

## A Checklist of *Merremia* (Convolvulaceae) in Australasia and the Pacific

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### Abstract

A checklist of *Merremia* species is presented for Australasia and the Pacific. In total, 49 species are enumerated here. Total numbers of species are estimated by region and for the genus as a whole. Comments on the systematics and taxonomy of the genus are reported and several problematic species complexes are identified. An index of numbered specimens examined is included to facilitate curation and identification of herbarium specimens.

### Introduction

The generic name *Merremia* was published as a *nomen nudum* by Dennstedt (1818: 12, 23, 34) and several modern floras attribute the valid publication of the name to Hallier (1893). Validation was provided substantially earlier, however, by Endlicher (1841) and both *Index Nominum Genericorum* and the current International Code of Botanical Nomenclature note this fact, as well as the status of *nomen conservandum* for *Merremia*. The genus has been recognized at times, and merged into *Ipomoea* at other times, ever since the concept was first established. Following the publication of Hallier's (1893) classification for the family, in which he noted a pollen difference between *Ipomoea* (spinulose pollen grains) and *Merremia* (non-spinulose grains) that was given considerable importance in recognizing subfamilial and tribal groupings, the genus *Merremia* gradually gained wider acceptance and by the mid-twentieth century was almost universally accepted in floras world-wide.

Recent molecular analysis (Stefanovic *et al.*, 2002, 2003) strongly indicates that *Merremia* is a polyphyletic genus, a fact that was already suggested by a comprehensive survey of pollen morphology (Ferguson *et al.*, 1977). In a family where one, or at most two, pollen types are typical for a genus, the five pollen types documented for *Merremia* are indicative that the genus is a mixed assemblage of species.

*Merremia* has long proven to be difficult to characterize as a genus, with no single morphological character that can be used to recognize it. O'Donnell (1941) proposed infrageneric groupings based on his revision of the American species; these sections were adopted by Van Ooststroom and Hoogland (1953) for Malesia, with the addition of one new section, *Wavula*. Later, two species with non-spinose, pantoporate pollen grains were segregated from *Merremia* as the new genus *Xenostegia* (Austin & Staples, 1980); although this genus has not been universally accepted, particularly in African floras, the molecular data supports the segregation and indicates that *Xenostegia* is sister group to the genus *Hewittia* (Stefanovic *et al.*, 2002). A thorough revisionary study is needed to elucidate just how many genera ought to be recognized from the polyphyletic *Merremia* and its closest allies (*Operculina*, *Hewittia*, *Remirema*, *Decalobanthus*) once their relationships are better understood. Until that is possible, an enumeration of the Asian species heretofore included in *Merremia* will provide a useful reference as well as a starting point for further study. And to put the Asian species in context, the species recognized elsewhere in the world must be considered.

The number of species of *Merremia* has been variously estimated in the botanical literature at *ca* 70 (Mabberley, 1997; Staples and Brummitt, 2007) or *ca* 80 (Van Ooststroom and Hoogland, 1953; Verdcourt, 1963; Airy Shaw, 1980; Fang and Staples, 1995; Derooin, 2001; Meeuse and Welman, 2000; *inter alia*). However, these estimates have always seemed too low and it was decided to tabulate the species world-wide to see how many are currently recognized. Tabulation of the accepted names used in recent literature (see Appendix for list of literature consulted) via an Excel® spreadsheet allowed for geographic distribution to be compared and synonyms to be reconciled. Once redundancy in the list was eliminated, there are 27 unique species in the Americas, 31 species in Africa (including Madagascar), just 3 species in Australia, and 40 species in Asia/Malesia/Pacific. This brings the actual number of species to just over 100, which reveals there has been a sizable underestimate (by at least 20%) of the species richness in *Merremia*.

### **Checklist of Asian *Merremia* Species**

The Asian and Pacific species are enumerated here – 49 in total – in alphabetical order by species name. Only selected synonyms relevant for the Asia/Malesia/Pacific regions are included. Excluded names and selected synonyms are listed at the end, to assist in cross-referencing to accepted names.

It has not been possible to produce a key for identification of all Asian species at the present level of knowledge, largely because several species are known only from the type gathering, or from few collections, that are

not available for study. Problem groups have been discussed in the Notes sections; two principal complexes of intergrading taxa bear mentioning.

1. The Bornean endemics comprising *M. crassifolia/elmeri/gracilis/korthalsiana*

Van Ooststroom (1939), and later Van Ooststroom and Hoogland (1953), were able to clearly distinguish several species endemic to Borneo, based on the small number of collections available for study at that time. In the intervening decades, many more collections have been made, and the distinctions between species do not seem nearly so clear cut now. Certainly there are specimens in herbaria that are intermediate in their characters, and hence can't be identified precisely, though they do seem close to one or another of the species in this complex. Revisionary study is needed to elucidate the true relationships in this group.

2. The *M. bambusetorum/kingii/tonkinensis/umbellata* group

O'Donell (1941), in tropical America, and Van Ooststroom (1939), in Malesia, were able to sharply delineate *M. umbellata* from all other species of the genus that they studied; based on several characters they assigned *M. umbellata* to sect. *Xanthips*. However, on the continental Asian mainland, there are a number of additional species, all clearly referable to sect. *Xanthips*, and some of these named entities intergrade with *M. umbellata*. To date, attempts to resolve the intergradation at the floristic level have met with mixed success (Songkhla and Khunwasi, 1993); what is needed is a regional study of the entire complex, with careful comparison of all type specimens. For now, some observations and comments have been made in the Notes section to guide development of such a revisionary study.

***Merremia*** Dennst. ex Endl., Gen. Pl. 1: 1403. 1841, *nom. cons.*

1. ***Merremia aegyptia*** (L.) Urban, Symb. Antillanae 4: 505. 1910.

*Ipomoea aegyptia* L., Sp. Pl. 162. 1753. – Type: *Herb. Linn.* 218.35 (LINN); lectotype chosen by D.F. Austin, Fl. Ecuador 15: 84. 1982.

Syn.: *Convolvulus pentaphyllus* L., *nom. illeg.*; *I. pentaphylla* Jacq.; *Spiranthera pentaphylla* (Jacq.) Bojer; *Batatas pentaphylla* (Jacq.) Choisy; *Merremia pentaphylla* (Jacq.) Hallier f.; *C. nemorosus* Roem. & Schultes; *C. hirsutus* Roxb., *nom. illeg.*; *C. munitus* Wall. ex Wight.

**Distribution:** Pakistan, India, Vietnam, Australia, Hawaiian Islands (Kaua'i, O'ahu, Moloka'i, Lana'i, Maui, Kaho'olawe, Hawai'i). Native to tropical America and now widespread around the world as a weed.

Because *Convolvulus pentaphyllus* L. is an illegitimate name the first time the epithet *pentaphyllus* is taken up in another genus, in this case by Jacquin (1788), provides the first valid publication for it and all subsequent combinations of the epithet *pentaphyllus* are to be based on *Ipomea pentaphylla* Jacq.

*Notes:* Fosberg & Sachet (1977) reported this species from Micronesia based on a single collection, *D. Anderson 227*, with duplicates in several herbaria. However, the BISH duplicate of *Anderson 227* is *Ipomoea pes-tigridis* L. I have seen no authentic material of *M. aegyptia* from the Pacific Basin aside from the Hawaiian Islands, where it is well established (Wagner *et al.*, 1999).

2. ***Merremia aniseiifolia*** Ooststr., *Blumea* 12: 363. 1964.

Type: Indonesia, Irian Jaya, Kebar Valley, Andjai, *V.W. Moll BW9511* (holotype, L!; iso LAE, *n.v.*).

*Distribution:* New Guinea.

*Notes:* Known only from the type collection until quite recently, when a single additional collection was made. When Van Ooststroom described this species he commented that it resembles *M. tridentata*, a species now removed to the genus *Xenostegia* (see Excluded Species). It would be worthwhile examining the pollen of *M. aniseiifolia* to determine whether the resemblance is purely superficial, or whether this might be a third species of *Xenostegia*. It is a pity that most of the duplicates of the following collection have no flowers; only the Kew sheet had a single flower

*Specimen examined:* INDONESIA. Irian Jaya: NE Kepala Burung, between Sungai Apriri and Sungai Aremi, 11 May 1994, *M.J. Sands et al. 6544* (BISH!, K!, KEP!, SING!).

3. ***Merremia bambusetorum*** Kerr, *Bull. Misc. Inform.* 1941: 18. 1941.

Type: Thailand [SE], Trat, Khao Kuap, *Kerr 17704* (holotype, K!; isotype, BK!).

*Distribution:* Myanmar, Thailand, Vietnam.

