:** *Creagh s.n.*, Borneo, Sabah, Sandakan (K).

Distribution: Peninsular Malaysia (confined to Perak) and Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

2. Microcos borneensis Burret

Microcos borneensis Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 772; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323. – *Grewia borneensis* (Burret) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 442; Anderson, Checkl. Trees Sarawak (1980) 338. **Type:** *Haviland 2837*, Borneo, Sarawak, Kuching (holo K; iso BO [3X], K, SAR, SING).

Distribution: Endemic in Borneo (confined to Sarawak and Brunei).

Notes: Burret (1926) erroneously cited *Hose 2837* as the type. However,

the correct type specimen for this species is *Haviland 2837* (see Steenis, 1954) and the collection date of this specimen matches well with that cited by Burret (1926). Two sheets of this collection (at flower-bud stage) were examined at K. The sheet with the notes "flowers yellow" is the holotype, while the sheet with the notes "near *M. florida* of Sumatra, venation of leaves is different. It is not *Motleys 1216* or *1260*" is the isotype.

Microcos borneensis is closely related to *M. riparia* but the latter differs from the former by its larger and thicker leaves with a greater number of secondary veins (5–7 pairs), and longer inflorescences (3–8 cm long), lower part of the androgynophore is longer (1.5–2 mm long) and concave in side view, sparsely stellate-hairy style to between 1/4 and 1/2 its length, longer fruit (2.5–2.7 mm long) with 5–7 mm long pseudostalk, thicker mesocarp (5–6 mm thick), thinner endocarp (*c.* 0.5 mm thick), always with one fertile pyrene, and inconspicuous sterile pyrene.

3. Microcos cinnamomifolia Burret

Microcos cinnamomifolia Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 770; Merrill, Univ. Calif. Publ. Bot. 15 (1929) 187; Masamune, En. Phan. Born. (1942) 449; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Kessler & Sidiyasa, Trees Balikpapan-Samarinda Area, Tropenbos ser. 7 (1994) 228; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 380. – *Grewia cinnamomifolia* (Burret) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 443; Anderson, Checkl. Trees Sarawak (1980) 338; Argent *et al.* (eds.), Man. Non-Dipt. Trees Centr. Kalimantan 2 (1997) 641. **Type:** *Beccari PB 1617*, Borneo, Sarawak (lecto K, here designated; isolecto BO, L).

Distribution: Endemic in Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

Notes: A very distinct species, it is the only *Microcos* with only a basal pair of secondary veins that reach almost to the apex of the blade. Nevertheless, it appears to be allied to *M. laurifolia*, with which it shares almost the same leaf shape (narrowly elliptic to elliptic or lanceolate to ovate).

4. Microcos crassifolia Burret

Microcos crassifolia Burret, Notizbl. Bot. Gart. Berl. –Dahl. 9 (1926) 780, *p.p.*; Merrill, Pl. Emer. Born. (1929) 186, *p.p.*; Masamune, En. Phan. Born. (1942) 449; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl.

Kalimantan 2, 1 (1990) 357; Kessler & Sidiyasa, Trees Balikpapan-Samarinda Area, Tropenbos ser. 7 (1994) 228. – *Grewia pyriformis* Merr., J. Str. Br. R. As. Soc. 86 (1922) 327, *p.p.*, *nom. illegit.*, *non G. pyriformis* Elmer, Leafl. Philip. Bot. 8 (1915) 2841. **Type:** *Ramos 1704*, Borneo, Sabah, Sandakan (holo K; iso L, US).

Distribution: Endemic in Borneo (confined to Sarawak, Sabah and Brunei).

Notes: In overall appearance, this species quite closely resembles *Microcos pachyphylla* from Borneo. However, it is sufficiently different to be maintained as a separate species (see note in *M. pachyphylla*). Oblong, ellipsoid or ovoid fruit galls, measuring 17–20 x 9–15 mm are sometimes found in this species.

5. Microcos dulitensis Airy Shaw

Microcos dulitensis Airy Shaw, Kew Bull. (1949) 159. – *Grewia dulitensis* (Airy Shaw) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 443; Anderson, Checkl. Trees Sarawak (1980) 338; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 355. **Type:** *Richards 1767*, Borneo, Sarawak, Mt. Dulit (holo K; iso BO, SING).

Distribution: Endemic in Borneo (Sarawak). Reported only from Mt. Dulit and Usun Apau plateau.

6. Microcos fibrocarpa (Mast.) Burret

Microcos fibrocarpa (Mast.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 782; Phengklai, Thai For. Bull., Bot. 16 (1986) 54, f. 24; Phengklai, Fl. Thailand 6, 1 (1993) 38, f. 24; Turner, Gard. Bull. Sing. 47 (1995) 487; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323, *p.p.*; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 380, *p.p.* (*excl. syn. Microcos reticulata* Ridl.). – *Grewia fibrocarpa* Mast. *in* Hooker *f.*, Fl. Brit. India 1, 2 (1874) 391; King, J. As. Soc. Beng. 60, 2 (1891) 111; Ridley, Fl. Malay Penins. 1 (1922) 301; Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973) 397; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 444, *p.p.* (*excl. syn. M. reticulata*); Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 733; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 356. **Type:** *Maingay 1080*, Peninsular Malaysia, Malacca (lecto K [with flower buds and fruits],

here designated; isolecto K [with flower buds], K [with fruits]).

Distribution: India (*fide* Phengklai 1993), peninsular Thailand, Peninsular Malaysia, and Borneo (Sarawak, Sabah and Kalimantan).

Notes: This species is easily confused with *Microcos reticulata*, but can be distinguished by the distantly and obscurely serrulate leaf margin, impressed midrib and secondary veins above, 1–1.5 mm long and glabrous lower part of the androgynophore, broadly ovoid or globose ovary, which is broadly ovate in cross section. It has soft indumentum on the twigs, lower leaf surface and infructescences.

7. Microcos gracilis Stapf *ex* Ridl.

Microcos gracilis Stapf *ex* Ridl., Bull. Misc. Inform., Kew (1938) 229; Masamune, En. Phan. Born. (1942) 450; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323, *p.p.* – *Grewia gracilis* (Stapf *ex* Ridl.) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 444; Anderson, Checkl. Trees Sarawak (1980) 338; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 356. **Type:** *Haviland 1509*, Borneo, Sarawak, Kuching (holo K; iso A, SING).

Distribution: Endemic in Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

Notes: *Microcos gracilis* is closely related to *M. sumatrana* in having exclusively Type A panicles, glabrous lower part of the androgynophore, globose ovary, and densely stellate-hairy obovoid fruits. It is different in its basal pair of secondary veins reaching between 1/4 and 1/2 the length of the blade (vs. up to *c.* 1/4 in *M. sumatrana*), petiole 0.5–1 mm long and not swollen at the distal end (vs. 1–1.5 mm, and slightly swollen at the distal end), narrowly elliptic and 0.5–1 mm wide involucral bracts of the inner whorl (vs. oblanceolate, 1–1.5 mm wide), oblong sepals (vs. linear or oblanceolate), oblong or obovate petals (vs. lanceolate), and in cross section the ovary is elliptic with three shallow ridges (vs. circular).

8. Microcos henrici (Baker *f.*) Burret

Microcos henrici (Baker *f.*) Burret, Notizbl. Bot. Gart. Berl.-Dahl., 9 (1926) 781, *p.p.*; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 323, *p.p.* – *Grewia henrici* Baker *f.*, J. Bot. 62 (1924) 13. **Type:** *Forbes 3014*,

Sumatra, Palembang, Rupit River, Bingin (holo L [no. 908.144.547]; iso BO, GH, L [nos. 908.144.548, 908.140.1977, 409613], SING).

Distribution: Sumatra (Jambi and Palembang) and Borneo.

Notes: Two subspecies are recognised: subsp. *henrici* (represented by *Forbes 3014* and *Posthumus 1036*), which is endemic in Sumatra, and subsp. *acuta* R.C.K.Chung from Borneo.

subsp. acuta R.C.K.Chung

Microcos henrici (Baker *f.*) Burret subsp. *acuta* R.C.K.Chung, Kew Bull. 58 (2003) 242, fig. 5. **Type:** *Kostermans 12681*, Borneo, Kalimantan, Kutei, Belajan River, Tabang (holo L [no. 958.349.186]; iso L [no. 960.24.012], SING).
Grewia sp. 1, Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 447.

Distribution: Endemic in Borneo (confined to Sarawak, Sabah and Kalimantan).

