

The Identity of *Ipomoea staphylina* (Convolvulaceae) in Asia

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ABSTRACT : For the last 175 years the name *Ipomoea staphylina* has been applied throughout much of tropical Asia to one of the few lianoid species of *Ipomoea* found there. Study of herbarium specimens and living plants revealed that three distinct taxa are passing under the name *I. staphylina*. Two problems emerged: a pernicious confusion dating back to the 1930s, in which collections of *Merremia boisiana* (Gagnepain) Ooststroom were misidentified as *I. staphylina*, and, a taxonomic problem that requires delimitation of two similar species of *Ipomoea*, both heretofore called *I. staphylina*. The nomenclature is discussed for names pertinent to this taxonomic problem and all names are typified. A key to the three similar taxa and an illustration of their diagnostic characters are provided to aid in recognizing them. The synonymy and geographic distribution are summarized for the two species of *Ipomoea* and an index of numbered collections examined is provided.

KEY WORDS : Convolvulaceae, Taxonomy, Nomenclature, *Ipomoea*, *Merremia*, Floristics.

INTRODUCTION

Identification of tropical Asian Convolvulaceae for several contemporary floras brought to light a persistent confusion in the herbarium for specimens called "*Ipomoea staphylina*". This name has been applied throughout tropical Asia from peninsular India and Sri Lanka in the west across to Southeast Asia, southern China, Taiwan, and western Malesia in the east. Specimens bearing this name have been examined from numerous herbaria in Asia, Europe, and North America over the last decade; these identifications showed that with surprising frequency a yellow-flowered species of *Merremia* was being confused with a rose to greenish white-flowered *Ipomoea*. Closer inspection revealed that actually three distinct convolvulaceous taxa were involved, as the *Ipomoea* collections proved separable into two entities. Thus, in herbaria at least, application of the name *I. staphylina* is ambiguous and clarification is necessary for the species concepts involved.

This situation first came to my attention in 1985 while identifying Convolvulaceae specimens I collected in Thailand. Subsequent herbarium study and literature research led me to adopt *I. sumatrana* for Thai populations of the widespread rose-flowered *Ipomoea*. In the ensuing decade, when research began on floristic accounts of the family for the *Flora of China* and the second edition of the *Flora of Taiwan*, it became clear that the problem of

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species identification extended beyond the Southeast Asia region. In order to resolve the confusion I examined representative specimens from throughout the region where the name "*Ipomoea staphylina*" has been used, in conjunction with examination of type specimens for the names nomenclaturally involved. I first dispose of the pernicious confusion between *Merremia boisiana* and the genuine *Ipomoea*, then turn to the species delimitation issue.

A CASE OF MISTAKEN IDENTITY

Herbarium collections examined while preparing the Convolvulaceae account for the English-language *Flora of China* brought to light a significant number of specimens identified as *I. staphylina* that proved on closer examination to be a species of *Merremia*. Some Chinese specimens bore annotations made as recently as 1990. This calls into question the validity of the descriptive information provided in Chinese provincial and national floras, because the information seems very clearly to be based on a mixed concept including at least two taxa.

The misidentification seems to have originated with determinations made by E. D. Merrill for specimens collected on Hainan Island off the southeast coast of China in the 1930s (Wu 1965; Ferguson *et al.* 1977). Merrill confused in the dried state *Merremia boisiana* (Gagnepain) Ooststroom and a genuine *Ipomoea*, calling both *I. staphylina*. Numerous duplicates of these Hainanese collections were widely disseminated by the Arnold Arboretum to herbaria located in Asia, Europe, and North America.