*Notes:* Distinguishing *M. bambusetorum* from *M. kingii* and some forms of *M. umbellata* is quite difficult. It is possible that the holotype of *M. bambusetorum* is conspecific with one or more of the syntypes for *M. kingii*, which may be a mixed concept. Only careful comparison of all type

specimens concerned will resolve the ambiguity in species concepts. It is possible that *M. caloxantha* belongs with this complex as well.

That said, this complex of three intergrading entities can immediately be recognized among Asian *Merremia* by the presence at the petiole base of tiny paired auricles that look very much like stipules. These can be hidden in the typically dense hair-cloth of *M. umbellata*, but are usually quite evident for *M. bambusetorum* and *M. kingii*.

4. *Merremia bimbim* (Gagnep.) Ooststr., *Blumea* 3: 343. 1939.  
*Ipomoea bimbim* Gagnep., *Not. Syst. (Paris)* 3: 140. 1915. – Type: Vietnam, Hanoi Prov., near Vo-xa, *Bon 2700* (holotype, P, n.v.).

*Distribution*: Vietnam.

*Notes*: I have not seen the type specimen for this name nor any other collections of it. The species appears to be distinct and remains enigmatic.

5. *Merremia boisiana* (Gagnep.) Ooststr., *Blumea* 3: 343. 1939.  
*Ipomoea boisiana* Gagnep., *Notul. Syst. (Paris)* 3: 141. 1915. – Types: Vietnam, montagnes de Cai-kinh, *Bois 138* (syntype, P!); mont Cha-pa, *Lecomte & Finet s.n.* (syntype, P!). Laos, vers Ken-trap, *Spire 1049* (syntype, P!); du Mékong à Hue, *Harmand 1827* (syntype, P!). See notes.  
Syn.: *I. boisiana* var. *fulvopilosa* Gagnep., *I. boisiana* var. *rufopilosa* Gagnep., *Merremia boisiana* (Gagnep.) Ooststr. var. *rufopilosa* (Gagnep.) C.Y. Wu.

*Distribution*: China, Laos, Vietnam, Indonesia (Sumatra).

*Notes*. Floras for Malesia recognize two varieties: var. *boisiana* and var. *sumatrana* Ooststr., and floras for China and SE Asia recognize var. *boisiana* and var. *fulvopilosa* (Gagnep.) Ooststr. See Van Ooststroom and Hoogland (1953: 450) for a key to the Malesian varieties and Fang and Staples (1995: 299) for a key to the Chinese varieties.

In transferring the epithet to *Merremia*, Van Ooststroom (1939b: 344) excluded a fifth syntype cited by Gagnepain in the protologue, *Beccari 3594* from Borneo, and referred it to his new species *Merremia crassinervia* Ooststr. Chinese specimens differ from Malesian ones in several characters and it is possible that they are a different species. No taxonomic changes are initiated here until revisionary study clarifies relationships.

6. *Merremia borneensis* Merr., *Univ. Calif. Publ. Bot.* 15: 260. 1929.  
Type: Malaysia, Sabah, Elphinstone province, Tawao, *A.D.E. Elmer 20990* (isotypes, A!, BO, F!, G!, GH!, K, MO(× 2)!, P, NY!, SING!, U).

*Distribution:* Malaysia (Peninsula, Sabah, Sarawak), Brunei, Indonesia (Kalimantan).

*Notes:* In herbaria, several other Bornean species are often confused with, and misidentified as, *M. borneensis*. The basal petiole attachment, medium-large flowers, and puckered, rugose leaf surface in dried material makes it distinctive.

7. *Merremia bracteata* P.S. Bacon, Bot. J. Linn. Soc. 84: 259. 1982.

Type: Solomon Islands, Kolombangara, near Poitete forestry camp, P.S. Bacon 2 (holotype, K!; isotypes, BSIP, L!).

*Distribution:* Solomon Islands. Known from only two collections; apparently endemic.

*Note:* The general facies of this species comes very near to *Operculina ventricosa*, known from the Micronesian islands and the Caribbean (Staples, 2007). The similarity may be only superficial but requires investigation. A few South Pacific insular collections seen (New Caledonia, Vanuatu [Santo, Vaté]) appear intermediate between these two species bearing large, foliose, persistent inflorescence bracts.

*Specimens examined:* SOLOMON ISLANDS (Santa Cruz group). Vanikoro: secondary forest near Government House, Peou, 27 Mar 1963, T.S. Whitmore BSIP 1613 (L!).

8. *Merremia caloxantha* (Diels) Staples & R.C. Fang, Novon 5: 109. 1995.

*Ipomoea caloxantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 203. 1912. – Type: China, Yunnan: in valley of Mekong River, at crossing of Teng Yueh-Talifu road, G. Forrest 1111 (holotype, E!).

*Distribution:* China, Laos, Vietnam.

*Notes:* An enigmatic species known, for most of the twentieth century, only from the type collection. A recent specimen from Laos has been tentatively identified as conspecific. Although the corollas on these SE Asian specimens are smaller than those on the holotype sheet, in all other characters (leaf shape and indumentum, calyx characters, corolla pubescence), they are a good match with the type specimen. The following collections document the distribution for *M. caloxantha*.

*Specimens examined*: CHINA. Yunnan: Nujiang Lisu Auton. Prefect., Lushui Xian, road from Man Hui village to Shanjiang, 3 Oct 1997, *Gaoli Gongshan Exped. 1997–9928* (E!); Szemao [=Simao], A. *Henry 13441* (E!, K!); valley of Mekong at the crossing of Teng Yueh–Dalifu road, Sep 1905, *G. Forrest 71111* (E!). PDR LAO. Khammouan Province: along tracks S of Ban Mak Phueang, 31 Oct 2005, *M.F. Newman et al. LAO-659* (E!). VIETNAM. Ho Yung Shan and vicinity, Tien-yen, 13 Oct–22 Nov 1940, *W.-T. Tsang 30645* (B!, BO!, C!, E!, L!).

9. *Merremia calyculata* Ooststr., *Blumea* 3: 265. 1939.

Type: Fiji, Puna, Jun 1860, *Seemann 324* (holotype, K!; isotype, BM!).

*Distribution*: Fiji, apparently endemic.

*Notes*: As suggested previously (Staples, 2009) *M. calyculata* may prove to be no more than a variant of the widespread and variable *M. pacifica*. One sterile specimen, for which the vernacular name, “wabula”, was recorded by the collector, may belong here. Van Ooststroom (1939a: 265) recorded *wavula* as the vernacular name for *M. calyculata* and *veliyawa* for *M. pacifica*. It remains to be seen whether the difference in vernacular names reflects a genuine taxonomic distinction. Further collecting and field study of Fijian plants is needed to resolve whether one species or two is present.

*Specimen examined*: FIJI. Bequ: Rukua village, 21 July 1972, *M. Weiner MW-72-F-124* (BISH!).

10. *Merremia cissoides* (Lam.) Hallier f., *Bot. Jahrb. Syst.* 16: 552. 1893.

*Convolvulus cissoides* Lam., *Tab. Ency.* 1: 462. 1793. – *Ipomoea cissoides* (Lam.) Griseb. – Type: French Guiana, Cayenne, *Leblond s.n.* (holotype, P-LA, n.v.; IDC microfiche 6207. 462: II. 4!).

*Distribution*: India (West Bengal), Sri Lanka, Papua New Guinea, and Thailand.

*Note*: Native to tropical America and increasingly naturalized in the Old World tropics.

11. *Merremia clemensiana* Ooststr., *Blumea* 3: 350. 1939.

Type: Malaysia, Sarawak, Kapit, upper Rejang River, *J. & M.S. Clemens 21133* (holotype, BO!; isotypes, A!, B!, BISH!, MO!, NY(×2)!, P!, SAR!).



*Distribution:* Malaysia (Sarawak, Sabah?).

*Note:* *Merremia clemensiana* is expected to be more widespread on Borneo than the few available collections would indicate. See the comments under *M. gracilis*.

12. ***Merremia cordata*** C.Y. Wu & R.C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 163. 1979.

Type: China, Yunnan: Likiang, Cheli, *R.C. Ching 21660* (holotype, KUN, *n.v.*; iso A!).

*Distribution:* China (Sichuan, Yunnan).

*Notes:* The following collections have been examined and agree well with the description for the species.

*Specimens examined:* China. Yunnan: Ta-pin-tze, 2 Sep 1887, *J.M. Delavay 3073* (P(×3)!); Yung Ning, May 1933, *McLaren's collector 204* (K); sine loco or date, *G. Forrest 11121* (K!).

13. ***Merremia crassinervia*** Ooststr., Blumea 3: 350. 1939.

Type: Malaysia, Sarawak, Saribas, Paku, *Haviland & Hose 3523E* (holotype, L!), *3523K* (isotype, K!), *3523A* (isotype, SAR!).