9. Microcos hirsuta (Korth.) Burret

Microcos hirsuta (Korth.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 782; Merrill, Univ. Calif. Publ. Bot. 15 (1929) 185; Masamune, En. Phan. Born. (1942) 450; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66; Cheek & Turner, Kew Bull. 50 (1995) 129; Turner, Gard. Bull. Sing. 45 (1993) 221, Gard. Bull. Sing. 47 (1995) 487; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324, *p.p.* – *Omphacarpus hirsutus* Korth. *in* Temminck, Verh. Nat. Gesch. Ned. Bezitt., Bot. 6 (1842) 193, Verh. Nat. Gesch. Ned. Bezitt., Bot. 5 (1842) *t.* 42. – *Grewia omphacarpa* Miq., Fl. Ind. Bat. 1, 2, 2 (1859) 204; Merrill, J. Str. Br. Roy. As. Soc., Spec. No. (1921) 373; Ridley, Fl. Malay Penins. 1 (1922) 301; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 445, *p.p.*; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 356. – *Grewia hirsuta* (Korth.) Kochummen, *in* Whitmore, Tree Fl. Malaya 2 (1973) 39, *nom. illegit. et nom. superfl.*, *non G. hirsuta* Vahl, Symb., Bot. 1 (1790) 34; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 240. **Type:** *Korthals s.n.*, Borneo, Kalimantan, Doesoen River (lecto L [no. 908.253.200], here designated; isolecto L [nos. 944.56.122–124,

908.253.353, 908.253.341–342]).

Grewia palembanica Miq., Fl. Ind. Bat., Suppl. 3 (1861) 405. **Type:** *Teijsmann HB 3658*, Sumatra, Palembang, Muara Enim (BO, L [no. 908.253.799], U *n.v.*).

Distribution: Sumatra, Peninsular Malaysia, Singapore, and Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

Notes: *Microcos hirsuta* is closely related to *M. phaneroneura* (see note under *M. phaneroneura*).

10. Microcos kinabaluensis R.C.K.Chung

Microcos kinabaluensis R.C.K.Chung, Kew Bull. 58 (2003) 330, fig. 1. **Type:** *Chew & Corner RSNB 4994*, Borneo, Sabah, Mt. Kinabalu, Mesilau River (holo SING; iso SAN, US).

Distribution: Endemic to Borneo (Mt. Kinabalu, Sabah).

11. Microcos latifolia Burret

Microcos latifolia Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 781. – *Grewia latifolia* Mast. *in* Hooker *f.*, Fl. Brit. India 1, 2 (1874) 392, *non G. latifolia* F.Muell. *ex* Benth. *in* Bentham & Mueller, Fl. Austral. 1 (1863) 271; King, J. As. Soc. Beng. 60, 2 (1891) 112; Gagnepain *in* Lecomte, Not. Syst. 1 (1909) 132; Ridley, Fl. Malay Penins. 1 (1922) 300. – *Grewia blattaefolia* Corner, Gard. Bull. S.S. 10 (1939) 262; Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973) 399; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 442, *p.p.*; Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 733; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 355; Kochummen, Tree Fl. Pasoh (1997) 429. – *Microcos blattaefolia* (Corner) R.S.Rao, J. Bomb. Nat. Hist. Soc. 48 (1949) 300, *p.p.*; Turner, Gard. Bull. Sing. 45 (1993) 221, Gard. Bull. Sing. 47 (1995) 487; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 380. **Type:** *Maingay 3150* (= Kew Distr. No. 249), Peninsular Malaysia, Malacca (lecto K, here designated).

Distribution: Peninsular Malaysia, Singapore and Borneo (confined to Sarawak and Brunei).

Notes: *Microcos latifolia*, a highly variable species with respect to vegetative characters, is sometimes confused with *M. globulifera* from Peninsular Malaysia. Two rather distinct entities can be recognised. The first, represented by specimens collected from Peninsular Malaysia and Singapore are characterised by elliptic to broadly elliptic leaves with an acute or obtuse apex and impressed hairy midrib and secondary veins above; and the second by specimens from Sarawak and Brunei which have narrowly elliptic leaves with acuminate apex, and raised glabrous midrib and secondary veins above.

The name *Microcos latifolia* (Mast.) Burret (Burret, 1926: 781) is an illegitimate name because it was based on an illegitimate basionym (*Grewia latifolia* Mast., 1874, *non G. latifolia* Benth. & F.Muell, 1863). In accordance with the International Code of Botanical Nomenclature 2000 (St. Louis Code) Art. 58.3 with Ex. 2 (Greuter *et al.*, 2000), the correct name for the species is *Microcos latifolia* Burret with no parenthetic author citation.

The epithet of "*blattaefolia*" is not to be changed to "*blattifolia*" since Corner (1939) avowedly based it on *Blatta*, the Latin name for the cockroach used by Pliny, Vergil, Horace, etc., and has nothing to do with *Blatti* Adanson, a listed rejected name in the synonymy of *Sonneratia nom. cons.*

12. Microcos latistipulata (Ridl.) Burret

Microcos latistipulata (Ridl.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 795; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Turner, Gard. Bull. Sing. 47 (1995) 487; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324, *p.p.* – *Grewia latistipulata* Ridl., Bull. Misc. Inform., Kew (1924) 262, Fl. Malay Penins. 5 (1925) 293; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 444, *p.p.* (*excl. syn. M. crassifolia* Burret *et M. pachyphylla* Merr.); Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 356. **Type:** *Burkill SFN 7826*, Peninsular Malaysia, Selangor, Klang (holo K; iso SING).

Distribution: Sumatra, Peninsular Malaysia and Borneo.

Notes: A species with two recognised varieties: var. *latistipulata* is known only from Peninsular Malaysia and Borneo and var. *lanceolata* (Ridl.) Burret from Sumatra.

var. latistipulata

Distribution: Peninsular Malaysia and Borneo (confined to the east coast of Sabah).

Notes: *Microcos latistipulata* is characterised by the coriaceous and glabrous leaves, as well as by the distinctly sharply prominent midrib and secondary veins beneath, and glabrous pyriform fruits with pseudostalk. Specimens of var. *latistipulata* from Borneo differ from the Peninsular Malaysian ones by their glabrous lower part of the androgynophore (vs. stellate-hairy) and glabrous ovary (vs. stellate-hairy). However, the presence of a number of specimens with intermediate characters means that the populations in Peninsular Malaysia and Borneo should be grouped under var. *latistipulata*. Some of these intermediate specimens are: *Charington SAN 24716*, *Elmer 20310* and *Meijer SAN 25133*.

13. Microcos laurifolia (Hook.*f. ex* Mast.) Burret

Microcos laurifolia (Hook.*f. ex* Mast.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 771; Phengklai, Thai For. Bull., Bot. 16 (1986) 56, f. 25, Fl. Thailand 6, 1 (1993) 39, f. 25; Turner, Gard. Bull. Sing. 47 (1995) 487; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 381. – *Grewia laurifolia* Hook. *f. ex* Mast. *in* Hooker *f.*, Fl. Brit. India 1, 2 (1874) 392; King, J. As. Soc. Beng. 60, 2 (1891) 114; Baker *f.*, J. Bot. 62 (1924) 13; Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973) 399; Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 733; Kochummen, Tree Fl. Pasoh (1997) 429. **Type:** *Maingay 1647*, Peninsular Malaysia, Malacca (lecto K [with flower buds], here designated; isolecto K [with fruits]).

Distribution: India (*fide* Phengklai 1993), peninsular Thailand (*fide* Phengklai 1993), Sumatra, Peninsular Malaysia, and Borneo (confined to Brunei).

Notes: The specimen from Brunei (*Dransfield et al. JD 6825*) represents a new record of the species for Borneo. The young twigs, petioles, midrib and secondary veins of this specimen are covered with simple hairs (vs. glabrous, except for the sparsely minutely stellate-hairy petioles for the Peninsular Malaysian specimens).

Morphologically, *M. laurifolia* is closely allied to *M. florida* (Miq.) Burret and *M. loerzingii* Burret (from Sumatra), *M. pyriformis* (Elmer) Burret (from the Philippines) and *M. kinabaluensis* (from Borneo; see Chung (2003) for further details).

Microcos florida differs from *M. laurifolia* by its hairy sac-type domatia (vs. glabrous pocket-type), densely stellate-hairy ovary (vs. sparsely

covered with glandular trichomes in buds and less in flowers), fruits with a short remnant of style (vs. without a style remnant), endocarp of less than 0.5 mm thick (vs. 0.5–1 mm thick), and consistently 1 fertile pyrene (vs. 1–2).

Microcos laurifolia can be distinguished from *M. loerzingii* by its equilateral leaf base (vs. inequilateral, i.e. with halves or sides unequal in shape and size), thinner (1–1.5 mm) petioles (vs. *c.* 2 mm thick), sparsely simple- or minutely stellate-hairy petioles (vs. glabrous), ovary sparsely covered with glandular trichomes (vs. densely stellate-hairy), and glabrous style (vs. sparsely stellate-hairy).

