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A synoptic revision of the golden glories, genus *Decalobanthus* (*Convolvulaceae*)

G. Staples[1]

Key words

biodiversity
Convolvulaceae
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Malesia
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taxonomy

Abstract Eighteen species of *Decalobanthus* are recognized in this concise revision of the genus. Two new combinations are made and one new name is proposed to accommodate a change in rank. The genus is centered in Southeast Asia and Malesia, with outlier species in the tropical Pacific and one species that reaches the Neotropics; a single wide-ranging species extends from eastern Tropical Africa and Madagascar in the west to the Hawaiian Islands in the east. Each species is provided with a diagnosis, summary of the species' ecology, compiled vernacular names, and uses. Distributions are mapped based on herbarium voucher specimens. Where appropriate, typifications and nomenclatural problems are explained and comments on morphological variation and the need for further study are highlighted. Selected species are illustrated with colour photos of living plants. An index of numbered collections examined is provided to aid in specimen identification and herbarium curation.

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INTRODUCTION

This study provides a concise taxonomic revision for the genus *Decalobanthus* Ooststr., another in a series of taxonomic studies following on from, and indicated by, Simões & Staples (2017). The reasons and rationale for the revisions having already been explained in some detail (Simões & Staples 2017, Staples et al. 2020). Suffice it to say that the genus name *Decalobanthus* was taken up in 2017 as a monophyletic clade teased out of the former polyphyletic assemblage *Merremia* Dennst. ex Endl. sensu lato (s.lat.). The newly expanded genus as defined in this revision comprises 18 species, mainly distributed in tropical Asia and Malesia, with outlier species extending westward across the Indo-Pacific as far as Madagascar and eastern coastal Africa, and eastward across the tropical Pacific to the Neotropics. *Decalobanthus* comprises lianas, often of large size, always with simple, entire leaves, showy flowers that are yellow or white, and fruits that are typically valvate capsules with a peculiar bicoloured schema: the upper part of the fruit wall dehisces so that the capsule apex is straw-yellow, while the lower portion is brown or blackish. In this revision two additional fruit types are described for the first time.

Unlike the preceding study, which was monographic in scope (Staples et al. 2020), the present paper presents a synoptic revision that focuses on the taxonomically informative characters that enable species (or infraspecific taxon) recognition. Although some species included here in *Decalobanthus* have been sampled for molecular analysis the greater part of them awaits genetic sampling. In fact, it is difficult to know just which *Decalobanthus* taxa have actually been sampled, because discrepancies have come to light between the terminal taxa appearing in the trees presented by Simões et al. (2015: f. 1, 2) and the supporting vouchers cited in the appendix to that work: either no voucher is cited or some vouchers appear to be wrongly identified. Three species can confidently be counted as sampled for molecular systematic analysis by Simões et al. (2015): *D. borneensis* (Merr.) A.R.Simões & Staples (2 accessions), *D. mammosus* (Lour.) A.R.Simões & Staples, and *D. peltatus* (L.) A.R.Simões & Staples (2 accessions). Other names appearing in the trees have problems: *Merremia gracilis* E.J.F.Campb. & Argent appears in the tree but has no voucher cited in the appendix; *D. sumatranus* Ooststr. appears in the tree with 2 accessions, only one of these has a voucher cited and that is from Borneo rather than Sumatra so the identity is doubtful. Suffice it to say, more genetic study is needed when it becomes possible to collect suitable samples. It is likely that the backbone of the *Decalobanthus* clade is accurate, even if some terminal taxa cannot be taxonomically verified at this time. Some critical areas for focusing a future molecular study are pointed out in the species commentaries.

The common name 'golden glories' was recently coined (Staples 2011), based on the prevalence of yellow flowers in *Merremia* s.lat. and playing off the name 'morning glory' used generally for species of *Ipomoea* L. grown in cultivation. The common name 'golden glories' is very appropriate for *Decalobanthus* species, about half of which have yellow flowers in various shades, some small and borne in profusion, others of large size and quite showy.

Historical issues of generic concept development have been discussed by Staples et al. (2020) and it is not necessary to repeat those here other than to say that the same problems evident throughout the history of *Convolvulaceae* studies are applicable to *Decalobanthus* as well. A concise review of the taxonomic history follows.

[1] Harvard University Herbaria, 22 Divinity Ave., Cambridge MA 02138, USA; e-mail: geozsg@gmail.com.

TAXONOMIC HISTORY

The genus *Decalobanthus* was first recognized in 1936 (Van Ooststroom 1936) and was treated as a monospecific genus in the Flora Malesiana account for *Convolvulaceae* (Van Ooststroom & Hoogland 1953). It remained thus for the next 60 years or so, until molecular phylogenetic studies (Simões et al. 2015) disclosed that the type species, *D. sumatranus*, was embedded in one clade of the polyphyletic grade *Merremia* s.lat. A new classification was proposed soon thereafter (Simões & Staples 2017) that recognized monophyletic lineages segregated out of *Merremia* s.lat. and the expanded taxonomic concept for *Decalobanthus* then comprised 12 species. More recently, Simões et al. (2020) made four more new combinations in *Decalobanthus* for ambiguous taxa that had been left 'parked' under the old concept for *Merremia* s.lat. This recent paper did not add any new molecular analysis and failed to correct any of the problems noted above for the 2015 publication. Additional discrepancies and problems with this recent paper (Simões et al. 2020) are rectified, where possible, in the comments under individual species in the Taxonomic part. The current circumscription for *Decalobanthus* in this revision comprises 18 species and one variety.

MATERIALS & METHODS

This taxonomic study is based firstly on study of more than 770 herbarium collections examined between 1976–2021, either by in-person visits or via loans, from the herbaria A, AAU, ANDA, B, BCU, BISH, BKF, BM, BO, C, CMU, E, F, G, G-DC, G-PREL, GH, HAST, HITBC, K, KEP, KKU, KLU, KUN, L, M, MBK, MO, NA, NY, P, PNH, PSU, PTBG, QBG, S, SAN, SAR, SING, SINU, TAI, TAIF, TCD, UPS, and US (for abbreviations see Thiers continuously updated). Between 1985–2018 field work and collecting enabled study of living plants for five species: *D. borneensis* (Malaysia – Peninsula, Sabah), *D. clemensianus* (Ooststr.) A.R.Simões & Chatrou (Malaysia – Sabah), *D. mammosus* (Thailand), *D. peltatus* (French Polynesia; Malaysia – Peninsula, Sabah; Singapore; Thailand), *D. sumatranus* (Indonesia – Sumatra).