*Distribution:* Malaysia (Sarawak), Indonesia (Kalimantan).

*Notes:* Van Ooststroom described this species from material that lacked mature flowers, thus the shape of the corolla remains imperfectly known. The inflorescence architecture and leaf venation characters he noted seem distinct but further comparative study is needed to correctly associate all stages in the life history.

14. ***Merremia davenportii*** (F. Muell.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.

*Ipomoea davenportii* F. Muell., Fragm. Phytogr. Austral. 6. 1868. – Type: Australia, [Northern Territory] hills of Davenport's Range, *J.M. Stuart s.n.* (holotype, MEL?, *n.v.*).

*Distribution:* Australia (Western Australia, Northern Territory).

*Specimen examined:* AUSTRALIA. Western Australia: near Hedland, Pippingarra Station, 20 Jun 1962, *R.D. Royce 7492* (PERTH!).



15. *Merremia dichotoma* Ooststr., Blumea 3: 311. 1939.

Type: Indonesia, south middle Timor, Kolbano, S coast, *M.E. Walsh* 375 (holotype, BO!; isotype, BO (×2)!, L!).

*Distribution*: Malesia (Timor).

*Notes*: Apparently rather rare; just two recent collections have come to light since the type gathering was made. The species bears an uncanny similarity to *M. hainanensis* (q.v.).

*Specimens examined*: INDONESIA. Timor: Berg Sanbet, 21 Apr 1971, *C.W. Kooy* 794 (L!), Luid Belu, 28 Jun 1970, *C.W. Kooy* 832 (L!).

16a. *Merremia dissecta* (Jacq.) Hallier f. var. *dissecta*, Bot. Jahrb. Syst. 16: 552. 1893.

*Convolvulus dissectus* Jacq., Obs. Bot. 2: 4. tab. 28. 1767; *Ipomoea dissecta* (Jacq.) Pers.; *Operculina dissecta* (Jacq.) House. – Type: Jacquin plate #28 in protologue (lectotype, designated by Austin, Florida Scientist 42: 219. 1979).

Syn. *I. sinuata* Ortega

*Distribution*: Pakistan, India, Sri Lanka, Myanmar (reported), China, Indonesia (cultivated Java, Sumatra), Philippines (Mindanao), Australia (Northern Territory, Queensland, Western Australia), French Polynesia (Tahiti), Papua New Guinea, Solomon Islands (Guadalcanal), Samoa (Upolu), Tonga (Niuafou), Seychelles (Praslin); native in tropical and subtropical America and now virtually ubiquitous as a tropical weed.

16b. *Merremia dissecta* var. *edentata* (Meisn.) O'Donnell, Lilloa 6: 502. 1941.

*Ipomoea sinuata* Ortega var. *edentata* Meisn. in Martius, Fl. Brasil. 7: 285. 1869. – Type: Brazil. Bahia: prope Ilheos, *Riedel* 131 (isosyntype NY!); Rio de Janeiro: prope Copacabana, *Riedel* s.n. (n.v.).

Syn. *M. fulva* (Bertol.) Manitz

*Distribution*: Brazil, Bolivia, Paraguay, Argentina; naturalized in French Polynesia (Society Islands: Moorea).

*Notes*: There is no consensus about the rank at which this taxon should be recognized. Manitz (1983: 180) has raised it to specific rank and taken up the name *M. fulva* for it but without description or discussion of the characters used to justify this action. Austin & Staples (unpublished data) consider it

to be a variety of the widespread and variable *M. dissecta*, and that rank is accepted here. It has been treated this way in a recent checklist for the Argentine flora (Zuloaga and Morrone 1999: 564).

How this temperate South American variety of a widespread species came to be naturalized on a small Pacific island is unknown (Staples, 2009). The earliest Polynesian collection dates from 1931 (*M.L. Grant 5359*). Plants have been collected at various sites around Mo'orea ever since, the most recent dating from 1999 (*Murdoch M014*).

17. *Merremia eberhardtii* (Gagnep.) T.N. Nguyen in Averyanov *et al.*, Mater. Fl. Rast. Ostrov. V'etnama 43. 1988.

*Ipomoea eberhardtii* Gagnep., Not. Syst. (Paris) 3: 145. 1915. – Type: Vietnam, Thua-thien province, near Long-co, *Eberhardt 1708* (isotypes P, n.v., photos!)

*Distribution*: Vietnam. Endemic and very seldom collected, apparently. Only one collection seen aside from the type.

*Specimen examined*: Vietnam. Hue and vicinity, 1927, *J. & M.S. Clemens 4091* (A!, BM!, G!, K!, P!, NY!).

18. *Merremia elmeri* Merr., Univ. Calif. Publ. Bot. 15: 261. 1929.

Type: Malaysia, Sabah: Elphinstone province, Tawao, *A.D.E. Elmer 20396* (isotypes, B!, BO!, G!, L!, MO!, NY!, SING!).

*Distribution*: Malaysia (Sabah), Indonesia (Kalimantan).

*Notes*: Two varieties are recognized – var. *elmeri* and var. *glaberrima* Ooststr., both found on Borneo. See Van Ooststroom and Hoogland (1953: 453) for distinguishing features of the varieties.

19. *Merremia emarginata* (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.

*Evolvulus emarginatus* Burm. f., Fl. Ind. 77. 1768. – Type: Indonesia, Java, *Kleinhof 85* (lectotype, G-Burman!, chosen by Staples and Jacquemoud, *Candollea* 60: 449. 2005).

Syn.: *Convolvulus excisus* Zipp.; *C. reniformis* Roxb.; *Ipomoea reniformis* (Roxb.) Choisy; *Lepistemon reniformis* (Roxb.) Hassk.

*Distribution*: Nepal, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand, Malaysia, Indonesia (Java), Philippines; also in Africa.

20. ***Merremia gemella*** (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.  
*Convolvulus gemellus* Burm. f., Fl. Ind. 46. 1768. – *I. gemella* (Burm. f.) Roth.  
– Type: Indonesia, Java, *collector unknown* (lectotype, G-Burman!, chosen by Staples and Jacquemoud, Candollea 60: 448. 2005).  
Syn.: *Ipomoea cymosa* var. *radicans* (Blume) Miq.; *I. polyantha* Miq.; *I. radicans* Bume non Choisy.

*Distribution*: India, Sri Lanka, Myanmar, Thailand, Vietnam, Taiwan, Malaysia, Indonesia (Java, Seram, Irian Jaya), Philippines, Papua New Guinea, Australia, Micronesia (Mariana Islands: Guam).

*Notes*: Malesian floras recognize two varieties – var. *gemella* is widespread throughout Malesia, Asia, and the Pacific; and var. *splendens* Ooststr. is confined to a small area in Papua New Guinea. See Van Ooststroom and Hoogland (1953: 441) for a key to the Malesian varieties. An earlier lectotypification for this species (Van Ooststroom, 1939) had to be set aside because the specimen chosen was not part of the original material available to Burman; see Staples and Jacquemoud (2005) for details.

21. ***Merremia gracilis*** Campbell & Argent, Notes Roy. Bot. Gard. Edinburgh 45(2): 345–348. 1988.  
Type: Malaysia, Sabah: Lahad Datu distr., Ulu Segama, Danum Valley Field Centre, *Argent & Campbell 411854* (holotype, SAN!; isotypes, A!, E!, K!, L!)

*Distribution*: Malaysia (Sabah), Indonesia (Kalimantan).

*Notes*: *Merremia gracilis* was described and compared by its authors with the species assigned to sect. *Wavula* (e.g., *M. similis*, *M. pacifica*, *M. calyculata*); on that basis it seemed distinctive. However, my own examination of the type gathering revealed it is much more similar to species of sect. *Hailale* (e.g., *M. clemensiana*, *M. crassinervia*, *M. korthalsiana*). It appears that the name *M. gracilis* has been applied to plants from Sabah, where they are widespread and abundant, whereas plants from Sarawak and Brunei have been otherwise named. Revisionary study may show that these names refer to one, or more, variable species distributed across the whole of Borneo.

22. ***Merremia hainanensis*** H. S. Kiu, Fl. Hainan 3: 587. 1974.  
Type. China. Hainan Province: Wanning County, *H.F. How 71693* (holotype, where?, n.v.; iso A!).

*Distribution:* China (Hainan), Vietnam.

*Notes:* The protologue does not state where the holotype specimen is deposited and I have failed to locate it. Kiu Hua-shing compared this new species from Hainan to *M. dichotoma* and the excellent figure accompanying the protologue demonstrates that the two are uncannily similar. When I saw a duplicate of *How* 71693 in A, I first called it *M. dichotoma* without hesitation, not knowing that it was an isotype for Kiu's species. Ultimately, these two species may prove to be conspecific, though their type localities are far apart. A single specimen was discovered in the Paris herbarium that indicates *M. hainanensis* also occurs in nearby Vietnam.