From *M. pyriformis*, *M. laurifolia* differs by the concolourous subcoriaceous leaves (vs. discolourous chartaceous leaves), pyriform fruits with distinct pseudostalk (vs. obovoid without pseudostalk), smaller fruits 1.5–2 x 0.8–1.3 cm (vs. 2.5–3 x 1.8–2 cm), thinner (1–1.5 mm) mesocarp (vs. 4–6 mm thick), thinner (0.5–1 mm) endocarp (vs. 1–2 mm thick), consistently with 1–2 fertile pyrenes (vs. 1), and shorter (4–6 mm) fertile pyrenes (vs. 8–10 mm long).

Baker *f.* (1924), Ashton (1988) and Kessler *et al.* (1992) reported that *M. laurifolia* occurs in Palembang, Sumatra (specimens *Baker f. 3005* and *3146*), Sarawak (*Ridley s.n.*) and Kalimantan (*S 292*) respectively. However, during this study we could not locate these specimens in order to confirm their identity.

Ridley (1938) identified one collection from Sarawak (*Beccari PB 3473*) as that of *M. laurifolia*. Careful study of the specimen revealed that it belongs to *M. riparia*.

14. Microcos membranifolia R.C.K.Chung

Microcos membranifolia R.C.K.Chung, Kew Bull. 58 (2003) 336, fig. 3. **Type:** *Singh SAN 30672*, Borneo, Sabah, Sandakan, Sungai Binuang (holo KEP; iso K, SAN, SAR, SING).

Distribution: Endemic in Borneo (confined to Sarawak and Sabah).

15. Microcos opaca (Korth.) Burret

Microcos opaca (Korth.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 781; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66. – *Omphacarpus opacus* Korth. *in* Temminck, Verh. Nat. Gesch. Ned. Bezitt., Bot. 6 (1842) 193. – *Grewia opaca* (Korth.) Miq., Fl. Ind. Bat. 1, 2, 2 (1859) 204; Merrill, J. Str. Br. Roy. As. Soc., Spec.

No. (1921) 373; Masamune, En. Phan. Born. (1942) 449; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 446. **Type:** *Korthals s.n.*, Borneo, Kalimantan, Gunung Sakoembang (lecto L [no. 908.253.752], here designated; isolecto L [no. 908.253.767]).

Distribution: Endemic in Borneo (confined to Sarawak, Sabah and Kalimantan).

Notes: This species is sometimes confused with *M. henrici* subsp. *acuta* because of its leaf shape, inequilateral leaf blade, and flattened midrib above. *Microcos opaca* is sufficiently different in its inflorescence type, filament and style indumentum, ovary shape, and fruit shape. Additionally, it has acuminate leaves and the acumen with blunt tip.

16. Microcos ossea Burret

Microcos ossea Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 779; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 357; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324, *p.p.* – *Grewia ossea* (Burret) P.S.Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 446, *p.p.*; Anderson, Checkl. Trees Sarawak (1980) 338. **Type:** *Haviland 42*, Borneo, Sarawak, Kuching (lecto K [with flower buds and flowers], here designated; iso BO, K [with young and mature fruits], L [no. 908.254.267], SING).

Microcos paucicostata Burret, Notizbl. Bot. Gart. Berl.-Dahl. 12 (1935) 602; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358. **Type:** *Clemens 21071*, Borneo, Sarawak, Kapit (A, K, NY, SAR).

Distribution: Endemic in Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

Notes: In his original publication for the species, Burret (1926: 779) did not specify the collector and collection number of the type. However, under the distribution note, he stated that the species was described based on a specimen on loan from K collected from a small tree near Kuching on 2 March 1893. We have examined specimens deposited at BO, K, L, and SING and found that *Haviland 42* bears the same notes on the habit, locality and date of collection. Based on this, we concluded that *Haviland 42* is the type of *Microcos ossea* Burret and here designate it as such.

17. Microcos pachyphylla Merr.

Microcos pachyphylla Merr., Univ. Calif. Publ. Bot. 15 (1929) 187; Masamune, En. Phan. Born. (1942) 450. **Type:** *Elmer 21880*, Borneo, Sabah, Tawau (holo US; iso A, BO, K, L, NY, SING).

Distribution: Endemic in Borneo (confined to Sabah, Brunei and E Kalimantan). This species is common in Sabah and Kalimantan but rare in Brunei. In Sabah, it is found mainly in the east coast districts (Sandakan and Tawau), with one collection from Beaufort on the west coast.

Notes: *Microcos pachyphylla* is closely related to *M. crassifolia*. In both species the leaf is coriaceous and glabrous, the mesocarp is dorsilaterally ribbed, and the specimens of fruits are often infested with galls. The former, however, differs from the latter in having leaves shiny on both surfaces (vs. not shiny), short petioles of less than 12 mm long (vs. 7–18 mm long), and globose fruits (vs. ellipsoid or obovoid). Fruit galls, ovoid to broadly ovoid or occasionally ellipsoid to oblong and measuring (9–)12–14 x 9–12 mm, are often found in this species.

18. Microcos pearsonii (Merr.) Burret

Microcos pearsonii (Merr.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1927) 1171; Merrill, Univ. Calif. Publ. Bot. 15 (1929) 185; Masamune, En. Phan. Born. (1942) 450; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324. – *Grewia pearsonii* Merr., Philipp. J. Sci. 30 (1926) Bot. 83; Masamune, En. Phan. Born. (1942) 449; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 447. **Type:** *Wood 1216*, Borneo, Sabah, Kudat, Lingkongan River (holo UC [barcode UC 232336]).

Distribution: Endemic in Borneo (confined to Sarawak, Sabah, and Brunei).

Notes: The collections from Sarawak and Brunei have longer (9–15 mm long) and sparsely stellate-hairy petioles and differ from the "typical" collections from Sabah which have shorter petioles (2–7 mm long) and are densely stellate-hairy. A number of collections (e.g., *Dewol & Donggap SAN 129474* from Sabah and *Nielsen & Balslev 1109* from Brunei) have the secondary veins and tertiary venation impressed above which differ from those of the "typical" collections.

Microcos pearsonii, with its cordate leaf base, is distinctive among the Bornean species of *Microcos*. It is closely allied to *M. erythrocarpa* and *M. malayana* from Peninsular Malaysia, but differs from both by its cordate leaf base, type of indumentum of the twigs, veins, petioles, inflorescences and infructescences, and by its floral characters.

19. Microcos phaneroneura Burret

Microcos phaneroneura Burret, Notizbl. Bot. Gart. Berl.-Dahl. 12 (1934) 163; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66. **Type:** *Hallier 2868*, Borneo, Lianggagang (holo BO [with white specimen tag.; iso BO [without white specimen tag], SING).

Distribution: Endemic in Borneo (confined to Sarawak, Brunei and Kalimantan).

Notes: *Microcos phaneroneura* is closely related to *M. hirsuta* in the smooth twigs, basal pair of secondary veins reaching between ¼ and ½ the length of the blade and forming an angle of less than 45° from midrib, lanceolate petals, and smooth in the lower part of the androgynophore. However, the former differs from the latter by its chartaceous leaf (vs. subcoriaceous), sparsely simple- and stellate-hairy leaf above (vs. glabrous), impressed secondary veins and tertiary venation (vs. flattened), exclusively Type A panicles (vs. mixture), lanceolate involucral bract lobes of the outer whorl (vs. ovate), narrowly elliptic involucral bracts of the inner whorl (vs. oblanceolate), acuminate petals (vs. with shallow 2–3 teeth), and sparsely stellate-hairy lower part of the androgynophore with cylindrical side view (vs. glabrous with concave side view).

20. Microcos reticulata Ridl.

Microcos reticulata Ridl., Bull. Misc. Inform., Kew (1933) 490, *p.p.*; Masamune, En. Phan. Born. (1942) 450; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324. **Type:** *Creagh s.n.*, Borneo, Sabah (holo K; iso K).

Distribution: Sumatra and Borneo (Sarawak, Sabah, Brunei, and Kalimantan). Very common in Borneo.

Notes: Two sheets of *Creagh s.n.* collection (at flower-bud stage) were examined at K. The sheet with a white envelop and a determination slip by

J.R. Drummond is considered the holotype, while the other sheet without the envelop and Drummond's determination slip is the isotype.

Ridley (1933) cited specimen *Anderson 160* from Sarawak as belonging to *M. reticulata*. However, this specimen has elliptic leaves with an unequal base and pyriform fruits with narrowed pseudostalk, and thus matches well with *Haviland 1685* belonging to *M. stylocarpoides* Burret, a species restricted to Sarawak and Kalimantan.

21. Microcos riparia (Boerl. & Koord.) Burret

Microcos riparia (Boerl. & Koord.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 795; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241. – *Grewia riparia* Boerl. & Koord. *in* Koorders-Schumacher, Syst. Verz. 2 (1911) 35. **Type:** *Koorders 10450b*, Sumatra (holo BO).