That Merrill confused two such distinctive species under one name is understandable in this case because in the dried state there are superficial similarities between them. The confused taxa are both expansive lianas that climb high into the forest canopy or run over considerable areas of ground if there is no support on which to twine. Both have entire, cordiform leaves with similar secondary venation and large inflorescences of showy flowers (Fig. 1). There the similarities end, however. *Merremia boisiana* has bright yellow, campanulate corollas arranged in erect inflorescences that are crowded, more or less flat-topped umbelliform panicles or thyrses (Fig. 1). Its seeds are glabrous. In contrast, the *Ipomoea* has tubular-funnelform corollas that are greenish white outside, pink to rose within, arranged in pendulous, lax, racemiform inflorescences (Fig. 1). Like all species of section *Eriospermum*, the seeds of the *Ipomoea* have long woolly hairs, especially along the angles of the seeds; the hairs are rather persistent. Furthermore, the leaf shape and texture are subtly different, the tertiary venation is distinct, and there are subtle differences in the sepals and capsules that are characteristic for *Ipomoea* and *Merremia*. As remarked by Verdcourt (in Ferguson *et al.* 1977), these latter facies are readily discernible to an experienced eye but impossible to convey in words, making them useless as diagnostic characters.

A key to similar taxa and an illustration of their diagnostic features (Fig. 1) are presented following the next section, in which the taxonomic problem in *Ipomoea* is discussed. Collections of *Merremia boisiana* that have been misidentified as *I. staphylina* in herbaria are included in the index to numbered collections examined to facilitate the correct identification of duplicates in herbaria not consulted in the course of this study.