*Specimen examined:* Vietnam. Côn Tho, route de Côn Tho a Long xuyên, 2 Nov 1967, Vu Van Cuong 690 (P!).

23. ***Merremia hederacea*** (Burm. f.) Hallier f., Bot. Jahrb. Syst. 18: 118. 1893. *Evolvulus hederaceus* Burm. f., Fl. Ind. 77. 1768. – Type: Indonesia, Java, *Pryon s.n.* (lectotype, G-Burman!, chosen by Van Ooststroom, Blumea 3: 306. 1939).

Syn.: *Convolvulus acetosellifolius* Desr.; *C. chryseides* (Ker Gawl.) Spreng.; *C. dentatus* Vahl; *C. flavus* Willd.; *C. lapathifolius* Spreng.; *Ipomoea acetosellifolia* (Desr.) Choisy; *I. chryseides* Ker Gawl.; *I. dentata* (Vahl) Roem. & Schultes; *I. subtriflora* Zoll. & Moritzi; *Lepistemon glaber* Hand.-Mazz.; *L. muricatum* Spanoghe; *Merremia chryseides* (Ker Gawl.) Hallier f.; *M. convolvulacea* Dennst. ex Hallier f.

*Distribution:* Pakistan, Nepal, India, Sri Lanka, Bangladesh, Myanmar, Thailand, China, Taiwan, Japan (Ryukyu, Ogasawara), Laos, Cambodia, Vietnam, Malaysia (Sarawak, Sabah), Singapore, Indonesia (Sumatra, Kalimantan), Philippines, Australia (Northern Territory, Queensland, Western Australia), Papua New Guinea, Micronesia (Caroline Islands: Yap; Mariana Islands: Guam), French Polynesia (Society Islands: Tahiti); and widespread in tropical Africa, Madagascar, Indian Ocean islands (Réunion, Mauritius); introduced in the Americas and naturalized around the Caribbean (Cuba, Lesser Antilles, Colombia, Trinidad and Tobago).

24. ***Merremia hirta*** (L.) Merr., Philipp. J. Sci. 7: 244. 1912.

*Convolvulus hirtus* L., Sp. Pl. 1: 159. 1753. – Type: India, *Osbeck II* in Herb. Linn. 218.56 (lectotype, LINN!, chosen by Merrill, Philipp. J. Sci., sect. C, 7: 245. 1912).

Syn.: *C. caespitosus* Roxb.; *C. reptans* L., p.p.; ? *Ipomoea hepaticaefolia* Blanco; *I. linifolia* Bl.; *I. philippinensis* Choisy; *Lepistemon decurrens* Hand.-

Mazz.; *Merremia caespitosa* (Roxb.) Hallier f.; *M. decurrens* (Hand.-Mazz.) H. S. Kiu; *Skinneria caespitosa* (Roxb.) Choisy.

*Distribution*: India, Bangladesh, Myanmar, Thailand, China, Taiwan, Laos, Vietnam, Malaysia, Singapore, Indonesia (Sumatra, Irian Jaya), Philippines, Australia (Queensland), Papua New Guinea, Solomon Islands (Guadalcanal).

*Notes*: Two varieties are recognized – var. *hirta* is widespread; var. *retusa* Ooststr. is found in the Philippines (Luzon). See Van Ooststroom and Hoogland (1953: 442) for a key to the Malesian varieties.

25. *Merremia hungaiensis* (Lingelsh. & Borza) R.C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 76. 1979.

*Ipomoea hungaiensis* Lingelsh. & Borza, Repert Spec. Nov. Regni Veg. 13: 389. 1914. – Type: China. Yunnan: Talifu [Tali town], bei Tschian-t'ou-shao vor Hun-gai, 19 Aug 1913, H.W. Limpricht 928 (holotype, WRS�, n.v.).

Syn. *Ipomoea wilsonii* Gagnep. (1915), *nom. illeg.*, non House (1907); *Merremia wilsonii* Verdc.; *I. hungaiensis* var. *linifolia* C.C. Huang.

*Distribution*: China (Guizhou, Yunnan).

*Notes*: Chinese floras recognize two varieties – var. *hungaiensis* and var. *linifolia* (C.C. Huang) R.C. Fang. See Fang and Staples (1995: 297) for a key to the varieties.

26. *Merremia incisa* (R. Br.) Hallier f., Meded. Rijks Herb. Leiden 1: 21. 1923 [t.p. 1910].

*Ipomoea incisa* R. Br., Prodr. 486. 1810. – Type: Australia, locality not stated, R. Brown s.n. (holotype, BM, n.v.).

*Distribution*: Australia. Endemic.

*Notes*. A presumed new species of *Merremia* reported from the Northern Territory of Australia (Elliot and Jones 1993: 389) is actually *M. incisa* (B. Johnson, pers. comm., 4 Feb 2009).

27. *Merremia kingii* (Prain) Kerr, Fl. Siam. En. 3(2): 5. 1954.

*Ipomoea kingii* Prain, J. As. Soc. Bengal 1, 13, pt. 2: 110. 1894. – Types: specimens from India, Bhutan, and Burma were cited (all CAL, n.v.).

Syn.: *Ipomoea cymosa* Roem. & Schultes var. *macra* C.B. Clarke; *M. umbellata* subsp. *macra* (C.B. Clarke) P.J. Parmar.

*Distribution:* Bhutan, India [West Bengal (Sikkim), Assam, Arunachal Pradesh, Nagaland, Meghalaya], Myanmar, Thailand.

*Notes:* This is one of the most difficult species to define among all Asian *Merremia*. Prain based his new species *I. kingii* on at least 14 collections, all in CAL, which would be syntypes under today's rules of nomenclature. He sent duplicates for some of these collections to Kew, where O. Stapf compared them with specimens cited by Clarke in the *Flora of British India* Convolvulaceae account. Based on Stapf's findings, Prain subsumed Clarke's variety, *I. cymosa* var. *macra*, and included Clarke's syntypes for that name in his list of collections cited under *I. kingii*, making these collections types for both names.

The lack of a clear-cut type specimen for this name makes it impossible to establish a species concept. Specimens called *M. kingii* in herbaria intergrade with both *M. bambusetorum* and *M. umbellata*, among others. Careful study of the full series of Prain's material in Calcutta, and choice of a lectotype from the many specimens he included, will determine how this name should be applied. A mini revision of the species complex including *kingii/bambusetorum/umbellata* and others is much needed.

28. *Merremia korthalsiana* Ooststr., Kew Bull. 1938: 175. 1938.

Type: Indonesia. Borneo: [Kalimantan], Doesoen, *Korthals* 237 (holotype L!, 2 sheets).

*Distribution:* Malaysia (Sarawak, Sabah), Indonesia (Kalimantan), Brunei.

29. *Merremia mammosa* (Lour.) Hallier f., Teysmannia 7: 164. 1897.

*Convolvulus mammosus* Lour., Fl. Coch. 108. 1790; *I. mammosa* (Lour.) Choisy. –Type: No specimen traced.

Syn.: *Ipomoea gomezii* C.B. Clarke, in part, as to flowers.

*Distribution:* India (West Bengal, Assam, Andaman Islands), Myanmar, Thailand, Vietnam, Indonesia (cultivated and escaped – Java, Bali, Moluccas).

*Notes:* The application of this name has stabilised since Van Ooststroom (1939b, and in Van Ooststroom & Hoogland 1953) explicated the species concept and applied it to a distinctive Malesian species with large flowers, perhaps the biggest in the genus, and fascicled, swollen roots used as food and medicine. Previously, Merrill (1935) pointed out that there is no type specimen extant for this Loureiro name and the Rumphius plate (Herbar. Amboin. 5: 370, pl. 131. 1750) – cited by Loureiro as a synonym – may be a

mixed concept. Merrill initially (1917: 442) stated that this plate depicts the roots of a *Dioscorea* with the above-ground parts of some convolvulaceous plant and later (Merrill 1935: 325) decided that the above-ground parts referred to the sweet potato. Merrill accordingly reduced *C. mammosa* Lour. to synonymy with *Ipomoea batatas*. However, it seems that the Rumphius plate agrees very well with the plant from SE Asia that has latterly been called *Merremia mammosa*.

Clarke (1883: 211) created a mixed concept when he named *I. gomezii*: the flowers, based on a Burmese collection, *W. Gomez s.n.* (K!, 2 sheets), are *M. mammosa*; the fruits, based on Kurz specimens from the Andaman Islands, appear to belong to *Operculina riedeliana*.

30. ***Merremia pacifica*** Ooststr., Blumea 3: 263. 1939.