Microcos ovato-lanceolata Burret, Notizbl. Bot. Gart. Berl.-Dahl. 12 (1934) 163, ***syn. nov.***; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66; Argent *et al.* (eds.), Man. Non-Dipt. Trees Centr. Kalimantan 2 (1997) 641. **Type:** *Hallier 1314*, Borneo, Kalimantan, Sungai Keniboeng (BO [3X]).

Distribution: Sumatra, Peninsular Malaysia (only recorded in Rompin FR, Pahang) and Borneo (confined to Sarawak and E Kalimantan, recorded in the area around Sungai Keniboeng, Sungai Kenepai, and Wanariset Research Institute).

Notes: Burret (1934) distinguished *Microcos ovato-lanceolata* from *M. riparia* solely by its lanceolate to ovate leaves with obtuse to rounded base (vs. broadly ovate with truncate base in *M. riparia*). Detailed study on the available specimens of both species showed that these distinguishing characters of the leaves intergrade. In addition, the fruits of the two species also possess many similar characters. In conclusion, *M. ovato-lanceolata* is here reduced to the synonymy of *M. riparia.*

Sterile specimens of *M. riparia*, especially those with small leaves, can be easily confused with *M. borneensis.* However, the latter can be distinguished by its glabrous older twigs and leaves, chartaceous leaves, and brown leaf colour when dried (see note under *M. borneensis*).

22. Microcos stylocarpoides Burret

Microcos stylocarpoides Burret, Notizbl. Bot. Gart. Berl.-Dahl. 12 (1934) 162; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1

(1990) 358; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66; Argent *et al.* (eds.), Man. Non-Dipt. Trees Centr. Kalimantan 2 (1997) 641 [cited as (*Grewia?*) *Microcos stylocarpoides* Burret]. **Type:** *Hallier 756*, Borneo, Kalimantan, Soemedoene (holo BO).

Distribution: Endemic in Borneo (confined to Sarawak and Kalimantan).

Notes: *Microcos stylocarpoides* is closely related to *M. henrici* subsp. *acuta*. In both taxa the leaves are subcoriaceous, elliptic or obovate, and with flattened midrib and secondary veins above. In addition, the side axes of the inflorescences bear bracteole and peduncle scars, the lower part of the androgynophore is obovate in side view, and the style is sparsely stellate-hairy for at least a quarter of its length. *Microcos stylocarpoides* differs from *M. henrici* subsp. *acuta* mainly in having obovoid flower buds (vs. narrowly oblong), linear sepals (vs. oblong), subglobose or broadly ellipsoid ovary without ridges (vs. ellipsoid with 6 distinct and sharp ridges), and pyriform fruits without ridges (vs. ellipsoid or obovoid with 6 distinct ridges).

23. Microcos subcordifolia R.C.K.Chung

Microcos subcordifolia R.C.K.Chung, Kew Bull. 58 (2003) 339, fig. 4. **Type:** *Kirkup & Thomas DK 727*, Borneo, Brunei, Tutong, Lamunin, Kampung Menangah (holo KEP [barcode 77837]; iso BRUN, KEP [barcodes 77838–77840]).

Distribution: Endemic in Borneo (confined to Sarawak and Brunei).

24. Microcos subepetala Stapf *ex* Ridl.

Microcos subepetala Stapf *ex* Ridl., Bull. Misc. Inform., Kew (1938) 228; Masamune, En. Phan. Born. (1942) 450. **Type:** *Haviland 1885*, Borneo, Sarawak, Kuching (holo K).

Distribution: Endemic in Borneo (confined to Sarawak and Sabah).

Notes: The species is characterised by its glabrous twigs, conspicuously small elliptic or ovate leaves, glabrous and subcoriaceous leaves with hardly prominent venation, 4–6(–8) secondary veins, dense Type A or Type B panicles, and glabrous ovary. Specimens from Sarawak consistently have four pairs of secondary veins and pocket-type domatia, while those from Sabah have 4–8 pairs of secondary veins and domatia are absent.

The species is closely related to *M. antidesmifolia* var. *hirsuta* in

leaf shape but can be distinguished by its subcoriaceous leaves with a pointed tip, densely flowered inflorescences, broadly obovoid flower buds, cup-shaped lower part of the androgynophore, and glabrous ovary.

25. Microcos sumatrana (Baker *f.*) Burret

Microcos sumatrana (Baker *f.*) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 783; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358; Kessler *et al.*, Checkl. Tree Fl. Balikpapan-Samarinda Area (1992) 66. – *Grewia sumatrana* Baker *f.*, J. Bot. 62 (1924) 13. **Type:** *Forbes 2684*, S Sumatra, Palembang, Batoe Pantjeh, Moesi River (lecto L [no. 908.140.744], here designated; isolecto L [nos. 908.140.1824, 409657]).

Distribution: Sumatra and Borneo (Sarawak, Sabah, Brunei, and Kalimantan).

Notes: See note under *M. gracilis.*

26. Microcos tomentosa Sm.

Microcos tomentosa Sm. *in* Rees, Cycl. 23, 2, 46 (1813) 2; Jack *in* Hooker, Bot. Misc. 1, 3 (1830) 281, *t.* 60; Don, Gen. Hist. 1 (1831) 551; Backer & Bakhuizen *f.*, Fl. Java 1 (1964) 393; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Phengklai, Thai For. Bull., Bot. 16 (1986) 52, f. 23; Phengklai, Fl. Thailand 6, 1 (1993) 37, f. 23; Turner, Gard. Bull. Sing. 47 (1995) 487. – *Grewia paniculata* Roxb. *ex* DC., Prodr. 1 (1824) 510; Blume, Bijdr. Fl. Ned. Ind 3 (1825) 115; Roxburgh, Fl. Ind. ed. 1832, 2 (1832) 591; Miquel, Fl. Ind. Bat. 1, 2, 2 (1859) 203; Masters *in* Hooker *f.*, Fl. Brit. India 1, 2 (1874) 393 (*excl. Ins.* Philipp.); King, J. As. Soc. Beng. 60, 2 (1891) 110; Pierre, Fl. Forest. Cochinch. 11 (1888) *t.* 153; Gagnepain *in* Lecomte, Not. Syst. 1 (1909) 131 (*excl. Ins.* Philipp.), *in* M.H.Lecomte, Fl. Indo-Chine 1, 5 (1911) 544; Koorders, Exkurs.-Fl. Java 2 (1912) 577; Koorders & Valeton, Bijdr. Boomsoort. Java 1 (1894) 225, Atlas Baumart. Java 2, 8 (1914) figs. 393 & 394; Ridley, Fl. Malay Penins. 1 (1922) 300; Kochummen *in* Whitmore, Tree Fl. Malaya 2 (1973) 397; Whitmore & Tantra, Tree Fl. Indon., Checkl. Sumatra (1986) 241; Corner, Wayside Trees Malaya 3rd edition, 2 (1988) 734. **Type:** *Roxburgh s.n. in Herb. EIC 1097B*, buds & fl., Peninsular Malaysia, Penang (holo K-W, photo; iso BR [barcode BR-S.P. 817069], photocopy).
Grewia blumei Hassk. *in* Hoeven & de Vriese, Tijdschr. Nat. Geschied. 12

(1845) 130; Miquel, Fl. Ind. Bat. 1, 2, 2 (1859) 203. **Type:** *Teijsmann s.n.*, Java (*n.v.*).

Grewia cumingiana Turcz., Bull. Soc. Natural. Moscou 1854, 31, 1 (1858) 231. **Type:** *Cuming s.n.*, Peninsular Malaysia (B†).

Distribution: Myanmar (*fide* Phengklai 1993), S China (*fide* Phengklai 1993), Indo-China (*fide* Phengklai 1993), Thailand, Sumatra, Peninsular Malaysia, Singapore, Java, Borneo, and the Philippines (*fide* Phengklai 1993). In Peninsular Malaysia, this species is common throughout except in the southern states.

Notes: *Microcos tomentosa* is a new record for Borneo with single collection from Kalimantan (*de Vriese 111* = L sheet nos. 899.300.63 & 899.300.64). It is closely related to *M. paniculata* in having peduncles, which arch out and droop, and in its curved-striate exocarp. However, the two species can be distinguished by characters of their leaves, flowers and fruits.

27. Microcos triflora (Blanco) R.C.K.Chung

Microcos triflora (Blanco) R.C.K.Chung, Kew Bull. 58 (2003) 346. – *Helianthemum triflorum* Blanco, Fl. Filip., ed. 2 (1845) 309, Fl. Filip., ed. 3, 2, 12/13 (1878) 208, *non Grewia triflora* (Bojer) Walp., Repert. Bot. Syst. 5, 1 (1845) 119; Merrill, Sp. Blancoan. (1918) 250. **Type:** *Sp. Blancoan. 864*, the Philippines, Luzon Laguna, Mt. Maquiling (neo US [barcode US 904559], "illustrative specimen" of Merr., Sp. Blancoan. (1918) 250, designated by Chung, 2003; isoneo L [no. 921.22.116], PNH†].