In the later stages of manuscript preparation (i.e., during 2020–2021), after the novel corona virus prevented herbarium visits and direct access to herbarium specimens, the draft was finalized by study of digital images for selected herbarium specimens provided by A/GH, BRIT, BRUN, CR, E, FI, L, LE, NY, P, PPI, PR, SING, TNM, U, UC, US, and WAG. The proliferation of online virtual herbaria in recent years has proven enormously beneficial for checking many details and verifying numerous identifications made over the previous three decades. In particular the consolidation sites such as the Australasian Virtual Herbarium (https://avh.chah.org.au, last accessed 30 January 2021), where digital images were examined for specimens in BRI, CANB, CHR, MEL, and NSW, and the Chinese Virtual Herbarium (2020) where images for specimens in GXMG, IBK, IBSC, IMDY, NAS, PE, and WUK were consulted. These sites were supplemented by several institutional online herbaria maintained, for example, by the Conservatoire et Jardin Botanique de la Ville de Genève (http://www.ville-ge.ch/musinfo/bd/cjb/chg), the Royal Botanic Gardens, Kew (http://www.kew.org/herbcat), the Naturalis Biodiversity Center (https://bioportal.naturalis.nl), the New York Botanical Garden (http://sweetgum.nybg.org/science/vh/), the Museum National d'histoire Naturelle, Paris (https://science.mnhn.fr/institution/mnhn/item/search/form), and the Smithsonian Institution's Botany Department (https://collections.nmnh.si.edu/search/botany/). Specimens seen online only are marked with an asterisk (*).

Also in the later stages of manuscript preparation, numerous online social media groups for plants and natural history enthusiasts were explored for colour images of *Decalobanthus* plants in the field, including among others: iNaturalist (2008 and ongoing), Co's Digital Flora of the Philippines (2012 to present), Convolvulaceae group on Facebook (2011 to present), and Phytoimages (Nickrent et al. 2006 onwards).

Ecological data and elevation ranges were compiled from herbarium specimen labels and summarised; vernacular names and uses were compiled from specimen labels and the published literature, with the source cited for each item. Distribution maps were prepared using QGIS (2021) freeware from coordinates generated directly from a BRAHMS® (https://herbaria.plants.ox.ac.uk/bol/, last accessed 23 June 2021) specimen database for *Convolvulaceae* created by the author beginning in 2002 and comprising more than 37 500 specimen collection records and linked data. Colour photographs used to prepare species plates have been loaned by many colleagues and friends, their images are credited individually in the figure legends, citing voucher specimens where available.

TAXONOMY

Decalobanthus

Decalobanthus Ooststr. (1936) 99, A.R.Simões & Staples (2017) 568. — Type: *Decalobanthus sumatranus*.

Merremia Dennst. ex Endl. section *Wavula* Ooststr. (1939a) 266. — Type: *Merremia similis* Elmer (= *Decalobanthus distillatorius* (Blanco) Staples).

Merremia section *Hailale* Hallier f. (1913) 379. — Type: *Merremia nymphaeifolia* (Blume) Hallier f. (= *Decalobanthus peltatus* (L.) A.R.Simões & Staples).

Woody lianas or large herbaceous climbers; roots sometimes enlarged, tuberous. *Indumentum* comprising simple trichomes on the plant body (and corollas of *D. bimbim*, *D. boisianus*, *D. ooststroomii*), sessile glandular hairs on the corolla exterior, stalked glandular hairs on the staminal filaments, and 2–3 mm long, uniseriate trichomes sometimes present on the anther connectives (*D. elmeri*, *D. peltatus*). *Stems* twining or prostrate, smooth or striate (never winged), sometimes lenticellate, fistulose or solid. *Leaves* simple, always entire, petiole basally or peltately attached; venation pinnate, secondary veins arcuate and curving toward margin, flat or impressed adaxially, prominent abaxially. *Inflorescences* fundamentally cymose, aggregated into panicles or corymbs, sometimes umbelliform, rarely flowers solitary; peduncle long, naked, only branched toward apex; lowermost bract often foliaceous, upper bracts and bracteoles reduced, deciduous. *Flowers* small to very large, diurnal, odourless; sepals strongly convex (boat-shaped), accrescent and persistent in fruit; corolla usually glabrous outside (sericeous to tomentose in *D. bimbim*, *D. boisianus*, *D. ooststroomii*), granulose-glandular outside with tiny golden glands (in *D. bracteatus*, *D. elmeri*, *D. mammosus*, *D. pacificus*), midpetaline bands without distinct dark lines; stamens included or protruding, lower filaments adnate to corolla tube, margins glandular hairy, upper filaments free, thread-like, glabrous, anthers spirally twisted at dehiscence, sometimes tardily so, in *D. elmeri* and *D. peltatus* with very long tufts of hairs on the anther connectives; pollen almost exclusively tricolpate. *Fruits* of 3 distinct types: in most species valvate capsules, the 4 valves sometimes splitting into several smaller segments, distinctively bicoloured: the exocarp partially delaminating so that the lower fruit wall remains dark brown or black and the apical portion is straw-yellow after the exocarp falls away; in *D. borneensis*, *D. bracteatus*, and *D. pulcher* indehiscent berries, blackish, dry, 2- to many-seeded; in *D. discoidespermus* a chartaceous utricle, brittle, translucent, indehiscent, 1-seeded. *Seeds* usually 4, or 10 (or more) and carinate, or 1 and depressed quatrefoil, pu-

bescent at first, sometimes with longer hairs along the angles, often glabrescent later. *Cotyledons* 2, epigeous, petiolate; blades broadly obovate, apices deeply emarginate.

Distribution — 18 species, centered in Malesia and continental Southeast Asia and extending eastward across the tropical Pacific with one species found in the Neotropics. A single species, *D. peltatus*, extends its distribution westward to coastal East Africa, Madagascar and throughout the Indian Ocean Islands, as well as eastward across the Pacific as far as the Hawaiian Islands, where it is naturalized. The greatest concentration of species occurs on Borneo, where four endemic species are found. The recent report (Simões et al. 2020) that *Decalobanthus* occurs on 'Santa Cruz Island, North America' is erroneous.

Note — The polymorphism in fruit types in *Decalobanthus* seems surprising at first, because we have historically been trained to think one genus has only one fruit type. However, molecular phylogenetics has turned this received wisdom upside down and we are having to revise our thinking about the taxonomic importance of fruit types and dehiscence mechanisms. The fruits of *Decalobanthus* will be explicated more fully in a paper devoted to fruit types and their evolutionary implications in the *Convolvulaceae*, now in preparation.