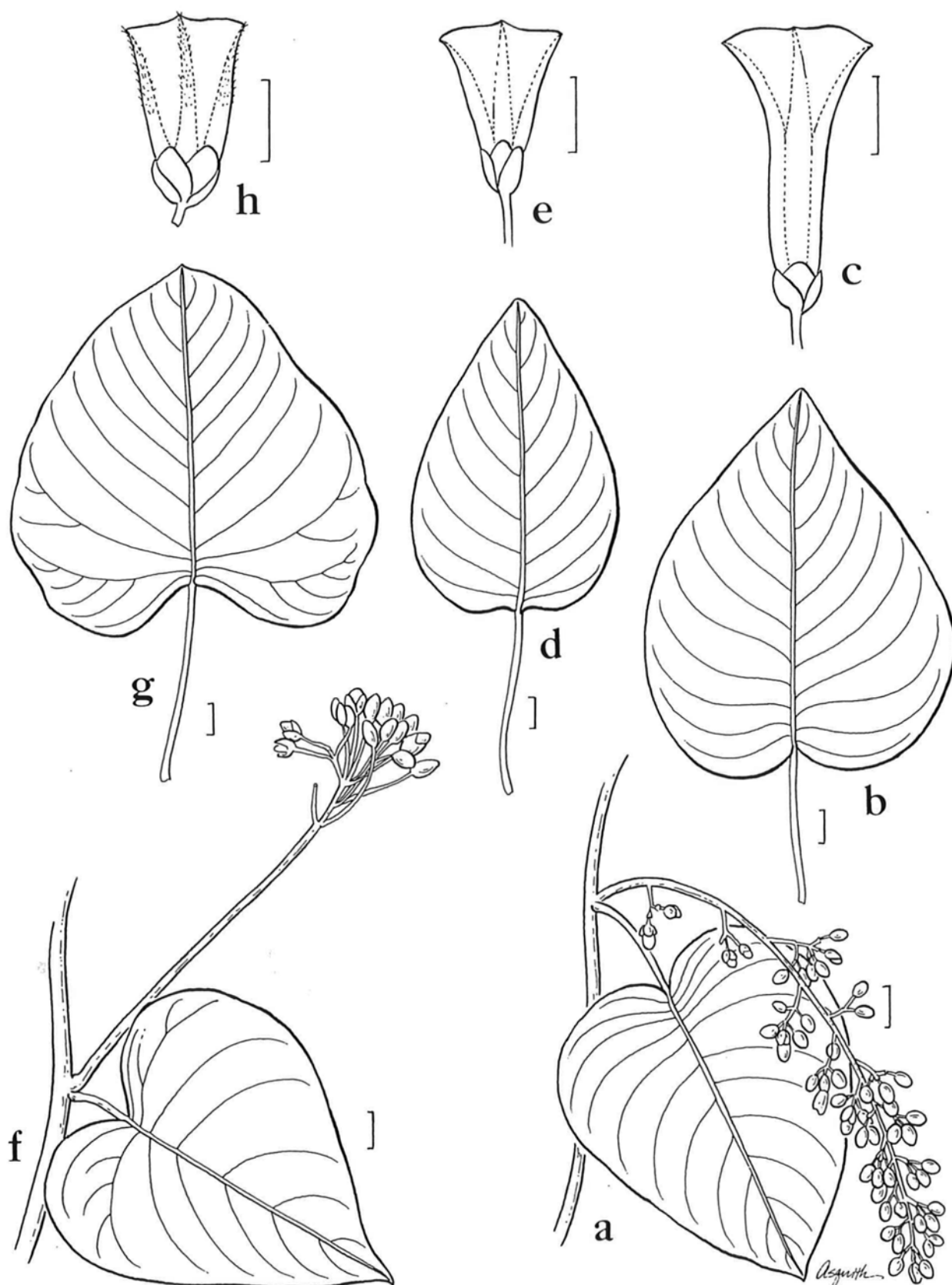


Fig. 1. Comparative features for *Ipomoea sumatrana*, *I. staphylina*, and *Merremia boisiana*. scale bars = 1 cm. *Ipomoea sumatrana* a) flowering branch, b) leaf [both from S.K. Lau 588 (A)], c) flower [from K. Larsen 8419 (L)]; *Ipomoea staphylina* d) leaf, e) flower [both from S. Perianayagam RHT 26057 (L)]; *Merremia boisiana* f) flowering branch [W.T. Tsang 27409 (A)], g) leaf [H.Y. Liang 61780 (B)], h) flower [S.K. Lau 155 (B)]

A TAXONOMIC PROBLEM

As mentioned previously, I first became aware that two species were passing under the name *Ipomoea staphylina* in 1985, while identifying Thai collections. The critical piece of literature that brought this problem to light was Simon Van Ooststroom's detailed treatment of *Ipomoea* (Ooststroom 1940) that appeared prior to the *Flora Malesiana* account of the Convolvulaceae. Ooststroom (1940) investigated the identity of plants called *I. staphylina* only in the Malesian geographic region. He found consistent differences in leaf blade shape and texture, the number of secondary veins, the corolla shape and size, and the height at which the staminal filaments are inserted above the base of the corolla tube (Ooststroom 1940). Although he did not cite any extra-Malesian collections, Ooststroom must have had genuine *Ipomoea staphylina* available for comparative purposes. He concluded that distinct species were involved and took up the name *I. sumatrana* for Malesian plants formerly called *I. staphylina*. Subsequently, Ooststroom maintained *I. sumatrana* in floristic treatments for Malesia (Ooststroom & Hoogland 1953) and Java (Ooststroom 1965).

Ooststroom (1940) provided a thorough explanation of the characters on which he based this taxonomic change. When I investigated the same characters for Thai collections, I found that they keyed out to *I. sumatrana* rather than *I. staphylina*. This clarified the action of Kerr (1954), who took up *I. sumatrana* for Thai plants without offering any explanation for doing so. These characters are incorporated, and amplified, in the key to similar plants that follows.

Based on these investigations it seemed clear that Malesian and Thai collections were referable to *I. sumatrana*, however, the status of plants called *I. staphylina* elsewhere in Asia was uncertain. A survey of regional floras indicated that the name *I. staphylina* has been used in Ceylon (Austin 1980), India (Clarke 1883, Cooke 1905, Kanjilal *et al.* 1939, Saldanha and Nicolson 1976), China (Wu 1965, Anonymous 1974, Fang 1979, Fang & Huang 1979), Taiwan (Chang 1978), and Laos (Gagnepain & Courchet 1915). Based on its exclusion from floras or checklists *I. staphylina* (or *I. sumatrana*) is not known to occur in Pakistan (Austin & Ghazanfar 1979), Nepal (Vickery 1982), Bangladesh (Khan 1986), or the Andaman Islands (Parkinson 1923). The status of *I. staphylina* in Myanmar (formerly Burma) is ambiguous as I have not been able to examine many floras for this region. When I visited the only active herbarium in Myanmar [RAF, in 1985 located at Yezin, Pyinmana district] I found no specimens labelled *I. staphylina* or *I. sumatrana* conserved there.