Grewia stylocarpa Warb. *in* Perkins, Fragm. Fl. Philipp. 1 (1904) 104; Gagnepain *in* Lecomte, Not. Syst. 1 (1909) 131; Merrill, Philipp. J. Sci. 1 (1906) Suppl. 90, Sp. Blancoan. (1918) 250, Enum. Philipp. Fl. Pl. 3, 1 (1923) 27; Anderson, Checkl. Trees Sarawak (1980) 338; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 447. – *Microcos stylocarpa* (Warb.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 780; Whitmore *et al.* (eds.), Tree Fl. Indon., Checkl. Kalimantan 2, 1 (1990) 358; Coode *et al.* (eds.), Checkl. Flow. Pl. Gymno. Brunei (1996) 324; Boer & Sosef *in* Sosef *et al.*, Pl. Resources of South-East Asia 5, 3 (1998) 381. **Syntypes:** *Warburg 11870*, the Philippines, N Luzon, Malunu (B†, PNH†); *Warburg 13072*, the Philippines, C Luzon, Tayabas, Sampaloc (B†, PNH†).

Distribution: Borneo, the Philippines and Sulawesi.

Notes: Two varieties are recognised in Borneo.

a. var. triflora

Distribution: Borneo (Sarawak, Sabah, Brunei, and Kalimantan), the Philippines and Sulawesi.

b. var. longipetiolata (Merr.) R.C.K.Chung

Microcos triflora (Blanco) R.C.K.Chung var. *longipetiolata* (Merr.) R.C.K.Chung, Kew Bull. 58 (2003) 347. – *Grewia stylocarpa* Warb. var. *longipetiolata* Merr., J. Str. Br. R. As. Soc. 76 (1917) 97; Merrill, J. Str. Br. Roy. As. Soc., Spec. No. (1921) 373; Ashton, Man. Non-Dipt. Trees Sarawak 2 (1988) 447. – *Microcos stylocarpa* (Warb.) Burret var. *longipetiolata* (Merr.) Burret, Notizbl. Bot. Gart. Berl.-Dahl. 9 (1926) 780; Merrill, Univ. Calif. Publ. Bot. 15 (1929) 186; Masamune, En. Phan. Born. (1942) 450. **Type:** *Villamil 243*, Borneo, Sabah, Kalabakan watershed (holo K; iso BO, SING, US).

Microcos havilandii Ridl., Bull. Misc. Inform., Kew (1938) 228; Masamune, En. Phan. Born. (1942) 450. **Type:** *Haviland 2332*, Borneo, Sarawak, Kapit, Rejang (A, K, SAR, SING).

Distribution: Endemic in Borneo (Sarawak, Sabah and Brunei).

Excluded species

Microcos longipetiolata Kosterm., Reinwardtia 6, 3 (1962) 301. **Type:** *Meyer SAN 19494* (holo K; iso SAN), Borneo, Sabah, Tawau, Tawau FR = *Scaphium longipetiolatum* (Kosterm.) Kosterm. (Sterculiaceae). See: Kostermans, Bull. Bot. Surv. India 7 (1965) 128.

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Identification list

The number after the collector numbers refers to the following *Microcos* taxa. When the number of the collection is not available or unknown then the dates or sheet numbers are mentioned between brackets.

1 = *M. antidesmifolia* var. *hirsuta*
2 = *M. borneensis*
3 = *M. cinnamomifolia*
4 = *M. crassifolia*
5 = *M. dulitensis*
6 = *M. fibrocarpa*
7 = *M. gracilis*
8 = *M. henrici* subsp. *acuta*
9 = *M. hirsuta*
10 = *M. kinabaluensis*
11 = *M. latifolia*
12 = *M. latistipulata* var. *latistipulata*
13 = *M. laurifolia*
14 = *M. membranifolia*
15 = *M. opaca*
16 = *M. ossea*
17 = *M. pachyphylla*
18 = *M. pearsonii*
19 = *M. phaneroneura*
20 = *M. reticulata*
21 = *M. riparia*
22 = *M. stylocarpoides*
23 = *M. subcordifolia*
24 = *M. subepetala*
25 = *M. sumatrana*
26 = *M. tomentosa*
27a= *M. triflora* var. *triflora*
27b= *M. triflora* var. *longipetiolata*

Aban SAN 29557: 9; SAN 30365: 3; SAN 30400: 3; SAN 30437: 16; SAN 30444: 17; SAN 30445: 16; SAN 30468: 18; SAN 30494: 9; SAN 30536: 27a; SAN 30545: 3; SAN 30547: 17; SAN 31186: 17; SAN 31201: 8; SAN 31231: 27a; SAN 31309: 17; SAN 32411: 9; SAN 32433: 3; SAN 32527: 1; SAN 33028: 18; SAN 33039: 20; SAN 34126: 1; SAN 35880: 17; SAN 35959: 3; SAN 55485: 14; SAN 66719: 20; SAN 66758: 27a; SAN 66935: 9; SAN 73775: 27a; SAN 76683: 12; SAN 92479: 20; SAN 94313: 14; SAN 100338: 20 – Aban & Dewol SAN 91619: 27a – Aban & Minjulu SAN 79677: 9; SAN 79825: 18; SAN 79830: 9 – Aban & Kodoh SAN 81001: 1; SAN 81033: 1 – Aban & Nordin SAN 47739: 20 – Aban & Patrick SAN 73669: 27a; SAN 74285: 17 – Aban & Saikeh SAN 79374: 9 – Aban & Soinin SAN 66340: 4; SAN 66898: 27b – Aban *et al.* SAN 66886: 20 – Abang Daud S 433: 7 – Abang Mohtar S 53957: 18 – Abang Mohtar & Yii S 66193: 19; S 66199: 4; S 66238: 19 – Abang Mohtar *et al.* S 49273: 19; S 47121: 20; S 49546: 8; S 49589: 16; S 51418: 1 – Abdul Karim SAN 80225: 1 – Abdul Latiff ALM 2911: 8 – Abdul Rahim SAN 92971: 9 – Agam SAN 37215: 12 – Agam & Aban SAN 40859: 8; SAN 40875: 9; SAN 40876: 18; SAN 41604: 1 – Agama 555: 17 – Agama & Kadir SAN A 3505: 9 – Ahmad SAN 50547: 20; SAN 52763: 9; SAN 54858: 27a; SAN 54951: 27a; SAN 55004: 7; SAN 68343: 27a; SAN 70522: 12; SAN 70547: 14 – Ahmad & Latip SAN 52523: 27a; SAN 52525: 14; SAN 52532: 27a; SAN 52540: 27a; SAN 52545: 27a; SAN 52570: 14; SAN 52574: 27a – Ahmad & Nordin SAN 48967: 1 – Ahmad & Sairin SAN 59520: 17 – Ahmad & Termiji SAN 67973: 8; SAN 68352: 20 – Allen 630: 1 – Ahmad Zainuddin *et al.* AZ 4861: 25 – Aloysius SAN 78567: 14 – Ambri & Arifin W 382: 21; W 524: 21 – Amin SAN 105194: 16; SAN 106128: 1; SAN 111510: 20; SAN 126416: 3; SAN 126618: 3; SAN 127039: 16; SAN 132040: 27a – Amin & Jarius SAN 116411: 20 – Amin & Lideh SAN 70341: 4; SAN 110480: 3 – Amin & Matin SAN 108057: 9 – Amin & Sigin SAN 111693: 12 – Amin & Zainuddin SAN 117380: 27a – Amin, Ismail & Hassan SAN 113604: 9 – Amin *et al.* SAN 59499: 1; SAN 67317: 4; SAN 69495: 14; SAN 69989: 9; SAN 107147: 9 – Amir & Jafar SAN 40989: 9 – Ampuria SAN 19092: 4; SAN 32671A: 4; SAN 32764: 9; SAN 32855: 9; SAN 32873: 8; SAN 35309: 9; SAN 36501: 20; SAN 41262: 6; SAN 41274: 20 – Anak SAN 24870: 1 – Anderson 160: 22; S 4027: 7; S 4067: 8; S 14709: 18; S 15956: 2; S 19135: 22; S 25147: 3 – Anderson & Ilias S 28502: 8 – Anderson & Keng K 70: 8 – Argent & Amiril 9380: 1 – Argent *et al.* 93195: 15 – Ariffin *et al.* ARK 7: 9; BRUN 16876: 27a; BRUN 17460: 11; BRUN 17468: 3; BRUN 17720: 27b; BRUN 18257: 3 – Asah BRUN 3132: 3 – Ashton BRUN 31: 17; BRUN 62: 3; BRUN 155: 9; BRUN 248: 25; BRUN 476: 16; BRUN 5505: 3; S 17622: 9; S 17800: 20; S 17946: 11; S 17956: 2; S 18198: 27b; S 18416: 27b; S 19788: 19; S 5936: 3 – Asik SAN 104276: 9; SAN 115802: 9 – Atkins *et al.* SA 433: 9; SA 460: 20; SA 504: 9 – Au S 17270: 11 – Awang Ahmad SAN 133138: 27a – Awang Enjah S 81830: 20 – Awang Safri S 9648: 16.