KEY TO THE SPECIES OF DECALOBANTHUS

1. Cauline leaves all peltately attached (small leaves below inflorescences and bracts in inflorescences sometimes basally attached) 2
1. Cauline leaves and all smaller leaves and bracts basally attached 3
2. Inflorescences many-flowered, corymbose, ± secund; sepals 0.9–1.3(–1.5) cm long; corollas 3–3.5 cm long, white with blackish tube base, minutely granular-glandulose outside . . . . . 11. *D. elmeri*
2. Inflorescences several-flowered, loosely paniculate or flowers solitary; sepals 1.8–2.5 cm long; corollas 4–6 cm long, white or yellow, not glandular outside . . . . .16. *D. peltatus*
3. Stems and branches lenticellate 4
3. Stems and branches smooth, striate, or angled, not lenticellate 8
4. Leaves with 6 or 7 secondary veins on either side of the midvein 5
4. Leaves with 8–11 secondary veins on either side of the midvein 6
5. Corolla broadly funnelform, c. 6 cm long; fruit indehiscent, black . . . . . 17. *D. pulcher*
5. Corolla salverform, 2.5–3 cm long; fruit 4-valved, brownish . . . . . .18. *D. sumatranus*
6. Inflorescence bracts ovate, c. 3 by 2 cm, sessile, persistent; sepals up to 3 cm long; corolla dotted with tiny golden glands outside . . . . . 4. *D. bracteatus*
6. Inflorescence bracts all caducous, or lowermost bract foliose, petiolulate; sepals 1.1–2.2 cm long; corolla lacking glandular dots outside 7
7. Sepals 1.8–2.2 cm long; corolla 5.5–6 cm long . . . . . 3. *D. borneensis*
7. Sepals 1.1–1.2 cm long; corolla 2–2.5 cm long . . . . . 7. *D. crassinervius*
8. Corolla midpetaline bands sericeous to tomentose 9
8. Corollas glabrous or minutely glandular-dotted, lacking hairs on midpetaline bands 12
9. Stems, branches and leaves softly tomentose-villous; corollas c. 6 cm long; capsules 1.8–2 cm long. — Vietnam . . . . . 10. *D. eberhardtii*
9. Stems, branches and leaves glabrous or tomentose-pubescent; corollas 1.2–3 cm long; capsules 0.9–1.2 cm long 10
10. Corollas white, limb erect, crenulate; hairs on midpetaline bands drying white on darker background. — N Sumatra . . . . . 14. *D. ooststroomii*
10. Corollas yellow, limb spreading or reflexed, entire; hairs on midpetaline bands almost same colour as background. — China, Laos, Vietnam 11
11. Corollas c. 3 cm long; buds conical, tapering-pointed; sepals 1–1.2 cm long, tapering acute; secondary veins 8–10 on either side of the midvein . . . . . 1. *D. bimbim*
11. Corollas 1.2–1.7(–2.1) cm long; buds ovoid, blunt; sepals 0.4–0.7 cm long, obtuse or rounded; secondary veins 6–8 on either side of the midvein . . . . . 2. *D. boisianus*
12. Flowers with an 'epicalyx' at the junction of pedicel with calyx: a lobed ring, a deep groove, or 4 flat lobes; inflorescences umbelliform or appearing so 13
12. Flowers without any appendages or groove at pedicel/calyx junction; inflorescences cymose, cymose-paniculate, corymbose, or flowers solitary 15
13. 'Epicalyx' of 4 flat lobes; sepals 1.7–2 cm long; corollas 3.5–4 cm long; secondary veins 10 or 11 on either side of midvein. — Fiji . . . . . 5. *D. calyculatus*
13. 'Epicalyx' a groove or thick lobed ring; sepals 1–1.8 cm long; corollas 3–5 cm long; secondary veins 7–10 on either side of midvein 14
14. Corollas rotate, pinkish or white, lacking glands outside; stamens and pistil protruding; 'epicalyx' a thick lobed ring. — Philippines, Taiwan . . . . . 9. *D. distillatorius*
14. Corollas broadly funnelform-campanulate, white with yellow tube, outside minutely golden gland-dotted; stamens and pistil included; 'epicalyx' a groove at pedicel/calyx junction. — Southwestern Pacific islands . . . . . 15. *D. pacificus*
15. Corollas 1.5–2.5 cm long; sepals 0.6–1 cm long 16
15. Corollas 4.8–12 cm long; sepals 2–3.6 cm long 17
16. Sepals 0.6–0.7 cm long; corollas 1.5–2 cm long; secondary veins 5–7 on either side of the midvein . . . . . 6. *D. clemensianus*
16. Sepals 0.9–1 cm long; corollas 2–2.5 cm long; secondary veins 7–10 on either side of the midvein . . . . . 12. *D. korthalsianus*
17. Corollas 4.8–6 cm long, bright yellow, without glandular indument; secondary veins 5–7 on either side of the midvein; leaf bases rounded or emarginate . . . . . 8. *D. discoidespermus*
17. Corollas 7–12 cm long, pale yellow or white with yellow tube, minutely gland-dotted outside; secondary veins 7–9 on either side of the midvein; leaf bases cordate . . . . . 13. *D. mammosus*

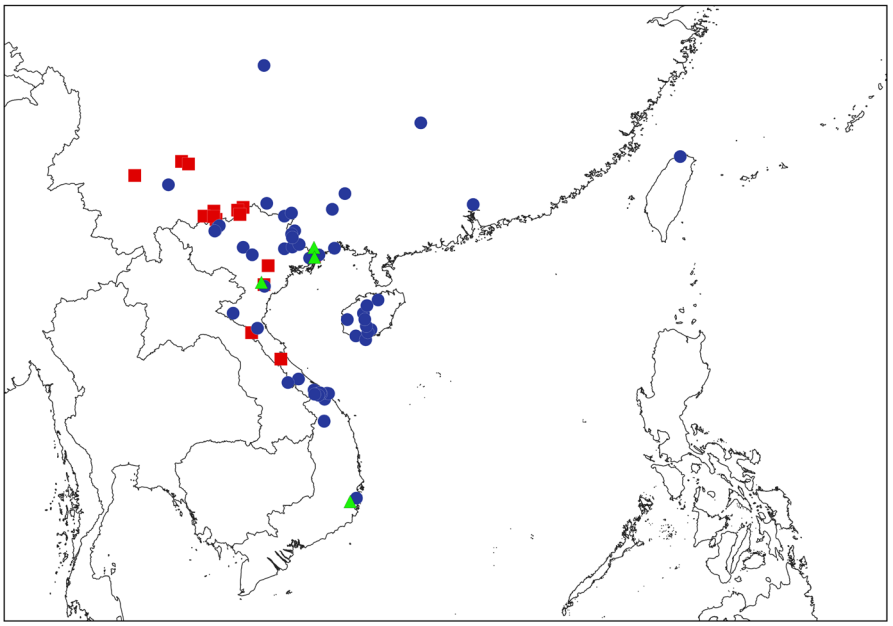
1. *Decalobanthus bimbim* (Gagnep.) A.R.Simões & Staples — Fig. 1; Map 1

Decalobanthus bimbim (Gagnep.) A.R.Simões & Staples (2017) 569. — *Ipomoea bimbim* Gagnep. (1915a) 140. — *Merremia bimbim* (Gagnep.) Ooststr. (1939b) 343. — Type: *Bon 2700* (holo P [P00608896]; iso P [P00608897, P00608898]), (Vietnam, Ha Nôi,) Tonkin, 'vers Vo-xa, inter rupes arcis Regis Hô'.