Type: Fiji. Vanua Levu: Mbua, *A. C. Smith 1690* (holotype, L!; isotypes, BISH!, K!, NY!, P!).

*Distribution*: Fiji (Naitasiri, Ovalau, Vanua Levu), Papua New Guinea (Bougainville, New Britain, Rossel), Solomon Islands (Guadalcanal, Vanikoro, Kolombangara, New Georgia, Buka, Faro, Savo, San Cristoval), Vanuatu (Maewo), Micronesia (Caroline Islands – Ponape).

*Notes*: A full description, illustration, and greatly expanded Pacific distribution for this species appears in Staples (2009).

31. ***Merremia palmata*** Hallier f., Bot. Jahrb. Syst. 18: 112. 1893.

Type: Namibia. Ameib, *Belck 52* (lectotype, BRA, *n.v.*; iso, JE, *n.v.*).

*Distribution*: Pakistan; otherwise known from tropical and southern Africa.

*Notes*: Austin & Ghazanfar (1979: 56) tentatively took up this name for two collections from Pakistan that B. Verdcourt identified as *M. palmata*. I have seen no material.

32. ***Merremia peltata*** (L.) Merr., Interpr. Rumphius Herb. Amboin. 441. 1917.

*Convolvulus peltatus* L., Sp. Pl. 2: 1194. 1753; *I. peltata* (L.) Choisy; *Operculina peltata* (L.) Hallier f. – Type: Icon in: Rumphius, Herb. Amboin. 6: pl. 159. 1750 [lectotype, chosen by Merrill, *op. cit.* 31, 441. 1917].

Syn.: ?*Chironia capsularis* Blanco; ?*C. lanosantha* Blanco; ?*Ipomoea menispermacea* Domin; *I. nymphaeifolia* Blume; *Merremia nymphaeifolia* (Blume) Hallier f., *nom. illeg.*



*Distribution:* India (Andaman Islands), Thailand, Malaysia (Peninsula, Sarawak, Sabah), Singapore, Brunei, Indonesia (Aru arch., Java, Kalimantan, Key Islands, Selebes, Sulawesi), Philippines (Mindanao, Sulu arch.), Papua New Guinea, Australia (Queensland), Solomon Islands (Guadalcanal, San Cristobal), Vanuatu (Banks group, Efate, Erromanga, Santo), Fiji (Bua, Kandavu, Naitasiri, Vanua Balavu, Vanua Levu, Viti Levu), Wallis & Futuna, New Caledonia, Cook Islands (Rarotonga), French Polynesia (Austral Islands – Raivavae, Rurutu; Society Islands – Huahine, Maupiti, Moorea, Raiatea, Tahaa, Tahiti), Niue, Samoa (Sava'i, Tutuila, Upolu), Tonga (Eua, Tafahi, Vavau), Federated States of Micronesia (Kosrae, Ponape), Belau (=Palau); also in tropical east Africa, Madagascar, and throughout the Indian Ocean islands.

*Notes:* *Merremia peltata* is immediately recognizable for several features: the lianoid habit with large flowers; broadly campanulate corollas either bright golden yellow or white; the peltate leaf attachment (though small leaves just below an inflorescence may be basally attached); and the anthers with large tufts of hairs. The vines are rampant growers that quickly take advantage of any disturbance such as forest cutting or land clearing for agriculture; the species is now considered invasive on several Pacific islands, despite being native in Oceania. The only specimen seen from Belau states that it is an introduced plant, grown at the Aimireek Experiment Station.

33. *Merremia poranoides* (C.B. Clarke) Hallier f., Bull. Herb. Boiss. 5: 375. 1897.

*Ipomoea poranoides* C.B. Clarke in Hook., Fl. Brit. India 4: 208. 1883. – Type: India. Sikkim: Darjeeling, C.B. Clarke 9189A (lectotype, K!, designated by Staples, Edinb. J. Bot. 60: 91. 2006).

Syn.: *Ipomoea couchetii* Gagnep.; *I. longipedunculata* C.Y. Wu (1965), non Hemsl. (1882); *Merremia longipedunculata* R.C. Fang.

*Distribution:* ?Bhutan, India (West Bengal, Nagaland), China (Guizhou, Yunnan), Thailand, Vietnam.

*Notes.* The synonymy and typification for *M. poranoides* were clarified by Staples (2006); soon thereafter it was documented in Thailand (Staples and Traiperm, 2008). The species enjoys a wide geographic range but is evidently not common anywhere.

34. *Merremia pulchra* Ooststr., Blumea 3: 348. 1939.

Type: Brunei Darussalam. Brunei Muara District: Muara, Brunei Bay, Apr 1896, G. K. Gns 14 (holotype SING!). ]

*Distribution:* Brunei, Malaysia (Sarawak), ?Philippines.

*Notes:* Evidently Van Ooststroom erred in stating the type collection came from Sarawak, because the locality given on the label – “Muara, Brunei bay” – corresponds to modern Brunei. The name of the collector is ambiguous: it appears to be G.K. Gns, just as Van Ooststroom rendered it, but this name is not identifiable with anyone known to have collected in the Malesian region (Van Steenis-Kruseman, 1950, 1958, 1974). Although *M. pulchra* is reported to occur in the Philippines (Coode *et al.*, 1996: 61), and this is quite possible, I have seen no authentic material from there. The large flowers of a vivid yellow color make this species worthy of introduction to horticulture.

35. ***Merremia quinata*** (R. Br.) Ooststr., J. Arnold Arbor. 29: 417. 1948.  
*Ipomoea quinata* R. Br., Prodr. 486. 1810; *Convolvulus quinatus* (R. Br.) Spreng. – Type: Australia. Northern Territory: Arnhem Bay, Mallinson’s Island, R. Brown sub J.J. Bennett 2755 (holotype, BM!; probable isotypes, E!, K!).  
 Syn.: *I. hirsuta* R. Br.; *I. pentadactylis* Choisy.

*Distribution:* Myanmar, Thailand, Vietnam, China (Hainan), Taiwan, Philippines, Papua New Guinea, Australia (Queensland, Northern Territory). Surely more widespread in Malesia than the collections seen to date would indicate.

*Notes:* Van Ooststroom (1953: 447) commented that continental Asian specimens might not be conspecific with the specimens he examined from Australia, Papua New Guinea, and the offshore islets between. There is great variation in indumentum density, from glabrous to copiously hirsute with stiff yellowish hairs, but otherwise, the morphology is remarkably consistent. The peculiar crest on the seed apex is noteworthy and suggests seed characters might be taxonomically informative if studied comprehensively. Like some other Asian species (e.g., *M. subsessilis*, *M. verruculosa*) the corolla tube has a slight curve in life that gives the flower a weakly zygomorphic aspect.

36. ***Merremia quinquefolia*** (L.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.  
*Ipomoea quinquefolia* L., Sp. Pl. 162. 1753; *Convolvulus quinquefolius* (L.) L. – Type: Icon in: Plukenet, Phytographia plate 167, fig. 6. 1692 (lectotype designated by D.F. Austin, Ann. Missouri Bot. Gard. 62: 182. 1975).

*Distribution:* Indonesia (Java), Australia (Queensland), Papua New Guinea, French Polynesia (Society Islands: Tahiti), Nauru, Fiji (Labasa, Lautoka, Vanua Levu), Tonga (Foa); native in tropical America, where it is widespread

and abundant, and also naturalized in Africa (Lebrun and Stork 1997, and references cited therein).

Notes. I have seen a single old specimen (*Talmy s.n.*) from Indochina, without locality or date. Gagnepain and Courchet (1915: 239) listed this specimen under their mixed concept "*Ipomoea pentaphylla*", and gave the provenance as "Cochin-chine", which is now Vietnam. The distributional record for Vietnam is based on this Talmy collection.

37. *Merremia rajasthanensis* Bhandari, J. Bombay Nat. Hist. Soc. 84: 645. 1988.

Type: India. Rajasthan: Jodhpur District, Sardarsamand, 28 Aug 1975, Bhandari 1976 (holotype, K, *n.v.*; isotype, JAC, *n.v.*).

*Distribution*: India; endemic to Rajasthan.

*Notes*: The author, when naming this species, stated that it "is closely allied to *Merremia quinquefolia* (Linn.) Hall. f. ... However, it appears to be related to the African *M. palmata* Hall. f. and *M. verecunda* Rendle." and went on to note, "The stem of this species is typically winged like that of African *M. pterygocaulos* (Choisy) Hall. f." The similarity with these African species has already been pointed out by Austin (1979: 56–57), citing B. Verdcourt, who examined a duplicate in Kew of Bhandari 1971 (from the type locality) and considered it to be *M. palmata*, though perhaps differing sufficiently from the African populations of that species to be worthy of subspecific rank.