Bakar SAN; 17312: 18; SAN 24963: 27a – Banang SAN 36915: 9; SAN 36925: 20; SAN 49356: 3; SAN 52059: 12; SAN 54076: 8 – Banyeng S 22029: 27a – Banyeng & Dami S 43677: 15 – Banyeng & Jugah S 26703: 7 – Barttett *s.n.* (23/05/1893): 7 – Beccari PB 1617: 3; PB 1804: 3; PB 1993: 22; PB 3217: 3; PB 3473: 21 – Benang S 26117: 18 – Bernstein JHB 307: 3 – Binson SAN 62956: 27a – Binson & Lasan SAN 53179: 3 – Blicher & Rantai S 57925: 8 – Bongsu SAN 62905: 27a– Bousi *et al.* SAN 123779: 27b; SAN 123787: 27b – Brain S 14480: 11 – Brand SAN 21466: 17; SAN 30984: 4; SAN 30991: 12 – Brunig S 7440: 2 – Bujang S 12988: 16; S 20851: 2; S 20870: 2 – Bukah SAN A 3416: 14 – Buntar SAN 25864: 9; SAN 27286: 16 – Burgess & Charington SAN 19110: 14 – Burley *et al.* 2413: 9; 2935: 9; NGS 407: 15; NGS 428: 1; NGS 484: 9; NGS 2307: 9; NGS 2356: 16; NGS 2392: 16; NGS 2824: 15; NGS 2900: 22; NGS 3018: 15; NGS 3243: 22; NGS 3248: 20 – Burkill SFN 7826: 12.

Campbell SAN 112325: 20 – Campbell EG 323: 20 – Carr SFN 26541: 1 – Castro 3792: 15; Castro SAN A 819: 1 – Chai S 19274: 1; S 34080: 8; S 34667: 1; S 34769: 8; S 36100: 19; S 36174: 8; S 37226: 18; S 39657: 1; SAN 21682: 27a; SAN 25958: 8; SAN 26066: 7; SAN 26106: 20; SAN 26107: 18; SAN 26983: 27a; SAN 29304: 9; SAN 29660: 27a; SAN 29712: 27a; SAN 29741: 12; SAN 29824: 27b; SAN 31668: 9; SAN 33360: 18 – Chai & Ilias S 31118: 27b; S 31504: 4; S 31534: 9 – Chai *et al.* S 68827: 1 – Charington SAN 24680: 1; SAN 24716: 12; SAN 26354: 27b; SAN 29852: 3 – Chew & Corner RSNB 4216: 10; RSNB 4994: 10 – Chew *et al.* 33: 9; 100: 27a; 534: 9; 1468: 27b – Chin CSC 2688: 20; KLU 2536: 19 – Chow SAN 75346: 8; SAN 75663: 8 – Chow & Leopold SAN 76407: 10 – Chung FRI 40317: 7; FRI 40318: 3; FRI 40338: 12 – Chung & Banyeng FRI 40315: 16; FRI 40316: 16; FRI 40319: 16; FRI 40321: 4; FRI 40324: 16; FRI 40325: 16; FRI 40329: 16; FRI 40330: 16; FRI 40332: 4; FRI 40333: 16 – Chung & Dewol FRI 40335: 4; FRI 40339: 9; FRI 40340: 27a; FRI 40341: 1; FRI 40343: 4 – Church *et al.* 214: 1; NSF 13: 1; NSF 21: 16; NSF 26: 8; NSF 88: 16; NSF 299: 1; NSF 318: 8; NSF 495: 16 – Clemens 20154: 20; 21071: 16; 27284: 9; 28828: 10; 31148: 27a – Cockburn SAN 68472: 12; SAN 70041: 14; SAN 83330: 27b; SAN 85050: 12; SAN 85115: 20 – Coode MC 7716: 3 – Coode *et al.* MC 7923: 4; MC 6776: 7; MC 6914: 11; MC 7110: 9; MC 7865: 1 – Creagh *s.n* (8/1895): 20; *s.n.* (5/1895): 1 – Cuadra SAN A 2278: 12; SAN A 2290: 14.

Dagang SAN A 2751: 27a – Daim DA 507: 18; DA 754: 18 – Dan S 16505: 4 – Daud & Tachun SFN 35631: 16; SFN 35719: 22 – David S 10109: 20 – Dayang Awa & Ilias S 45267: 20; S 45291: 22; S 45589: 25; S 45620: 20; S 45689: 16; S 48783: 19 – Dayang Awa & Lee S 47855: 27a; S 50065: 16 – Dayang Awa & Othman S 47035: 11 – De Vogel 856: 15; 885: 15 – De Vriese 111: 26 – Dewol SAN 55979: 12; SAN 71503: 9; SAN 78341: 14; SAN 78492: 27a; SAN 80920: 27b; SAN 83791: 20; SAN 87969: 9; SAN 90341: 9; SAN 90450: 9; SAN 92192: 25; SAN 99477: 3; SAN 129459: 20; SAN 129540: 8 – Dewol & Alexius SAN 88397: 20 – Dewol & Donggop SAN 109282: 1; SAN 129474: 18 – Dewol & Karim SAN 80256: 1 – Dewol & Kodoh SAN 89316: 25 – Dewol & Petrus SAN 89581: 3 – Dewol & Termiji SAN 78247: 3 – Dewol *et al.* SAN 69909: 14; SAN 71196: 20; SAN 74951: 4; SAN 109631: 9; SAN 124624: 8 – Dransfield *et al.* JD 6825: 13; JD 7224: 25; JD 7243: 25; JD 7252: 3; JD 7255: 20; JD 7376: 3.

Egon F 591: 16 – Elmer 20135: 12; 20310: 12; 20911: 1; 21043: 3; 21094: 3; 21315: 9; 21365: 3; 21463: 18; 21591: 27b; 21704: 17; 21880: 17 – Enchai FMS 49060: 27a – Endert 1844: 7 – Enggoh FMS 48988: 1; SAN 10541: 9 – Evangelista 761: 12 – Everett KEP 104926: 11.

Fabia SAN A 4002: 27a – Fidilis SAN 68758: 25; SAN 82152: 1; SAN 87322: 9; SAN 89811: 9; SAN 94782: 9; SAN 94800: 3; SAN 94856: 20; SAN 94895: 27a; SAN 95781: 25; SAN 95849: 9; SAN 95989: 9; SAN 96048: 9; SAN 103490: 9; SAN 110238: 20; SAN 116748: 27b; SAN 118738: 1; SAN 118812: 1; SAN 129982: 1; SAN 131539: 3; SAN 135832: 9; SAN 135972: 20; SAN 136883: 8 – Fidilis & Asik SAN 96375: 1; SAN 110139: 16 – Fidilis & Awang SAN 79236: 16 – Fidilis & Soludi SAN 105336: 16 – Fidilis & Sumbing SAN 68804: 9; SAN 88219: 18; SAN 88232: 1; SAN 88333: 14; SAN 88493: 27a; SAN 89710: 14; SAN 91405: 9; SAN 91491: 3; SAN 91758: 9; SAN 91832: 27a; SAN 101394: 9; SAN 114013: 20; SAN 125445: 16 – Forbes 2684: 25 – Forman & Blewett LLF 1053: 23 – Francis SAN 42870: 10.

Galau S 15645: 3 – Gambio SAN 117552: 12 – Gambio *et al.* SAN 133700: 7 – Geh & Samsuri GSY 402: 20 – George SAN 121786: 9; SAN 128807: 9 – George & Joseph SAN 130782: 9 – George *et al.* SAN 120513: 14; SAN 120978: 25; SAN 138330: 9 –

Good SAN 118088: 27a.

Hallier 756: 22; 1314: 21; 1833: 20; 1965: 21; 2208: 21; 2868: 19; 3020: 8 – Harvey & Melegrito SH 10129 (= FMS 48903): 8 – Hashim SAN 33463: 3 – Hassan SAN A 3702: 27a – Haviland c.c.m.a. (= 42): 16; c.l.v.n. (= 43): 11; *s.n.*: 11; *s.n.* (L sheet no. 908.254.234): 16; *s.n.* (10/02/1894): 16; *s.n.* (10/09/1894): 7; *s.n.* (18/09/1894): 7; 42 bis: 16; 1471: 9; 1509: 7; 1683: 7; 1685: 22; 1742: 7; 1885: 24; 2256: 3; 2332: 27b; 2837: 2 – Hemingway *et al.* CAH 80: 27b – Hose 626: 8.