Merremia boisiana (Gagnep.) Ooststr. var. *fulvopilosa* auct. non Gagnep.: C.Y.Wu (1965) 113; R.C.Fang & S.H.Huang (1979) 79; R.C.Fang & Staples (1995) 299.

Stems and branches pilose at first, later glabrescent, not lenticellate. *Indumentum* on all parts drying dull reddish. *Leaves* basally attached, suborbicular, bases deeply cordate; secondary veins 8–10 on either side of the midvein. *Inflorescences*

Fig. 1 *Decalobanthus bimbim* (Gagnep.) A.R.Simões & Staples. a. Habit of a cultivated plant, Xishuangbanna Tropical Botanical Garden, China (provenance: Vietnam); b. flowers; c. corolla opened to show stamens and detached stigmas; d. calyx with sepals spread apart showing nectary, ovary, and style; e. flower buds on herbarium sheet showing elongated, tapering aspect with pointed sepal apices; f. mature fruit before style base and apical exocarp detach; g. mature fruit after delamination (a–d, f, g: Sven Landrein, XTBG, voucher: *Landrein 2021-1* in HITBC; e: Naturalis Biodiversity Center digital image of *N.M. Cuong et al. 824* in L).



Map 1 Distribution of *Decalobanthus bimbim* (Gagnep.) A.R.Simões & Staples (■); *D. boisianus* (Gagnep.) A.R.Simões & Staples var. *boisianus* (●); *D. boisianus* var. *fulvopilosus* (Gagnep.) A.R.Simões & Staples (▲).

many-flowered corymbs; peduncles 16–20 cm long, naked. *Flower* buds conical, tapering-pointed; sepals (in bud) unequal, outer 2 shorter, elliptic-ovate, 1–1.2 cm long, apices tapering acute; corolla broadly funnelform, golden-yellow, c. 3 cm long, midpetaline bands sericeous outside; stamens included, equal, anthers oblong, 3–4 mm long, curved; pistil included, slightly exceeding stamens. *Fruiting calyx* accrescent, spreading, sepal margins entire or eroded. *Capsule* broadly ovoid, 0.9–1.2 cm long, glabrous, 4-valved. *Seeds* 4 or fewer, narrowly ovoid-trigonous, 6–8 mm long, velvety pubescent.

Previously published illustrations — One colour photo included in Simões et al. (2020: f. 2E) actually shows *D. bimbim* although it is wrongly labelled as '*D. boisianus* var. *sumatranus*'.

Distribution — China (Yunnan), Vietnam (Ha Nôi, Hà Tinh, Ninh Binh, Quang Binh, Quang Ninh). Probably in Laos, but not yet documented from there.

Habitat & Ecology — Found on the edges of primary tropical forest, evergreen broadleaf forest, and in secondary forest regrowth, in ravines and river valleys, on hillsides, along roadsides, on clay soils; elevation from 220–900(–1300) m.

Vernacular name — *Bìmbìm* (Vietnam).

Note — Herbarium specimens of *D. bimbim* have been thoroughly confused with and often misidentified as '*M. boisiana*'; particularly problematic are specimens called *M. boisiana* var. *fulvopilosa*. Wang et al. (2007) seem to have adequately sorted out the confusion, in so far as I can judge a paper written in Chinese with Latin nomenclature and an English abstract. In fact, much of the Chinese material recently treated as *D. boisianus* var. *fulvopilosus* in floras (Fang & Huang 1979, Fang & Staples 1995) is actually *D. bimbim*. However, Wang et al. (2007) failed to annotate the specimens they studied with the correct names and so the taxonomic confusion lives on via the Chinese Virtual Herbarium (CVH; http://www.cvh.ac.cn/, last accessed 28 July 2020), where not a single digital image for *D. bimbim* was found.

2. ***Decalobanthus boisianus*** (Gagnep.) A.R.Simões & Staples — Map 1

Decalobanthus boisianus (Gagnep.) A.R.Simões & Staples (2017) 569. — *Ipomoea boisiana* Gagnep. (1915a) 141. — *Merremia boisiana* (Gagnep.) Ooststr. (1939b) 343. — Lectotype (designated by Van Ooststroom (1939b) 344): *Bois 138* (lecto P [P00608899]), (Vietnam,) Tonkin, 'montagnes du Caï Kinh, route de Than Moï à Van Linh'.

Stems and branches usually glabrous, not lenticellate. *Indumentum* (when present) drying greyish yellow. *Leaves* basally attached, blade subcircular or broadly ovate, bases shallowly cordate; secondary veins 6–8 on either side of the midvein. *Inflorescences* many-flowered, crowded panicles or thyrses; peduncles 5–24(–35) cm; bracts caducous. *Flower* buds bluntly ovoid; sepals subequal or outer 2 shorter, broadly ovate, 0.4–0.7 cm long, apically obtuse or rounded; corollas broadly funnelform, 1.2–1.7(–2.1) cm long, yellow, midpetaline bands sericeous outside; stamens included, subequal, anthers belatedly curled; pistil included. *Fruiting calyx* persistent, slightly accrescent, cupping fruit base; sepals convex, margins entire or erose. *Capsules* conical-ovoid, 1–1.2 cm long, 4-valved, glabrous, brown below, apically straw-yellow. *Seeds* broadly trigonous-ovoid, c. 5 mm long, angles densely scaly pubescent.

Previously published illustration — Staples (1996: 187, f. 1).

Distribution — China (Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan), newly reported from Taiwan (Chen et al. 2022), Laos, Vietnam.

Habitat & Ecology — In diverse habitats ranging from primary broadleaf evergreen forest and forest margins, to secondary forests along roadsides, thickets, shaded areas in valleys, riversides, swamps, on various soil types including dry sandy soil, rocky hillsides, clayey shale, wet swampy muck, and sandstone; elevation ranges from (120–)300–900(–1435) m.

Several collectors report that the flowers are fragrant. Recently *D. boisianus* has been reported to be an invasive species in China (Chen et al. 2005) and potentially so in Taiwan (Chen et al. 2022).

Vernacular names — China: Duo hua shan zu cai (*Jiang 7710*), jin zhong teng (*H. Sun 1347*), ka chue tang (*Lei 865*), seng geng man (Cantonese, *Lau 155*). Vietnam: Dô ut (*Poilane 3879*), dok khua khan muok (*Spire 1049*), prỏ he (Moï dialect, *Poilane 13305*).