In order to resolve the taxonomic status of plants called *I. staphylina* in Asian countries outside Thailand and Malesia, loans were requested from the herbaria A, B, BM, BR, CAL, CGE, F, G, GH, GOET, GXMI, H, HAL, JE, K, KUN, L, M, MO, NY, S, TAIF, TI, U, UC, and W. Loans were requested from European herbaria likely to have type material for "*I. staphylina*" and its synonyms, whereas for Asian and American herbaria the emphasis was on seeing representative material from throughout the geographic region where "*I. staphylina*" is reported to occur. The results are summarized below. A key to the three similar taxa and an illustration of their diagnostic features are followed by discussions of the nomenclature and typification for *I. staphylina*, *I. sumatrana*, and relevant synonyms. The geographic distribution for each species is summarized.

KEY TO SIMILAR PLANTS

(amplified from Ooststroom (1940))

1. Corollas yellow, campanulate, hairy outside; pollen nonspinulose, 3-colpate; seeds glabrous; inflorescence erect, dense, a \pm flat-topped, umbelliform panicle or thyrse
..... *Merremia boisiana*
1. Corollas greenish white outside, rose-pink within, campanulate to tubular-funnelform, glabrous outside; pollen minutely spinulose, pantoporate; seeds with long silky hairs on angles; inflorescence pendulous, lax, \pm racemiform
2. Leaves ovate to ovate-oblong, thin textured, with 7 or 8 (-11) secondary veins on either side of the midrib; corolla broadly funnelform to campanulate, ca. 2 cm long; filaments inserted ca. 2.5 mm above base of corolla tube *Ipomoea staphylina*
2. Leaves always ovate to broadly ovate, thicker and more leathery, with 11-14 secondary veins either side of the midrib; corolla tubular-funnelform, ca. 3-3.5 cm long; filaments inserted ca. 1.5 mm above base of corolla tube *Ipomoea sumatrana*

NOMENCLATURE

Ipomoea staphylina Roemer & Schultes, Syst. Veg. 4: 249. [Jan.-June] 1819. TYPE: a substitute name based on the same type as *I. racemosa* Roth.

Ipomoea racemosa Roth in Roemer & Schultes, Syst. Veg. 4: 249. [Jan.-June] 1819, *nomen pro syn.*; Nov. Pl. Spec. 115. [Jan.-June] 1821, *non* Poirlet in Lamarck, (1816). TYPE: India Orientale, [Nundidrug, 17 Mar. 1806,] *B. Heyne s.n.* (holotype, B†; neotype, K!, here designated).

Convolvulus racemosus Roemer & Schultes, Syst. Veg. 4: 302. 1819. TYPE: "India Orientale," Klein [415] (lectotype, here designated, B-Willdenow cat. 3693, *n.v.*; IDC 7440. 255: I. 4).

Convolvulus kleinii Sprengel, Syst. Veg. 1: 606. 1824, excl. note 4: 61. 1827. TYPE: "India Orientale," Klein [415] (holotype, B-Willdenow cat. 3693, *n.v.*; IDC 7440. 255: I. 4).

Convolvulus malabaricus auct. *non* Linnaeus (1753): Roxburgh in Wallich, Fl. Indica ed. 1, 2: 49. 1824, Wallich, Fl. Indica ed. 2, 1: 469. 1832.

Nomenclatural discussion

Roth effectively pre-published a number of his new species in the Roemer and Schultes work by sending them a copy of his unpublished manuscript (Manitz 1983). Roemer and Schultes elected not to use the name Roth proposed for this species because Poirlet had already taken up the epithet *racemosa* for a different species. Instead, Roemer and Schultes called Roth's new species *I. staphylina* and listed *I. racemosa* Roth in synonymy with the remark, "*Nomen mutandum erat ob racemosam Poirletii.*" Their name is implicitly based on the same type specimen as Roth's name; it seems doubtful that Roemer and Schultes actually saw it. The Heyne specimen on which Roth based his *I. racemosa* (*i.e.*, the holotype) was almost certainly destroyed in the Berlin herbarium, where Roth's herbarium was transferred in 1925/26 (Stafleu & Cowan 1983). A recent loan from B to BISH did not contain any Heyne specimens.