Idris *et al.* BRUN 15652: 11 – Ignasius SAN 138762: 17 – Ilias S 13349: 19; S 15570: 4; S 15890: 16; S 16342: 15; S 22901: 16; S 25762: 16; S 26022: 1; S 26185: 22; S 26904: 3; S 28128: 19; S 28428: 19; S 36373: 23; S 36520: 8; S 39118: 20; S 39135: 15; S 39144: 1; S 39248: 7; S 41035: 8; S 42089: 25; S 42480: 20; S 43423: 19; S 44192: 19; S 45121: 8 – Ilias & Azahari S 35654: 4; S 35685: 1 – Ilias & Dami S 45004: 19 – Ilias & Yeo S 38372: 11 – Imbungan & Patrick SAN 74182: 14.

Jacobs 5120: 16; 5122: 9 – Jahudin SAN 70467: 17; SAN 70476: 17; SAN 70478: 17; SAN 71653: 20; SAN 71720: 8; SAN 71785: 14 – James SAN 19045: 12; SAN 34937: 12; SAN 34965: 9; SAN 35490: 27a; SAN 40057: 17; SAN 40185: 1 – James *et al.* S 33746: 16; S 34506: 16; S 35089: 22 – Joffre *et al.* BRUN 16539: 11; BRUN 16554: 18; BRUN 17508: 18; BRUN 17533: 20; BRUN 17872: 9; BRUN 17876: 16 – Johari SAN 59641: 27a – Joseph SAN 116938: 20 – Joseph & Lideh SAN 116883: 20; SAN 133008: 27a – Joseph & Tuyuk SAN 119049: 9 – Joseph *et al.* SAN 113585: 1; SAN 123817: 12 – Jugah S 23857: 19; S 27756: 20 – Julius SAN 89414: 27a; SAN 119348: 27a; SAN 124172: 9; SAN 131043: 9; SAN 132992: 9 – Julius *et al.* SAN 124169: 20 – Jusimin JD 376: 8.

Kadir SAN A 2893: 1 – Kadir & Jiran SAN A 3367: 14 – Kamarudin *et al.* RC 97: 6 – Kamideh SAN 66590: 27a – Kanis & Ding SAN 49318: 27a – Kanis & Sinanggul SAN 49337: 27a – Kapis SAN 46952: 3; SAN 46966: 3; SAN 46969: 3; SAN 46970: 3; SAN 46975: 3; SAN 46978: 3; SAN 46979: 3 – Kartawinata 696: 8; 815: 1; 963: 15 – Kessler SAN 118158: 9 – King's Collector 10185: 1 – Kinted SAN 15873: 27a – Kirkup & Thomas DK 727: 23 – Kirkup *et al.* 323: 27a; DK 259: 3; DK 314: 16; DK 427: 3; DK 855: 9; DK 935: 9 – Kloss 19086: 20 – Kodoh SAN 87736: 12; SAN 87777: 20 – Kodoh & Aban SAN 81928: 20 – Kokawa & Hotta 480: 20; 696: 14 – Koorders 10450b: 21 – Korthals 489 (L sheet nos. 899.216.268, 899.216.269): 15; *s.n.* (L sheet nos. 899.310.11, 899.310.12, 908.253.178, 908.253.200, 908.253.341, 908.253.342, 908.253.353, 908.253.357, 908.253.358, 944.56.122, 944.56.123, 944.56.124): 9; *s.n.* (L sheet nos. 908.253.752, 908.253.767): 15 – Kostermans 4243: 20; 5095: 15; 5797: 3; 6004: 27a; 6488: 1; 6918: 27a; 7075: 3; 7280: 1; 7574: 8; 8715: 8; 8792: 16; 9635: 16; 9643: 20; 9729: 8; 10076: 17; 10118: 17; 10184: 7; 10424: 8; 12681: 8; 13466: 15; 13593: 3; 13603: 20; 21765: 8 – Kram S 1207: 4 – Kumin SAN 43119: 12; SAN 70570: 20; Kuripin SAN 25776: 6 – Kuzza *s.n.* (04/1976): 25.

Lai *et al.* S 68522: 3; S 74043: 8; S 72424: 24; S 75359: 8 – Lajangah SAN 28767: 27a; SAN 32261: 27b; SAN 47796: 18 – Lakasing SAN 70167: 8 – Lee S 39337: 3; S 39406: 11; S 41852: 20; S 43227: 15; S 52308: 1; S 54670: 19; SAN A 3107: 4 – Leopold SAN 33167: 12; SAN 33236: 9; SAN 36755: 17; SAN 47165: 27a; SAN 53133: 16; SAN 63511: 17; SAN 63533: 20; SAN 73622: 14; SAN 76003: 4; SAN 78703: 20; SAN 81477: 12; SAN 81483: 8; SAN 81584: 9; SAN 83567: 27a; SAN 89505: 1; SAN 91142: 9; SAN 92040: 25; SAN 102192: 18; SAN 107940: 9; SAN 112940: 12; SAN 124404: 24; SAN 133490: 9;

SAN 133902: 9 – Leopold & Amin SAN 75368: 1; SAN 75372: 25 – Leopold & Dewol SAN 60146: 20; SAN 60220: 1; SAN 74343: 20 – Leopold & Ismail SAN 108606: 18; SAN 108636: 9; SAN 108678: 12 – Leopold & Kodoh SAN 81359: 9; SAN 81426: 9; SAN 81557: 20; SAN 81567: 9 – Leopold & Patrick SAN 72589: 27a; SAN 72636: 20; SAN 72650: 12; SAN 72680: 8 – Leopold & Pitty SAN 58956: 27a – Leopold & Saikeh SAN 82587: 20 – Leopold & Sigin SAN 111472: 18 – Leopold *et al.* SAN 73816: 12; SAN 73840: 12; SAN 73847: 20; SAN 114525: 20; SAN 133907: 9 – Lorence LL 540: 27a; LL 714: 14.

Mahyar *et al.* 966: 6; 1123: 1; 1190: 15; NSF 786: 9 – Maikin & Tuyuk SAN 117531: 9 – Maikin *et al.* SAN 132177: 20; SAN 132950: 27a – Maingay 1080: 6; 1647: 13; 3150: 11 – Manis & Salang S 41592: 19 – Mansus & Aban SAN 69232: 20 – Mansus & Dewol SAN 109240: 14 – Mansus *et al.* SAN 122293: 1 – Matin SAN 103515: 1 – Masirom SAN 43174: 14 – Meijer 2116: 1; 2146: 20; 2181: 16; 2228: 16; 2264: 20; 2525: 8; SAN 19169: 1; SAN 19539: 8; SAN 20042: 3; SAN 21216: 27a; SAN 21235: 9; SAN 25133: 12; SAN 25377: 1; SAN 29500: 9; SAN 42493: 27a; SAN 44072: 27a; SAN 48135: 27a; SAN 51184: 3; SAN 53551: 14 – Meijer & Brand SAN 20068: 27a – Meijer & Patrick SAN 57476: 12 – Meijer & Pereira SAN 47225: 18 – Meijer & Singh SAN 24791: 17 – Meijer *et al.* SAN 122556: 9 – Mendoza FMS 36793: 9 – Mikil SAN 30229: 27a; SAN 30339: 1; SAN 31390: 12; SAN 42061: 20; SAN 44334: 27b; SAN 46721: 27a – Minjulu SAN 77092: 16 – Mogea & de Wilde 4347: 16 – Mohd. Haslani HA 26: 20; HA 36: 16 – Motley 1260: 27a – Muas S 13354: 16; S 13388: 3 – Mukmin SAN 35601: 9; SAN 35613: 9; SAN 35614: 27a.

Nahar S 12662: 15 – Native 874: 9 – Native Collector 140: 2; 181: 7; 237: 7; 873: 7; 2505: 15 – Nedi 721: 17 – Neth. Ind. For. Service bb. 16252: 17; bb. 28325: 17 – Nicholson & Patrick SAN 17045: 3; SAN 17707: 17 – Nielsen & Balslev 1006: 16; 1109: 18 – Niga BRUN 15479: 3; NN 118: 23 – Niga *et al.* BRUN 15212: 11; BRUN 15448: 11; BRUN 15599: 9; BRUN 16779: 25 – Norasmah SAN 116487: 9 – Nordin SAN 46189: 27b; SAN 46256: 8; SAN 46317: 9; SAN 46332: 18; SAN 54500: 27b; SAN 54589: 9; SAN 85671: 8; SAN 85786: 1 – Nordin & Ali SAN 54447: 9.