Uses — The stem is used medicinally to treat anaemia (Fang & Staples 1995: 299).

Notes — There has been much confusion in herbaria between *D. boisianus* and two species of *Ipomoea*, *I. sumatrana* (Miq.) Ooststr. and *I. staphylina* Roem. & Schult.; Staples (1996)

clarified the differences, provided a key and diagnostic illustrations to distinguish these three taxa. The confusion began with misidentifications made by E.D. Merrill on specimens collected from Hainan Island in the 1920s–30s, which were widely distributed to many herbaria with the wrong names. Such errors persist for decades and are perpetuated in publications based on the misidentified specimens. The confusion was again elucidated by Wang et al. (2007).

The diagnostic characters useful for recognizing *D. boisianus* are: the inflorescence peduncle is typically longer than the subtending leaf; the inflorescence architecture is complex, multi-branched, flat-topped, corymb-like or thyrsiform; the corollas are bright yellow with pubescent midpetaline bands on the outside.

The genuine distribution for *D. boisianus* has been muddied by taxonomic confusion as noted above and explained further below (under var. *fulvopilosus*) but it seems clear that this species ranges widely across southern subtropical China and southward into Laos and Vietnam. The distribution in China is peculiar: the single isolated collections from Hunan (*Morse 627*) and Guizhou (*Z.Y. Cao & Z.T. Wang 165*) suggest that this species once grew, and perhaps still does grow, much further north than what is now documented by voucher specimens in

Fig. 2 *Decalobanthus boisianus* (Gagnep.) A.R.Simões & Staples var. *fulvopilosus* (Gagnep.) A.R.Simões & Staples. a. Flowers showing corolla shape, colour, and tightly spiralled anthers; b. cordate leaf base and basal petiole attachment, flower in side view showing size, calyx, and hairy midpetaline bands; c. flower buds on herbarium sheet showing blunt, broad aspect with rounded sepal apices and shorter outer sepals; d. mature fruits on herbarium sheet showing delamination of fruit walls, valvate dehiscence, and rounded sepals (a, b: Jana Leong-Škorničková, voucher: *Leong- Škorničková et al. HB-134* in SING; c: Royal Botanic Garden, Edinburgh, voucher: *W.T. Tsang 30075* in E; d: Royal Botanic Garden, Edinburgh, voucher: *W.T. Tsang 30211* in E).

the CVH. Does *D. boisianus* occur in Sichuan? There are no records from Sichuan province in the CVH, but the possibility cannot be excluded because the one Guizhou collection came from the border with eastern Sichuan. The single collection from Guangdong province was made in the metropolitan area for Guangzhou City; the documenting voucher specimen (*B.H. Chen 4193*) was written up as a first provincial record as well as to point out that *D. boisianus* can be invasive in intact forest ecosystems (Chen et al. 2005). Still, there is no reason why *D. boisianus* should not occur in coastal subtropical Guangdong, if there is any suitable habitat for it in the highly developed landscape there. All in all, the Chinese distribution is patchy and imperfectly known and further field work is needed to improve our knowledge of this species distribution and abundance. Newly reported as a naturalized species from northern Taiwan (Chen et al. 2022).

Historically, Chinese floras recognized two varieties, separable by the following key:

Key to the varieties

1. Branchlets, petioles, leaves, peduncles, and pedicels glabrous or nearly so . . . . . a. var. *boisianus* (see under the species)
1. Branchlets, petioles, leaves, peduncles, and pedicels greyish yellow tomentose . . . . . b. var. *fulvopilosus*

b. var. ***fulvopilosus*** (Gagnep.) A.R.Simões & Staples — Fig. 2; Map 1

Decalobanthus boisianus (Gagnep.) A.R.Simões & Staples var. *fulvopilosus* (Gagnep.) A.R.Simões & Staples (2017) 569. — *Ipomoea boisiana* Gagnep. var. *fulvopilosa* Gagnep. (1915a) 142. — *Merremia boisiana* (Gagnep.) Ooststr. var. *fulvopilosa* (Gagnep.) Ooststr. (1939b) 314. — *Ipomoea boisiana* var. *rufopilosa* Gagnep. (1915b) 263 '*fulvopilosa*', nom. inval. — *Merremia boisiana* var. *rufopilosa* C.Y.Wu (1965) 113, nom. superfl., illeg. (here lectotypified with *Bon 4801* as other specimens cited are *D. bimbim*). — Type: *Bon 4801* (holo P [P00622201]; iso P [P00622202, P03536892]), (Vietnam, Hoah Binh,) 'Tonkin meridional, reg. Lac Thô'.

Young stems, branchlets, petioles, leaves, peduncles, and pedicels greyish yellow tomentose (drying reddish or fulvous). *Flower* buds, sepals, and corollas identical with typical variety.

Previously published illustration — Staples (2018: 275, f. 14.2).

Distribution — China (Guangxi), Vietnam (Hoa Binh, Khanh Hoa, Quang Ninh).

Habitat & Ecology — Collectors recorded little data on specimen labels, only one collection reported the plant was growing on a roadside; elevation 1000–1434 m.

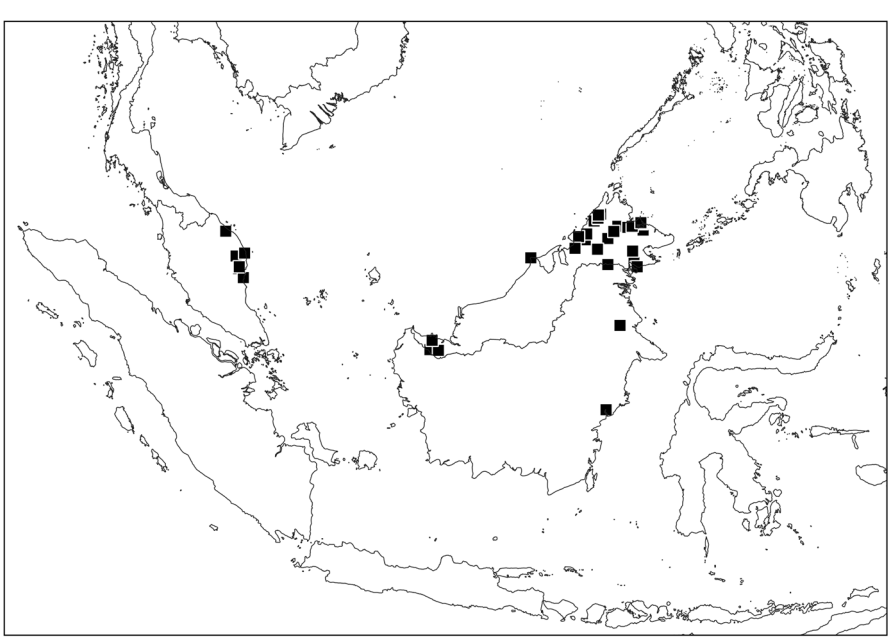
Vernacular name — 黄毛金钟藤 (transliteration: huang mao jin zhong teng, Fang & Staples 1995).