According to Steenis-Kruseman (1950), the top set of Heyne's collections is preserved in the former East India Company herbarium, now incorporated in the Wallich herbarium at

Kew. One set of Heyne's duplicate specimens was sent to Roth, others were widely distributed to contemporary European botanists and today Heyne specimens are to be found in several, primarily European, herbaria (Steenis-Kruseman 1950, Stafleu & Cowan 1979). It is unclear whether Roemer and Schultes ever saw any of them, therefore the typification of *I. staphylina* is problematic. At the suggestion of Dr. Bernard Verdcourt, designation of a neotype seems to be the best means to stabilize the nomenclature.

Loan requests to major European herbaria brought to light only two *bona fide* Heyne specimens, both conserved in the herbarium of the Royal Botanic Gardens, Kew. One is located in the Wallich herbarium under catalog number 1341A; the second is filed in the general herbarium. Of the two, the latter sheet is the better candidate as neotype although it has two specimens mounted on it. The lefthand portion is *Ipomoea arachnosperma* Welwitsch dated March 1800 and clearly states " *ab amiciss. Heyne.* " The right side of the sheet bears a scrappy specimen consisting of a bit of stem, a single detached leaf, and 4 inflorescences with buds and flowers that are undeniably *I. staphylina*. The handwritten label for this collection bears little information and is difficult to read. It apparently says:

24. Convolvul.
Nundgdr. Mars. 17,
1806.

The locality is probably Nundidrug (also spelt Nandigdroog and other variants), about 40 mi. N-NE of Bangalore, in what is now the state of Karnataka. The right side of this Kew specimen from the general herbarium is well documented original Heyne material from the appropriate time period and it is therefore here designated as the neotype collection for *Ipomoea racemosa* Roth and also for *I. staphylina* Roemer & Schultes.

No specimens that could be construed as types for either *C. racemosus* Roemer and Schultes or *C. kleinii* Sprengel came to light in the numerous loans examined. Examination of the IDC microfiche for the Willdenow herbarium conserved at Berlin revealed a single specimen collected by Klein that is here interpreted as the holotype for *C. kleinii* Sprengel and is designated the lectotype for *C. racemosus* Roemer and Schultes. Sprengel's protologue ends with the parenthetical expression " (*C. racemosus* Klein W. herb.) " indicating that the Klein specimen he examined was in the Willdenow herbarium. It is likely that the identical specimen was seen by Roemer and Schultes a few years previously; certainly the Latin descriptive phrase they published is identical to that hand-written on the outer cover for Willdenow specimen 3693.

It is ironic that Roemer and Schultes ended up describing the same species under two names, once as *Ipomoea staphylina* and again as *Convolvulus racemosus*, having rejected Roth's use of that epithet in *Ipomoea* only to take it up themselves on another page in the same work under a different genus, thereby creating a superfluous name!

Distribution:

India [Assam, Karnataka, Kerala, Madras, Tamil Nadu, West Bengal], Sri Lanka.

The contemporary distribution of *I. staphylina* is confined to south-central and southwestern peninsular India. Clarke (1885) reported *I. staphylina* to be common in "the

South Deccan Peninsula" which includes parts of the present day Indian states of Karnataka, Andra Pradesh, and Tamil Nadu. Historical collections and literature reports from northeastern India (Assam, West Bengal) and Sri Lanka are not supported by recent voucher specimens. Austin (1980) included *I. staphylina* for Sri Lanka on the basis of a specimen dated 1883 but saw no recent collections from there. As noted above, no collections of *I. staphylina* (or *I. sumatrana*) have been seen from Myanmar (Burma), which probably reflects the inadequate state of plant collecting for that country and does not conclusively indicate that the species does not occur there.

***Ipomoea sumatrana* (Miquel) Ooststroom, Blumea 3: 571. 1940.**

Basionym: *Lettsomia sumatrana* Miquel, Fl. Ned. Ind. suppl. 560. 1860. TYPE. INDONESIA. Sumatra, west coast, Soengi Pagoe, *Teysmann Hb. 1150* (holotype U 004137!; isotypes B†, CAL n.v., L 901,166-...22!).

Convolvulus polyanthus Wallich, Cat. no. 1378. 1828. *nomen nudum*.