Ong OHC 716: 19 – Othman S 19944: 19; S 21354: 8; S 37444: 22 – Othman & Rantai S 57464: 16 – Othman *et al.* S 41351: 1; S 41483: 16; S 43361: 9; S 49042: 20; S 57187: 20; S 57801: 16; S 65469: 2.

Patrick SAN 20608: 17; SAN 21442: 16; SAN 23409: 12; SAN 39474: 3; SAN 65608: 12; SAN 92077: 27a – Patrick & Leopold SAN 53031: 14; SAN 53038: 27a – Patrick & Kadir SAN A 1852: 12 – Patrick & Matin SAN 116781: 14 – Patrick & Nicholson SAN 17701: 3 – Pereira SAN 43432: 27a – Pereira *et al.* JTP 248: 20; JTP 421: 9 – Pickles S 3680: 5; S 3689: 5 – Pitty SAN 55164: 12; SAN 55748: 1; SAN 58975: 27a; SAN 59795: 9 – Pitty & Binson SAN 61723: 12 – Pitty *et al.* SAN 61620: 17 – Pius SAN 108939: 9; SAN 117717: 14 – Pius & Suali SAN 117725: 9 – Primack S 42409: 16 – Puasa A 3991: 12; CF 4627: 20; SH 10104 (= FMS 48878): 27b; SAN 36769: 12 – Prot SAN 32310: 27a; SAN 32345: 27a; SAN 32376: 27a – Purseglove & Mohd. Shah P 4503: 11; P 4577: 24.

Ramos 1438: 12; 1704: 4 – Rantai *et al.* S 66605: 16; S 66622: 16 – Richards 1129: 9; 1767: 5 – Ridsdale 1926: 27a – Robinson SAN A 1: 4 – Roxburgh *s.n.* (in Herb. EIC 1097B): 26.

Sabana 5: 20; SAN 49708: 10 – Saigol SAN 93053: 9; SAN 93093: 25 – Saikeh SAN 64759: 1; SAN 69276: 27a; SAN 69284: 20; SAN 69287: 3; SAN 72053: 20; SAN 72193: 1; SAN 75493: 12; SAN 82369: 9; SAN 82384: 20; SAN 83183: 27a; SAN 87805: 14; SAN 87867: 14 – Saikeh & Leopold SAN 74478: 27a – Salleh *et al.* BRUN 15315: 17; BRUN 16834: 9; BRUN 16853: 16 - Sani SS 629: 3; SS 664: 27a – Sarawak Museum Series 165 (= Sarawak Museum T, 2, 3): 11; 171: 7; 763: 7 – Sauveur 90: 20 – Sawan SAN 120370: 1; SAN 128068: 9 - Sayu SAN 35600: 9 – Shea SAN 75215: 27a; SAN 75223: 27a; SAN 75615: 9 - Shea & Chow SAN 75703: 27a; SAN 75717: 8 - Sibat S 21727: 8; S 21790: 16; S 21976: 1; S 22544: 8; S 22822: 27b; S 23033: 18; S 24381: 18; S 24508: 11; S 24565: 16; S 25179: 1 – Sidiyasa *et al.* BRF 1790: 16; PBU 620: 8 – Sie S 35468: 9 - Sigin SAN 95034: 9 – Sigin & Amin SAN 67559: 20 - Sigin & Joseph SAN 97151: 8 – Sigin *et al.* SAN 66534: 9; SAN 107409: 20; SAN 107703: 25 – Sinanggul SAN 51308: 20; SAN 54546: 12; SAN 56183: 20; SAN 56975: 16; SAN 57061: 27a; SAN 57105: 9; SAN 57303: 9; SAN 58036: 12; SAN 58042: 27a; SAN 58127: 27a; SAN 58128: 27a; SAN 58142: 27a; SAN 58160: 27a – Sinclair & Kadim S 10287: 20 – Singh SAN 22765: 17; SAN 22801: 17; SAN 24003: 27a; SAN 24232: 20; SAN 29960: 17; SAN 29976: 27a; SAN 30100: 17; SAN 30672: 14; SAN 30685: 9; SAN 30716: 27b; SAN 30724: 1; SAN 30735: 27b; SAN 30738: 27b; SAN 31096: 12; SAN 34729: 9; SAN 34745: 27a; SAN 53452: 27b; SAN 58758: 20 - Singh & Aban SAN 29970: 17; SAN 29989: 18; SAN 29990: 1; SAN 30027: 1; SAN 30135: 18 – Singh & Hui SAN 30656: 27a - Singh & Noordin SAN 48402: 9 – Singh *et al.* SAN 48870: 20 – Smythies S 12632: 25 – Smythies *et al.* S 5877: 2 – Soegang 744: 17; 751: 17 – Soepadmo & Chai S 27611: 20 - Sow KEP 80180: 1 - Stevens *et al.* 402: 12 – Stone SAN 85179: 12 – Students *s.n.* (08/1971): 26 – Suah SAN 36318: 1; SAN 37418: 9 - Suali SAN 117571: 9 – Sugau JBS 242: 9; SAN 145223: 18 – Suhaili *et al.* BRUN 17437: 7; BRUN 18028: 3 – Suib S 23458: 27b – Sumbing SAN 101452: 9; SAN 103566: 9; SAN 106907: 8; SAN 107041: 9; SAN 115844: 1; SAN 118376: 20; SAN 118533: 3; SAN 118684: 20; SAN 122040: 20; SAN 125305: 9; SAN 128267: 8; SAN 128519: 9; SAN 129924: 3; SAN 135695: 27b – Sumbing & Asik SAN 110245: 3; SAN 110869: 8; SAN 112958: 8.

Taib SAN 45165: 12 – Taleon 144: 8; KEP 55316: 8 – Talib SAN 84566: 1; SAN 84817: 3 – Talip & Ejan SAN 85704: 14 – Tan S 37480: 3 – Tay & Mohd. Shah 176: 27b – Tay & Othman 93-1113: 8 – Tay *et al.* 91-7: 6 – Teijsmann 10911: 9; 10914: 9; HB 3658: 9 – Termiji SAN 72872: 9; SAN 76378: 12; SAN 81296: 27a; SAN 81538: 12; SAN 82860: 8; SAN 85473: 24; SAN 90878: 12 – Termiji & Ali SAN 82931: 8; SAN 82937: 1 – Termiji & Bongsu SAN 75885: 10; SAN 75820: 4 – Termiji & Dewol SAN 80036: 3 – Termiji & Paul SAN 87643: 1 – Tiggi S 3311: 2 – Tingguan SAN 18791: 1 – Tong S 33866: 16; S 34324: 16; S 34916: 3; S 35005: 20; S 35035: 18; S 36536: 11; S 36584: 27b – Tong *et al.* S 34310: 15 – Tuah & Chai SAN 58709: 3 – Tuke P1-1005: 8.

Unknown FMS 25500: 6; FMS 34444: 20; FMS 34460: 3; SAN 44881: 12.

Veldkamp 8139: 9; 8292: 7; 8530: 8 – Villamil 243: 27b.

Wilkie 9544: 9 – Winkler 735: 8 – Wong SAN 68153: 12; SAN 68160: 4; WKM 379: 16; WKM 704: 19; WKM 1244: 27b; WKM 1290: 16; WKM 1544: 9; WKM 1545: 11; WKM 1564: 7; WKM 1947: 1; *s.n.* (03/10/1988): 3 – Wood 1216: 18; 1281: 18; 1989: 17; 2273: 27a; SAN 15063: 3; SAN 15174: 3; SAN 15278: 17; SAN 16126: 1; SAN A 1980: 1; SAN A 1992: 3; SAN A 2913: 9; SAN A 3682: 1; SAN A 3963: 27a; SAN A 4047: 27a; SAN A 4709: 14; SAN A 4723: 20; SAN A 4730: 12; SAN A 4788: 20; SAN A 4840: 1 – Wood

1216: 18 – Wood & Charington SAN 16511: 27a – Wood & Kadir SAN 17212: 27a – Wood & Kapis SAN 16928: 3 – Wood & Wyatt-Smith SAN A 4290: 12 – Wright S 23891: 19; S 27985: 6; S 29113: 18.

Yahud *et al.* S 61960: 1; S 82558: 2 – Yap SAN A 716: 12 – Yii S 37887: 9; S 41139: 15; S 42004: 16; S 45938: 16; S 55824: 27a; S 61492: 14 – Yii & Alex S 66403: 16 – Yii & Shalih S 64337: 16 – Yii *et al.* S 37752: 7; S 49164: 27a.

Zain SAN 61339: 27a; SAN 64703: 27a.

Index

The accepted names are in roman type, the synonymy and excluded names in *italics*. The numbers after the names refer to the numbered species in this synopsis; (gen) = taxa listed under the generic synonyms; (ag) = accepted taxa listed under the genus; (x) = excluded taxa.