Uses — The entire plant is used medicinally to treat arthritis (Fang & Staples 1995: 299).

Typification — Gagnepain (September 1915b) created an invalid name when he mistakenly used the varietal epithet '*rufopilosa*' instead of *fulvopilosa*, which he had published a few months previously (15 July 1915a). Wu (1965: 113) tried to make a new combination in *Merremia* for var. '*rufopilosa*' and created a superfluous name in the process: his use of the abbreviation 'll. cc.' refers to the full citations of both the Gagnepain works on the preceding page 112, thereby providing a direct reference to the Latin diagnosis for var. *fulvopilosa* Gagnep. (1915a: 142). Thus, one error became two.

Notes — I maintain this variety although it scarcely seems worthwhile to distinguish plants with more hair as a distinct taxon. As pointed out by Wang et al. (2007) nearly all the herbarium specimens from China labelled as '*Merremia boisiana* var. *fulvopilosa*' actually proved to be *D. bimbim*. After this taxonomic confusion was sorted out, there are very few specimens with the floral morphology of *D. boisianus* combined with distinctly hairy stems and leaves. These few collections occur in Vietnam and adjoining Guangxi province, China. Could these few specimens represent hybrids between the two species? Their intermediate morphology suggests as much. It is worthwhile flagging them with a name so that field studies and perhaps molecular sampling can be carried out to better understand their status and relationships. For this reason, I continue to recognize these intermediate specimens with a name.

Lastly, a comment is warranted about the resolution to the long-standing confusion and misidentification between genuine *D. boisianus* var. *fulvopilosus* and *D. bimbim* in China. Although Wang et al. (2007) basically sorted this out correctly they did not annotate specimens they studied with the correct names. Thus, in the CVH there are no Chinese specimens identified as *D. bimbim* and some of the specimens called '*Merremia boisiana*' are either wrongly named or confusingly named



Map 2 Distribution of *Decalobanthus borneensis* (Merr.) A.R.Simões & Staples.

when the digital images are matched against specimens cited in Wang et al. (2007). It is to be hoped that curators, both herbarium and digital, will step in and correct this omission by updating the names on the specimens and their images to reflect current taxonomic concepts. When authors fail to annotate the material they studied it deprives future researchers of a tangible means to assess taxonomic concepts and test their value. And in this case, despite a publication more than a decade ago, the wrong names left on herbarium specimens will only generate more confusion into the future, especially because they are online. In light of this situation it is even more unfortunate that the photographs in Simões et al. (2020: f. 2D, 2E) have been misidentified, which perpetuates the confusion in taxonomic concepts.

3. *Decalobanthus borneensis* (Merr.) A.R.Simões & Staples — Fig. 3; Map 2

Decalobanthus borneensis (Merr.) A.R.Simões & Staples (2017) 569. — *Merremia borneensis* Merr. (1929) 260. — Lectotype (designated here): *Elmer 20990* (holo PNH†; lecto UC [UC312121*]; isolecto A [00054672]*, BISH [BISH1001146], F [F567109], G [G00227276], GH [00054673]*, K [K000830847],L [L 0004222], M [M 0184797], MO [MO-694473, MO-694474]*, NY [NY00336579], P [P03536870], SING [SING0052311]*, U [U 0001428]*), (Malaysia. Sabah,) 'British North Borneo, Elphinstone prov., Tawao'.

Stems and branches (and peduncles) whitish lenticellate, glabrous. *Leaves* basally attached, orbicular or ovate, 5(–)8–22 by (3.5–)6–18 cm, ± bullate, bases deeply cordate; secondary veins (6–)8–11 on either side of the midvein. *Inflorescences* several-flowered, cymosely branched; peduncles 6–12 cm long; bracts caducous. *Flower* buds ovoid-oblong, acute; sepals elliptic to broadly elliptic, (1.5–)1.8–2.2 cm long, apically obtuse to slightly emarginate, outer 2 drying leathery, the inner ones