I have not examined the type collection nor the other material cited in the protologue but based on the detailed plate included there this species appears to me to be conspecific with one of these lobed-leaved African species; it is not remotely similar to the neotropical *M. quinquefolia*, which presents an entirely different facies. Given the well-known biogeographic affinity between eastern tropical Africa and the western Indian subcontinent, it would be entirely possible for *M. rajasthanensis* to be no more than a disjunct population of one of the widespread, variable African species.

38. *Merremia rhynchorrhiza* (Dalzell) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.

*Ipomoea rhynchorrhiza* Dalzell, J. Bot. 3: 179. 1851. – Type: India. "in montibus Syhadree, prope Tulkut-ghat, fl. Aug. et Sept." Dalzell *s.n.* (holotype, K, *n.v.*).

*Distribution*: India, western peninsula.

*Notes:* Writing more than a century ago Cooke (1905: 239) remarked concerning *M. rhynchorrhiza* “The tubers are eaten and greedily sought for by the natives, which accounts for the rarity of the plant. The leaves are also used as a vegetable.” Perhaps this is why not a single recent collection has been seen; the species should certainly be investigated in terms of IUCN conservation status and threats to its survival.

*Specimen examined:* India. “Malabar, Concan, etc., regio trop.” *Stocks, Law & Co, s.n.* (F!, UPS!, S!).

39. *Merremia semisagittata* (Griseb. ex Peter) Dandy in Andrews, Flw. Pl. Sudan 3: 123. 1956.

*Ipomoea semisagittata* Griseb. ex Peter in Engl. & Prantl, Pflanzenfam. 4 (3a): 31. 1891. – Type: “Mesopotamia”, no specimen cited.

*Distribution:* Saudi Arabia (Alfarhan and Thomas, 2001), otherwise known from dryland African above the tropical belt (Sebsebe, 2001).

*Notes.* The nomenclatural status of several *Ipomoea* names published by Peter (1891) is unsatisfactory because he did not cite specimens that could be considered types under the ICBN. A thorough and comprehensive study of the Peter names is needed to sort out the taxonomic concepts involved and to neotypify the names, if it can be proven that there are no specimens extant that could be eligible as original material for them.

I have seen no Asian material of this species.

40. *Merremia sibirica* (L.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.

*Convolvulus sibiricus* L., Mant. Pl. Alt. 203. 1771; *Ipomoea sibirica* (L.) Pers. – Type: without locality, *Herb. Linn.* 218.5 (LINN!, lectotype, designated by Staples in *Taxon* 55: 1022. 2006).

*Distribution:* India (Himalayas), China, Mongolia, NE Russia.

*Notes:* Chinese floras recognize 5 varieties: var. *sibirica*, var. *macrosperma* C.C. Huang, var. *vesiculosa* C.Y. Wu, var. *trichosperma* C.C. Huang, and var. *jiuhuaensis* B.A. Shen & X.L. Liu. See Fang and Staples (1995: 295) for a key to the varieties. As pointed out years ago by Ferguson *et al.* (1977: 768) the pollen of *M. sibirica* is unique in the genus *Merremia*. While the true affinities of the species await disclosure, the pollen discordance is suggestive that *M. sibirica* does not belong with any of the other species groups lumped under *Merremia*.

*Merremia sibirica* was introduced to horticulture in Britain and Europe

in the nineteenth century but apparently does not survive in cultivation. The flowers are small but borne in masses they are attractive; the repeatedly monochasial cymes result in a distinctive candelabrum-shaped inflorescence when well developed.

41. *Merremia similis* Elmer, Leaf. Philip. Bot. 1: 335. 1908.

Type: Philippines. Leyte, Palo, *Elmer 7341* (isotypes, BO, n.v., E!, G!, K!, NY!)

Syn.: ? *Convolvulus distillatorius* Blanco, ?*Merremia distillatoria* (Blanco) Merr., p.p.

*Distribution*: Taiwan (Hengchun Peninsula), Philippines (Leyte, Luzon, Mindanao, Panay, Samar, Sibuyan).

*Notes*: The reports of pinkish to red corollas in *M. similis* require confirmation; this would be most unusual in a genus where white or yellow corollas are the norm.

42. *Merremia steenisii* Ooststr., Blumea 20: 127. 1972.

Type: Papua New Guinea, Sepik District, Wewak-Angoram area, road from Yangoru to Kworo, in grassland, 1 Sep 1959, *Robbins 2316* (holotype, CANB, n.v., photo!).

*Distribution*: New Guinea.

*Notes*: Based on a single unicate specimen; *M. steenisii* has not been recollected since the type gathering was made in 1959. In describing it, Van Ooststroom (1972) stated that *M. steenisii* is closely allied to *M. aniseiifolia*. If that is the case, then the pollen of *M. steenisii* should also be examined, to see whether the similarity it bears to *Xenostegia* spp. is superficial or whether it should be transferred to that genus.

43. *Merremia subsessilis* (Courchet & Gagnep.) T.N. Nguyen, Vasc. Plts. Syn. Vietnam. Flora 1: 183. 1990. – *Ipomoea subsessilis* Courchet & Gagnep., Not. Syst. (Paris) 3: 148. 1915. – Types: Vietnam. Lam, *Mouret 189* (syntype, P!); Ouonbi, *Balansa 811* (syntype P!), same loc., *Balansa 812* (syntype, P!); baie de Fi-tsi-long dans l'île Verte, *Balansa s.n.* (syntype, P, n.v.); Quang-yen, *d'Alleizette 187* (syntype, P!).

Misapplied: *M. collina* sensu Songkhla & Khunwasi (1993).

*Distribution*: Thailand, Vietnam, Laos.

*Notes:* Although the protologue lists a third Balansa collection without number that would be a syntype, I did not find this in Paris. There is, however, a specimen with identical locality data numbered 813 and this may be the third Balansa collection cited.

The foliose bract clasping the peduncle is distinctive in this species, as is the slightly curved corolla tube, which gives the living flower a weakly zygomorphic appearance.

44. *Merremia thorelii* (Gagnep.) Staples, Thai Forest Bull. (Bot.) 36: 98. 2008.

– *Ipomoea thorelii* Gagnep., Not. Syst. 3: 148. 1915. – Type: Vietnam, Ti-tinh, *Thorel s.n.* [syntype, P (×2)!]; Laos, Khong, *Thorel s.n.* (syntype, P, *n.v.*).  
Syn. *M. collina* S.Y. Liu, Guihaia 4: 199. 1984.

*Distribution:* China (Guangxi), Thailand, Laos, Vietnam.

45. *Merremia tuberosa* (L.) Rendle, Fl. Trop. Africa 4(2): 104. 1905.

– *Ipomoea tuberosa* L., Sp. Pl. 160. 1753; *Operculina tuberosa* (L.) Meissn.  
– Type: Jamaica, *Herb. Linn. 219.4* (LINN!), lectotype designated by D.F. Austin, Ann. Missouri Bot. Garden 62: 182. 1975).

Syn.: ?*Convolvulus paniculatus* Blanco; *Ipomoea tuberosa* var. *oligantha* Hassk.

*Distribution:* Pakistan, Sri Lanka, Myanmar, Thailand, Malaysia (Kuala Lumpur, Sabah), Taiwan, Australia, French Polynesia (Society Islands: Tahiti), Hawaiian Islands (Kaua'i, O'ahu, Maui, Hawai'i), Micronesia (Guam), Easter Island. Native in tropical America and widely dispersed through cultivation.

*Notes:* *Merremia tuberosa* has been introduced throughout the tropics as an ornamental. The vines are grown for the large, golden yellow flowers as well as the papery, indehiscent fruits (wood rose), which are used in a variety of handicrafts. It is surely more widespread in tropical Asia than the distribution above would indicate. *Merremia tuberosa* frequently naturalizes where it is introduced, especially in damp to wet sites with plenty of sun and the rampant vines soon blanket roofs, trees, and powerlines.

46. *Merremia umbellata* (L.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893.

– *Convolvulus umbellatus* L., Sp. Pl. 1: 155. 1753; *I. umbellata* (L.) G. Meyer, non L. (1759). – Type: Icon in Plukenet, Phytographia plate 167, fig. 1. 1692 (lectotype, designated by D.F. Austin, Florida Sci. 42: 221. 1979).

Syn.: *C. cymosus* Desr., *Ipomoea cymosa* (Desr.) Roem. & Schultes, *I.*

*modesta* Choisy; *I. pilosa* Houtt.; *I. sepiaria* Zoll. & Moritzzi, non Koenig; *I. tonkinensis* Gagnep., *Merremia tonkinensis* (Gagnep.) T.N. Nguyen.