Ipomoea staphylina Roemer & Schultes var. *malayana* Prain, J. Asiatic Soc. Bengal 63: 106. 1894. TYPE. Malaysia, Perak, Larut district, Nov. 1881, *Dr. King's collector* [Kunstler] 2538 (syntypes, CAL n.v., K!), Oct. 1883, 5091 (syntypes, CAL n.v., K!); Malaysia, Penang, s.d., *Wallich distr. 1378* (syntypes, CAL n.v., K!, K-Wallich, n.v.).

Ipomoea rotundisepala Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 206. 1911. TYPE: Taiwan, in monte Morrison, Nov. 1906, *T. Kawakami & U. Mori 1915* (holotype, TII!; isotype, TAIF n.v., photo A!).

Ipomoea staphylina sensu auct. non Roemer & Schultes (1819); C. B. Clarke (1885, p.p. as to specimen of Wallich), Gagnepain & Curchet (1915), Anonymous (1974), Chang (1978), Fang (1979), Fang & Huang (1979).

Nomenclatural discussion

David Prain cited Wallich Catalog 1378 and unspecified Kunstler collections in his protologue for *I. staphylina* var. *malayana*; Prain worked at Calcutta and distributed duplicates to Kew. Four sheets were sent on loan from Kew, placed in a type cover for this taxon. There are two sheets bearing duplicates of *Wallich distr. 1378* neither of which was annotated by Prain, though he cited this collection in the protologue for his new variety. The other two sheets bear printed labels stating "Dr. King's Collector" and must correspond to the Kunstler collections cited in Prain's protologue, though the collector is not stated on the label. The handwritten data on these two labels indicates Perak, Larut district, as the collection locality and the dates and localities agree with Kunstler's collecting itinerary (Steenis-Kruseman 1950). Many of Kunstler's specimens were distributed from Calcutta with printed labels stating only "Dr. King's Collector" (Steenis-Kruseman 1950).

The two Kunstler specimens, numbered 2538 and 5091, bear Prain's handwritten annotations identifying them as *I. staphylina* var. *malayana*. A handwritten note from Prain is pinned to sheet 2538; it records for the first time the equivalence of Miquel's *Lettsomia sumatrana* with the taxon Prain chose to recognize as a variety of *I. staphylina*. Prain's note records that a duplicate of *Teysmann 1150* was studied in the Calcutta herbarium while preparing the description of his *I. staphylina* var. *malayana*; I have not examined this Calcutta isotype specimen. The observations in Prain's handwritten note are paraphrased in his published description of the new variety. Given the detailed manuscript notes and

annotations on Kunstler's specimen 2538, I here designate it as the lectotype for *I. staphylina* var. *malayana*.

Ipomoea rotundisepala Hayata was reduced to synonymy under *I. staphylina* by Chang (1978); examination of the holotype confirms that it is actually *I. sumatrana*.

Distribution:

China (SE Guangxi, Hainan, Hong Kong, S Yunnan), W Taiwan, Laos, Vietnam, Thailand, peninsular Malaysia, Indonesia (Sumatra, Java, Sumbawa).

It is to be expected that *I. sumatrana* occurs in Cambodia but no specimens from there have been seen. I've collected it from western Thailand near the border with Myanmar and it is to be expected that the species occurs in the Tennaserim Hills.

ACKNOWLEDGMENTS

The curators of the herbaria cited in the text kindly permitted the loan of specimens for this study or investigated their collections on my behalf but found no material. Ching-I Peng (HAST) facilitated the loan of critical type specimens. The Forest Herbarium (BKF), Royal Forest Department supported collecting and field studies in Thailand in 1985. The Harvard Botany Libraries (Judith Warnement, Jean Cargill), Bishop Museum Library (Patrice Belcher), and the University of California, Davis, library arranged loans for IDC microfiches and photocopied critical literature unavailable in Honolulu. Staff and volunteers of the Herbarium Pacificum (BISH) handled loans and annotated specimens. The Bishop Museum granted me leave in 1993 to participate in the *Flora of China* Project, which subsidized travel to Harvard (A/GH). The illustration was prepared by Anna Stone Asquith. Roy Vickery, the Natural History Museum, as well as Alan Radcliffe-Smith and Melanie Thomas at Kew kindly assisted in transcribing cryptic locality data and Bernard Verdcourt offered his opinion on typification. I offer my sincere thanks to one and all for the assistance, services, facilities, and collections so generously placed at my disposal in the course of this study.