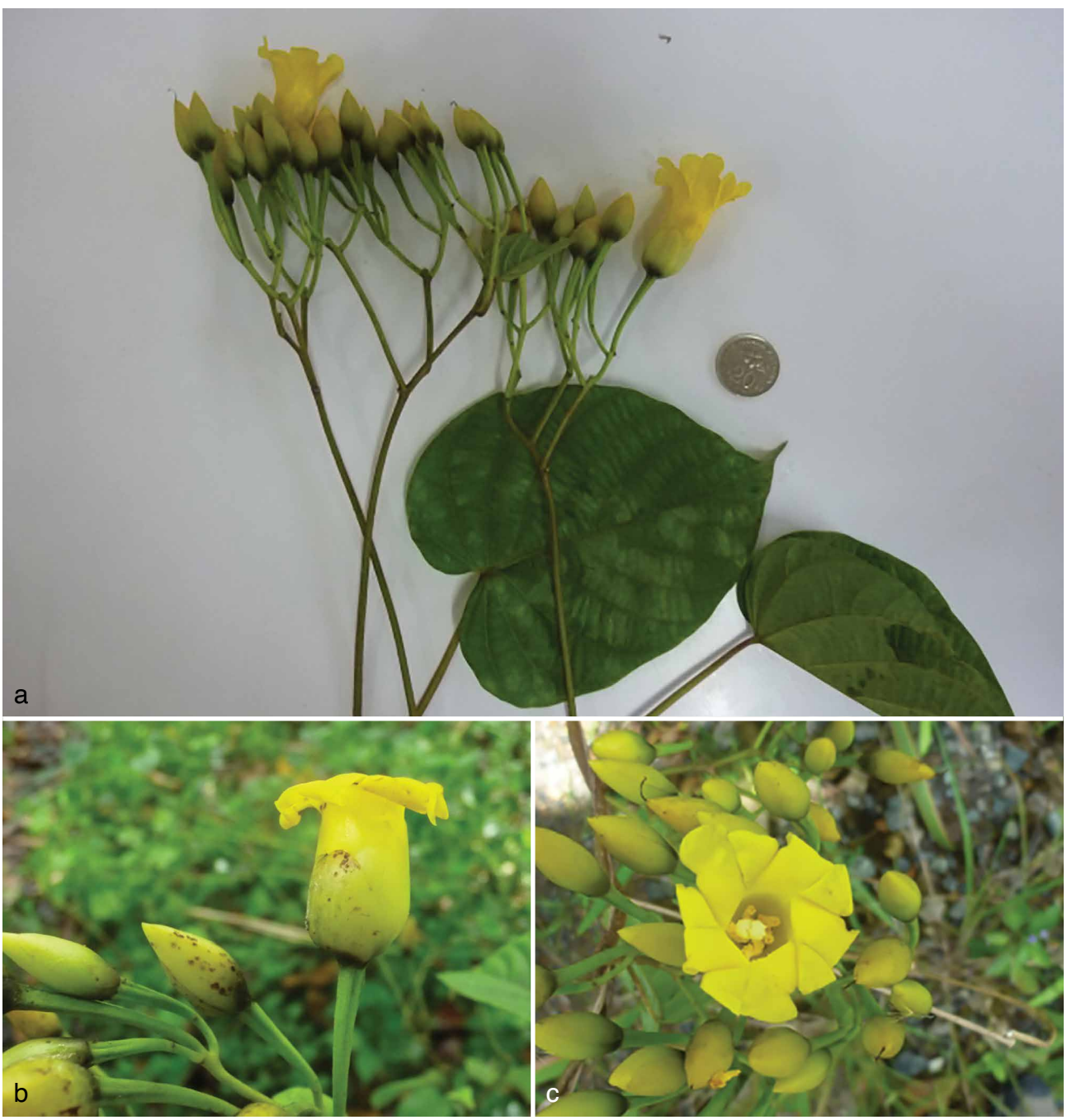
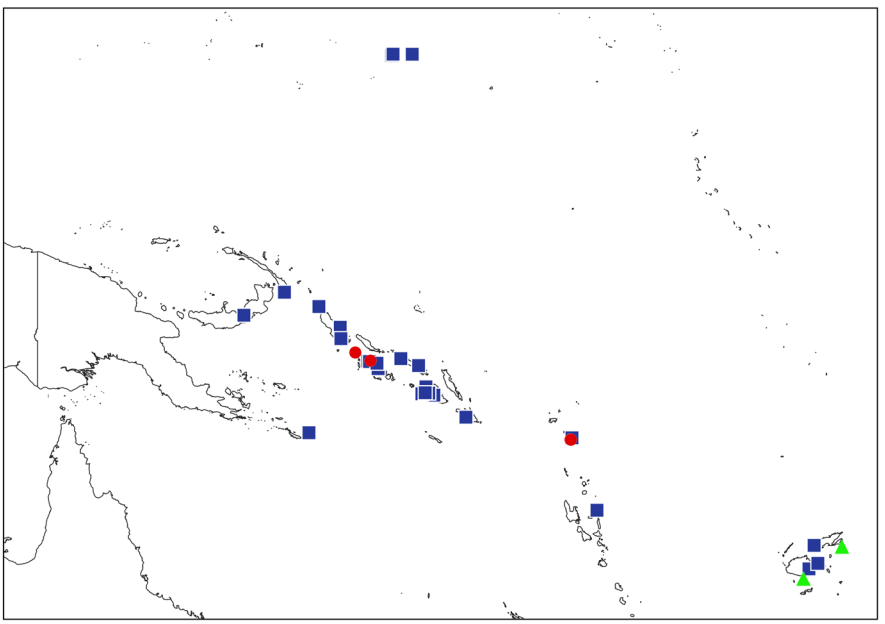


Fig. 3 *Decalobanthus borneensis* (Merr.) A.R.Simões & Staples. a. Habit with basal leaf attachment and more or less flat-topped, corymbose inflorescence architecture; b. flower in lateral view showing calyx covering half the corolla tube; c. flower in frontal view, showing lobed-reflexed corolla limb and spirally twisted anthers (all George Staples, vouchers: a: *Sugau et al. SAN-152855* in SING; b: *Sugau et al. SAN-152852* in SING; c: *Sugau et al. SAN-152859* in SING).



Map 3 Distribution of *Decalobanthus bracteatus* (P.S.Bacon) A.R.Simões & Staples (●), and *D. calyculatus* (Ooststr.) A.R.Simões & Chatrou (▲) and *D. pacificus* (Ooststr.) A.R.Simões & Staples (■).

± membranous; corolla broadly tubular-funnelform, 5.5–6 cm long, yellow, glabrous outside, limb 10-lobed, reflexed; stamens included; pistil included. *Fruiting calyx* slightly accrescent, spreading away from fruit; sepals blackish, leathery. *Fruit* seemingly indehiscent, berry-like, ovoid, c. 12 mm tall, black, glabrous, mucronate. *Seeds* oblong-ovoid, c. 6–7 mm long, appressed pilose with pale trichomes.

Previously published illustration — Staples & Syahida-Emiza (2015: 292, plate 38A).

Distribution — Peninsular Malaysia (Terengganu), Borneo (Sabah, Sarawak, Kalimantan).

Habitat & Ecology — Tolerant of human disturbance and often reported from logged or burned forest, in secondary regrowth, near homes, in vegetable plots and plantations, along roadsides, always in full sun; seemingly prefers high moisture and reported near rivers, banks of streams, or low-lying wet areas with standing water; on soils including sandstone, shale outcrops, and open, sandy loamsoils; usually at low elevations of 10–340 m, with two collections made from higher elevations, at 1055 and 1500 m.

Vernacular names — Malaysia: Akar larum (Kedayan; *Kadir A 2034*), balan (Su Pingas; *Taleon 101*), bunga karang hutan (*Rostado 13*), lapad (Dusun Kinabatangan; *Taleon 101*), laran (*Kadir A 2034*), pohon lapa gaga (*Rostado 13*), sireh-sireh (Banjar; *Taleon 101*), tangau (Dusun; *Jusimin D. JD 285*).

Note — *Decalobanthus borneensis* is similar to *D. pulcher*, which differs primarily in larger flower size. Both species share the lenticellate stems, bullate leaves, and black, evidently indehiscent fruits. Perhaps further investigation in the field and application of suitable molecular tools will clarify the relationships; for now, I maintain both species. Furthermore, I restrict *D. borneensis* to Borneo and use the name *D. sumatranus* exclusively for Sumatran plants.

4. ***Decalobanthus bracteatus*** (P.S.Bacon) A.R.Simões & Staples — Map 3

Decalobanthus bracteatus (P.S.Bacon) A.R.Simões & Staples (2017) 569. — *Merremia bracteata* P.S.Bacon (1982) 259. — Type: *Bacon 2* (holo K [K000830896]; iso BSIP n.v., L [L 0363556]), Solomon Islands, Kolombangara, near Poitete forestry camp.

Stems and branches lenticellate. *Leaves* basally attached, ovate, up to 24 by 20 cm, bases cordate; secondary veins 8–10 on either side of the midvein. *Inflorescences* racemes or simple panicles; peduncles up to 21 cm long; bracts elliptic, c. 3 by 2 cm, apex obtuse, apiculate, persistent. *Flowers*: sepals subequal, ovate, to 3 by 1.25 cm; corollas broadly funnelform-campanulate, lemon-yellow, c. 5 cm long, outside golden gland-dotted; stamens included, anthers 5–6 mm long, spirally twisted; pistils included. *Fruiting calyx* persistent and accrescent, loosely cupping fruit; sepals c. 3 by 2.6 cm. *Fruits* seemingly indehiscent, depressed globose, c. 1.2 cm tall by 2.6 cm diam. *Seeds* 2.