*Distribution:* Nepal, India, Sri Lanka, Bangladesh, China, Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, Indonesia, Philippines, Papua New Guinea, Australia, New Caledonia, Hawaiian Islands (O‘ahu), French Polynesia (Society Islands: Raiatea, Tahiti); also widespread in tropical Africa (but absent from Madagascar), the Indian Ocean islands, the Americas.

*Notes:* Van Ooststroom (1939b, in Van Ooststroom and Hoogland, 1953) recognized two subspecies of *M. umbellata* in the Malesian material he studied: subsp. *orientalis* (Hallier f.) Ooststr., comprised plants native in the Old World, whereas subsp. *umbellata* comprised plants native in the neotropics and introduced in Malesia (see 1953 reference for characters used to distinguish the two subspecies). For many years I followed this taxonomy implicitly, but as more material became available, both from Malesia and continental Asia, the distinctions have blurred and many specimens could not be satisfactorily placed in either taxon. Latterly I have abandoned all attempts to recognize subspecies.

The difficulty is compounded because the small-flowered plants typically called *M. umbellata* intergrade with larger flowered Asian plants that have been named as *M. bambusetorum* and *M. kingii*. Indochinese material called *M. tonkinensis* also belongs in this complex and while these specimens seemed distinctive on first appraisal, they were later found to be virtually identic with Bornean material that agrees almost exactly in terms of small, oblong-lanceolate leaves, dense whitish indumentum, and small flowers with white corollas. Clearly, this whole complex requires intensive study to sort out the taxonomy. The most distinctive feature of all plants in this complex is the presence of paired stipule-like appendages at the petiole-stem junction; this feature was first pointed out by Songkhla and Khunwasi (1993) and I have since found these appendages consistently in all specimens checked; that they have never previously been reported is remarkable. On densely hairy specimens the tiny appendages may be hidden among the trichomes, but careful examination reveals that they are present.

47. *Merremia verruculosa* S.Y. Liu, Bull. Bot. Res., Harbin 7(2): 133. 1987. Type: China. Guangxi: Yongning Xian, S.Y. Liu & S.J. Wei 1355 (holotype, GXCM, *n.v.*; iso, KUN, *n.v.*).

*Distribution:* China, Thailand, Laos.



*Notes:* The excellent figure accompanying the protologue (p. 136) provides a clear visual image for this species; the curious warty outgrowths on the abaxial side of the outer sepals are distinctive and this species is not easily mistaken for anything else. As in *M. subsessilis*, the corolla tube in life has a slight curvature, giving the flowers of *M. verruculosa* a weakly zygomorphic appearance.

48. ***Merremia vitifolia*** (Burm. f.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893. – *Convolvulus vitifolius* Burm. f., Fl. Ind. 45. t. 18, f. 1. 1768; *Ipomoea vitifolia* (Burm. f.) Blume – Type: Indonesia. Java, *Garzin s.n.* (G-Burman!, lectotype designated by Staples and Jacquemoud, Candollea 60: 449. 2005).  
Syn.: *C. angularis* Burm. f.; *I. vitifolia* var. *angularis* (Burm. f.) Choisy.

*Distribution:* Nepal, Bhutan, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Laos, Vietnam, China (Hainan, Yunnan), Taiwan, Malaysia (Sabah), Indonesia (Java, Maluku, Selebes, Sumatra, Timor), Philippines (Balabac, Luzon, Palawan, Paragua).

*Notes:* A species easily recognized; corolla color varies from pure bright yellow, to yellow with a wine-red base of the throat, through paler shades of yellow to almost white.

49. ***Merremia yunnanensis*** (Courchet & Gagnep.) R. C. Fang, Fl. Reipubl. Popularis Sin. 64(1): 74. 1979. – *Ipomoea yunnanensis* Courchet & Gagnep., Notul. Syst. (Paris) 3: 151. 1915. – Types: China. Yunnan: Ta-pin-siou, *Ducloux 4454* (syntype, P!), Lou-pou, près Tong-tchouan, *Ducloux 6398* (syntype, P!), col de Piou-sé, *Delavay 3184* (syntype, P!), près de Ta-pin-tzé, *Delavay 3931* (syntype, P!); Western China, without province or locality: *Wilson 4183* (syntype, P!, iso, A!).  
Syn.: *I. yunnanensis* var. *uniflora* C.Y. Wu.

*Distribution:* China (Guizhou, Sichuan, Yunnan). Endemic.

*Notes:* Chinese floras recognize three varieties: var. *yunnanensis*, var. *glabrescens* (C.Y. Wu) R.C. Fang, and var. *pallescens* (C.Y. Wu) R.C. Fang. See Fang and Staples (1995: 296) for a key to the varieties.

### Undescribed species

There are published reports of undescribed species of *Merremia*, for example from Brunei (Coode *et al.*, 1996: 61), as well as new species yet to be described for Australia (R. Johnson, pers. comm. 4 Feb 2009). I have

seen no specimens for either of these, but the reports indicate there are still novelties awaiting discovery. Indeed, given the vast tracts of continental tropical and subtropical Asia that remain severely under-collected – Laos, Cambodia, Myanmar, and eastern Tibet among them, a region here shown to be a center of species richness for *Merremia* – it is quite likely that the number of species will increase in future.

### Excluded Species & Synonyms

- Merremia angustifolia* (Jacq.) Hallier f. = *Xenostegia tridentata* (L.) D.F. Austin & Staples
- Merremia boisianana* var. *rufopilosa* (Gagnep.) C.Y. Wu = *Merremia boisianana* var. *fulvopilosa*
- Merremia caespitosa* (Roxb.) Hallier f. = *M. hirta*
- Merremia chryseides* (Ker-Gawl.) Hallier f. = *M. hederacea*
- Merremia collina* S.Y. Liu = *M. thorelii*
- Merremia convolvulacea* Dennst. ex Hallier f. = *M. hederacea*
- Merremia crispatula* Prain = *Operculina petaloidea* (Choisy) Ooststr.
- Merremia decurrens* (Hand.-Mazz.) H.S. Kiu = *M. hirta*
- Merremia distillatoria* (Blanco) Merr. = *M. similis*
- Merremia gangetica* (L.) Cufod. = *Cocculus hirsutus* (L.) Diels; vide Van Ooststroom (1934: 245).
- Merremia hastata* Hallier f. = *Xenostegia tridentata* (L.) D.F. Austin & Staples; vide Van Ooststroom (1972b: 939) for nomenclatural notes on the *Merremia* name.
- Merremia longipedunculata* R.C. Fang = *M. poranoides*
- Merremia medium* (L.) Hallier f. = *Xenostegia medium* (L.) D.F. Austin & Staples
- Merremia nymphaeifolia* (Blume) Hallier f. = *M. peltata*
- Merremia pentaphylla* (Jacq.) Hallier f. = *M. aegyptia*
- Merremia petaloidea* (Choisy) Burkill = *Operculina petaloidea* (Choisy) Ooststr.
- Merremia platypeltis* Prain = *Operculina riedeliana* (Oliv.) Ooststr.
- Merremia riedeliana* (Oliv.) Hallier f. = *Operculina riedeliana* (Oliv.) Ooststr.
- Merremia tridentata* (L.) Hallier f. = *Xenostegia tridentata* (L.) D.F. Austin & Staples
- Merremia tridentata* subsp. *genuina* Ooststr. = *Xenostegia tridentata* (L.) D.F. Austin & Staples
- Merremia tridentata* subsp. *hastata* Ooststr. = *Xenostegia tridentata* (L.) D.F. Austin & Staples
- Merremia triquetra* (Vahl) Roberty = *Operculina turpethum* (L.) S. Manso

*Merremia turpethum* (L.) Rendle = *Operculina turpethum* (L.) S. Manso  
*Merremia wilsonii* Verdc. = *M. hungaiensis*

**Table 1.** Number of total species by region, unique species and infraspecific taxa of *Merremia* in different regions of the world.

Region	total # species in region	# unique species	# infraspecific taxa
Americas	29	27	6
Africa & Madagascar	39	31	9
Australia	13	3	—
Asia & Pacific	48	40	20
TOTAL	—	101	—

Appendix: data sources for Table 1, grouped by region:

**AMERICAS** (North, Middle, South, and West Indies)

The primary source used is an unpublished manuscript prepared for *Flora Neotropica* (Austin and Staples, circa 1979), which expands on and updates the revision by O'Donnell (1941). A number of new neotropical species have been described in recent years (McDonald, 1987, 2008; Valencia and Martinez, 1995) that have been incorporated into the working list.

**AFRICA** (including Madagascar)

The primary source for the African tropics is the Convolvulaceae listing from Lebrun and Storck (1997) with additional recent floras consulted for South Africa (Meeuse and Welman, 2001), Madagascar (Deroin, 2001), Ethiopia (Sebsebe, 2006), and Somalia (Thulin, 2006).