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INDEX OF SPECIMENS EXAMINED

The following index includes all numbered specimens examined in the course of this study as well as those cited in literature (Ferguson *et al.* 1977; Ooststroom 1939, 1940; Kerr 1954) that I believe are accurately identified.

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| 1. = <i>Ipomoea staphylina</i> | 3. = <i>Merremia boissiana</i> |
| 2. = <i>Ipomoea sumatrana</i> | (T) = type specimen |

Anonymous 11034 [in herb. BKF]: 2.
Beddome, R. H. 5578: 1.
Bois, D. 138 (T): 3.
Bon, l'Abbé 4801 (T): 3.
Campbell, W. H. 855: 1.
Canton Christian College [CCC] 7778: 2; 9641: 3.
Charoenphol et al. 4513: 2.
Chun, N.K. & Tso, C.L. 44277: 2.
Clarke, C. B. 10433B: 1.
Clemens, J. & M. S. 3238: 3.
Collins, Mrs. D. J. 1274: 2; 1330: 2; 1651: 2.
Curtis, C. 470: 2.
Elbert, J. 3740: cf. 2.
Ford 426 (p.p.): 3.
Hammond 1827: 3.
Harmand 142: 3.
Henderson [sub Singapore Field no.] 22925: 2.
Henry, A. 8574: 3.
Heyne, B. 24 (T): 1.
Hong Kong Botanic Garden herb. 426: 2; 426a: 2.
How, F.C. 71860: 3.
Jiang, Fu-Xin 7710: 3.
Kao, M. T. 10769: 2.
Kawakami, T. & U. Mori 1915 (T): 2.
Kerr, A. F. G. 4518: 2; 6427: 2.
King's collector 1119: 2.
King's collector (= Kunstler) 2538 (T): 2; 5091 (T): 2.
Klein 415 (T): 1.
Larsen, K. 8419: 2.
Lau, S.K. 155: 3; 588: 2; 1066: 2; 3090: 2; 4918: 2.
Lei, C.I. 614: 3; 865: 3.
Liang, H.Y. 61780: 3; 66422: 2..
Lingnan Univ. herb. 17262: 3.
Lörzing 4234: 3; 4723 (T): 3.
Marcan, A. 1013: 2.
McClure, F. A. 1533: 2; 9641: 3; 3090: 3; 20126: 3.
Meebold, A. 8299: 1.

- Perianayagam, S. RHT 26057: 1.
Perianayagam & Xavier RHT 26331: 1.
Potts, J. 62: 1.
Rensch, Mrs. 619: 2.
Singapore Field no. [legit Henderson] 22925: 2.
Spire 1049: 3.
Staples, G. & Th. Wanthaniyakun 293: 2; 295: 2; 309: 2.
Staples, G. & Th. Wongprasert 137: 2; 169: 2; 172: 2; 346: 2.
Subramanian, K. N. 1030: 1.
Teysmann herb. 1150 (T): 2.
Tsang, Wai-Tak 513: 3; 27409: 3; 30075: 3.
Tsang & Fung 197: 3.
Van Beusekom, Phengkhilai, Geesink & Wongwan 4040: 2.
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圓萼牽牛(旋花科)在亞洲之鑑定

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摘 要

一百七十五年來，熱帶亞洲地區都以 *Ipomoea staphylina* 為圓萼牽牛及其相似種類之學名。根據臘葉標本及活植物之觀察研究，證實 *I. staphylina* 包括三種不同植物。問題之產生可追溯到1930年代，*Merremia boisiana* 之標本被鑑定成 *Ipomoea staphylina*，而且其中包含二相似種。本文討論相似種間之命名問題，同時對每一學名都列有模式標本。為鑑定方便起見，亦提供相關種類之檢索表，及主要區分特徵之圖鑑；同時提供圓萼牽牛(*Ipomoea staphylina*)及蘇門答臘牽牛(*I. sumatrana*)兩種之異名、分布及標本索引。

關鍵詞：旋花科，分類，命名，牽牛花屬，菜欒藤屬，區系誌。