**AUSTRALIA**

Names were compiled from diverse historical literature for Australia, and updated against two floras that cite Australia as part of the distribution (Van Ooststroom and Hoogland, 1953; Fang and Staples, 1995). Additional names were found in Elliot and Jones (1993). Bob Johnson (pers. comm., June 2007) kindly reviewed the working list of names that resulted and provided the current taxonomy to be adopted for the forthcoming *Flora of Australia* account.

**ASIA AND PACIFIC**

For Asia the primary flora used as the foundation of the species list was

Malesia (Van Ooststroom and Hoogland, 1953, and subsequent addenda and corrigenda) with updates and additions from the floras for Saudi Arabia (Alfarhan and Thomas, 2001), Pakistan (Austin and Ghazanfar, 1979), Sri Lanka (Austin, 1980), India (Clarke, 1883; Cooke, 1905; Gamble, 1923; Saldanha and Nicolson, 1976; Babu, 1977; Bhandari, 1988; Panigrahi and Murti, 1989), Bhutan (Mill, 1999), Bangladesh (Khan, 1985), Myanmar (Kress *et al.*, 2003), Thailand (Songkhla and Khunwasi, 1993; Staples *et al.*, 2005; Staples and Traiperm, 2008), China (Fang and Staples, 1995), Taiwan (Staples and Yang, 1998), Vietnam (Nguyen, 1990), Brunei (Coode *et al.*, 1996), Peninsular Malaysia and Singapore (Turner, 1995).

For the Pacific region additional references consulted included floras for Micronesia (Fosberg and Sachet, 1977), the Marquesas (Sachet, 1975), New Caledonia (Heine, 1984), and Staples (2009). Specimens I have examined in the past two decades have been used to correct and expand the distributions compiled from the literature.

### Index of numbered collections examined

The following alphabetical list includes numbered herbarium specimens I have examined from Asia and the Pacific. Numbers correspond to the list below, which is identical with the numbering used in the text. Type specimens have been indicated with (T).

- |   |   |
|---|---|
| <b>1. <i>Merremia aegyptia</i></b>                        | <b>16b. <i>Merremia dissecta</i> var. <i>edentata</i></b> |
| <b>2. <i>Merremia aniseiifolia</i></b>                    | <b>17. <i>Merremia eberhardtii</i></b>                    |
| <b>3. <i>Merremia bambusetorum</i></b>                    | <b>18. <i>Merremia elmeri</i></b>                         |
| <b>4. <i>Merremia bimbim</i></b>                          | — var. <i>elmeri</i>                                      |
| <b>5. <i>Merremia boissiana</i></b>                       | — var. <i>glaberrima</i>                                  |
| — var. <i>boissiana</i>                                   | <b>19. <i>Merremia emarginata</i></b>                     |
| — var. <i>fulvopilosa</i>                                 | <b>20. <i>Merremia gemella</i></b>                        |
| — var. <i>sumatrana</i>                                   | — var. <i>gemella</i>                                     |
| <b>6. <i>Merremia borneensis</i></b>                      | — var. <i>splendens</i>                                   |
| <b>7. <i>Merremia bracteata</i></b>                       | <b>21. <i>Merremia gracilis</i></b>                       |
| <b>8. <i>Merremia caloxantha</i></b>                      | <b>22. <i>Merremia hainanensis</i></b>                    |
| <b>9. <i>Merremia calyculata</i></b>                      | <b>23. <i>Merremia hederacea</i></b>                      |
| <b>10. <i>Merremia cissoides</i></b>                      | <b>24. <i>Merremia hirta</i></b>                          |
| <b>11. <i>Merremia clemensiana</i></b>                    | <b>25. <i>Merremia hungaiensis</i></b>                    |
| <b>12. <i>Merremia cordata</i></b>                        | — var. <i>hungaiensis</i>                                 |
| <b>13. <i>Merremia crassinervia</i></b>                   | — var. <i>linifolia</i>                                   |
| <b>14. <i>Merremia davenportii</i></b>                    | <b>26. <i>Merremia incisa</i></b>                         |
| <b>15. <i>Merremia dichotoma</i></b>                      | <b>27. <i>Merremia kingii</i></b>                         |
| <b>16a. <i>Merremia dissecta</i> var. <i>dissecta</i></b> | <b>28. <i>Merremia korthalsiana</i></b>                   |

- 29. *Merremia mammosa***  
**30. *Merremia pacifica***  
**31. *Merremia palmata***  
**32. *Merremia peltata***  
**33. *Merremia poranoides***  
**34. *Merremia pulchra***  
**35. *Merremia quinata***  
**36. *Merremia quinquefolia***  
**37. *Merremia rajasthanensis***  
**38. *Merremia rhynchorrhiza***  
**39. *Merremia semisagittata***  
**40. *Merremia sibirica***  
 — var. *sibirica*  
 — var. *macrosperma*  
 — var. *vesiculosa*  
 — var. *trichosperma*  
 — var. *jiuhuaensis*
- 41. *Merremia similis***  
**42. *Merremia steenisii***  
**43. *Merremia subsessilis***  
**44. *Merremia thorelii***  
**45. *Merremia tuberosa***  
 — subsp. *orientalis*  
 — subsp. *umbellata*  
**47. *Merremia verruculosa***  
**48. *Merremia vitifolia***  
**49. *Merremia yunnanensis***

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B.R. E-48 (23). – B.G.O. staff QSBG 2427 (29); QSBG 5376 (23); QSBG 8386 (23); QSBG 8565 (48); QSBG 8788 (48); 17 (48); 3556 (32). – B.S. & S.P. 1519 (46). – Bacani, E. FB-16477 (20); FB-16490 (24); FB-16656 (20). – Backer, C.A. 21115 (16); 33473 (29). – Bacon, P. PB-1 (30); PB-2 (T)(7). – Balakrishnan, N. NBK-1153 (46). – Balansa, B. 811 (T)(43); 812 (T)(43); 813 (T)(43); 3535 (46); 3536 (23); 3537 (46); 3538 (46); 4459 (T)(33). – Balgooy, M.M.J. van 1735 (32); 1768 (46). – Banyeng, L. *et al.* S. 57355 (32). – Bartlett, H.H. 8159 (32). – Baré, D. 114 (32). – Bauman-

Bodenheim, M. 11317 (32). – Beauvais, J. 704 (T) (25); 1205 (T)(25). – Beccari, O. 665 (32); 3954 (T)(13). – Bermejós, J. BS-265 (32). – Bernardi, L. 14636 (16a). – Beusekom, C.F. van 12535 (24). – Beusekom, C.F. van & C. Charoenphol 1687 (46); 2017 (24). – Beusekom, C.F. van & C. Phengkklai 2649 (24). – Beusekom, C.F. van *et al.* 3825 (35); 3953 (19); 4002 (23); 4287 (43); 4473 (48); 4474 (46); 4705 (46). – Bhargava, N. 3375 (32). – Blake, S.T. 16701 (16); 23196 (16); 23286 (23). – Blewett, J.B.J. B-19 (21); B-20 (21). – Bloembergen, S. 4612 (32). – Bodinier, E. & Ducloux 272 (T)(25); Bodinier, E. & L. Martin 1806(T), in part (49); in part (25). – Boeea, Rahmat Si 1330 (32); 1532 (23); 1645 (32); 2268 (46); 3778 (23). – Bois, D. 138 (T)(5). – Bon, l'abbé 2425 (T)(46); 2813 (46); 4801 (5); 5216 (T)(46). – Boom, B.K. 25770 (40). – Bor, N.L. 6294 (27); 6689 (33); 6774 (27); 16699 (29). – Borden, T.E. FB-2714 (20). – Bourdy, G. 675 (30). – Boyland, D.E. & J.G. Gilliett 367 (16). – Bragg, K. 22 (48); 217 (48). – Brass, L.J. 545 (46); 2712 (32); 7578 (T)(20); 7646 (20); 7778 (20); 27240 (24); 27264 (32); 28540 (30); 29365 (20). – Brass, L.J. & C.T. White 145 (32). – Bray, P.S. FRI 11786 (46). – Brook, Miss W.M.A. 8281 (18); 8828 (23). – Brooke, W. 10802 (23). – Brown, R. [Bennett catalogue no.] 2755 (T)(35); 2756 (35). – Bryan Jr., E.H. 584 (32). – Bunchuai, K. 4 (46). – Bünnemeyer, W. 12477 (48). – Bureau of Science BS 483 (48). – Burgess, P.F. FRI 9222 (32); FRI 9253, in part (32), in part (6); FRI 10161 (6); SAN 25166 (18). – Burkill, I.H. Mo-2829 (16). – Burley, J.S. NGS-651 (32); NGS-666 (46). – Bush, W. 32725 (46); 32727 (46). – Byrnes, N. 2469 (20).

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