Previously published illustration — Bacon (1982: 262, f. 3).

Distribution — Solomon Islands (Kolombangara, Vanikoro, Vella la Vella).

The recent report (Simões et al. 2020) that *Decalobanthus* ranges as far across the Pacific as 'Santa Cruz Island, North America' is a very unfortunate failure to distinguish Santa Cruz in the California Channel Islands from the Santa Cruz group in the Solomon Islands. So far as currently known *D. bracteatus* is endemic to the Solomon Islands and does not occur off the coast of North America.

Habitat & Ecology — At forest margins, in secondary forest regrowth and forestry plantations; soil volcanic basaltic clay. Elevation sea level to 115 m.

Vernacular name — Ambui (Kwara'ae; *Bacon PB-2*).

Notes — The fruits of *D. bracteatus* are imperfectly known: the holotype sheet in Kew has a single fruit enclosed in the fragment capsule. From what can be discerned in a digital image, the fruit appears to be the blackish, indehiscent type similar to those of *D. borneensis* and *D. pulcher*.

Only four specimens of *D. bracteatus* have been studied; this gives the impression that the species is rare. However, the Solomon Islands have not been well botanized and the herbarium collections in BSIP and SUVA have been unavailable for study for decades. It is quite possible that *D. bracteatus* is more common than the few collections available would suggest.

5. ***Decalobanthus calyculatus*** (Ooststr.) A.R.Simões & Chatrou — Map 3

Decalobanthus calyculatus (Ooststr.) A.R.Simões & Chatrou in Simões et al. (2020) 55: 5. — *Merremia calyculata* Ooststr. (1939a) 265. — Type: *Seemann 324* (holo K [K000830927]; iso BM [BM000884662]*, GH [00054678], P [P00600290]), Fiji, (Taveuni) Vuna ('Puna', see Van Ooststroom 1939a).

Stems and branches lengthwise-striate, not lenticellate, glabrous. *Leaves* basally attached, suborbicular, 12–15 by 12–15 cm, bases broadly cordate; secondary veins 10 or 11 on either side of the midvein. *Inflorescences* subumbelliform, branching near apex; peduncles terete, c. 20 cm long; pedicel apices with an 'epicalyx' c. 9 mm diam comprising 4 flat triangular lobes. *Flowers*: sepals equal, convex, membranous, suborbicular, 1.7–2 cm long; corollas campanulate, c. 3.5–4 cm long, white, yellow inside at tube base, glabrous; stamens and pistil included. *Fruits* and *seeds* not seen.

Previously published illustration — Van Ooststroom (1939a: 264, f. 1h–t).

Distribution — Fiji.

Habitat & Ecology — No information recorded by collectors.

Vernacular name — Wavula (*Seemann 324*).

Notes — *Decalobanthus calyculatus* remains an enigmatic taxon. Staples (2009: 336) speculated that this entity could be an extreme morphological variant of *D. pacificus*. Study of more material should resolve the ambiguity; unfortunately, the SUVA and BSIP herbaria remain closed so it is not likely any further specimens will be available for study any time soon. Now that a name has been provided for it (Simões et al. 2020), I provisionally maintain this taxon as a practical consideration but point out the need for locating further material and critical

Fig. 4 *Decalobanthus clemensianus* (Ooststr.) A.R.Simões & Chatrou. a. Habit with basal leaf attachment and prominent glands on outer sepal bases; b. flower buds on herbarium sheet showing typically angulate aspect with 'hipped' bases; c. mature fruits on herbarium sheet showing delamination of apical fruit wall and long hairy seeds (a: George Staples, voucher: *Sugau et al. SAN-152864* in SING; b: Royal Botanic Garden, Edinburgh, voucher: *Argent & Campbell 411854* in E; c: Harvard University Herbaria, voucher: *J. & M.S. Clemens 21134* in A).

comparison with *D. pacificus,* which has been shown to be more morphologically variable (Staples 2009) than was initially described.

The diagnostic characters Van Ooststroom (1939a: 265) used to distinguish *D. calyculatus* from *D. pacificus* are: outer sepals 17–20 mm long (vs up to 12 mm in *D. pacificus*); the 'epicalyx' at the juncture of the pedicel apex/calyx base is composed of 4 triangular, flat, obtuse lobes (vs a wavy, narrow, continuous ring in *D. pacificus*). The 'epicalyx' character is clearly visible on all sheets of the type gathering, *Seemann 324*. Van Ooststroom had a good eye for species discrimination in *Convolvulaceae* and his concepts have almost all been maintained over time; it seems prudent then to maintain this taxon until further specimens can be studied and a more definitive decision reached about the correct status for it.

6. *Decalobanthus clemensianus* (Ooststr.) A.R.Simões & Chatrou — Fig. 4; Map 4

Decalobanthus clemensianus (Ooststr.) A.R.Simões & Chatrou in Simões et al. (2020) 55: 5. — *Merremia clemensiana* Ooststr. (1939b) 350. — Type: *J. & M.S. Clemens 21133* (holo BO [BO 177795]; iso A [00054674], B†, BISH [BISH1001147], K [K000830845], L [L 0004223, L 0640533], MO [MO-989044], NY [NY 336580, NY 336581], P [P00622203], SAR), Malaysia, Sarawak, 'upper Rejang River, Kapit'.

Decalobanthus gracilis (E.J.F.Campb. & Argent) A.R.Simões & Chatrou in Simões et al. (2020: 55) 6. — *Merremia gracilis* E.J.F.Campb. & Argent (1988) 345. — Type: *Argent & Campbell 411854* (holo SAN; iso A [00054677], BM [BM000797174], E [E00273914], K n.v., L n.v.), Malaysia, Sabah, Lahad Datu distr., Ulu Segama, Danum Valley Field Centre.

Stems and branches angled-striate, bark cracking, glabrous, not lenticellate. *Leaves* basally attached, ovate to broadly ovate, 5–14 by 3–10 cm, bases rounded to truncate or emarginate-subcordate; secondary veins 5–7 on either side of the midvein. *Inflorescences* many-flowered, corymbose, ± secund; lowermost bracts often foliaceous, 3–5 cm long, petiolulate, upper bracts and bracteoles caducous. *Flower* buds ovoid, bases conspicuously angulate, apices acute to obtuse; sepals convex, unequal, outer 2 oblong, 0.6–0.7 cm, bases abaxially with 2 swollen glands, inner 3 longer; corolla campanulate to broadly funnelform, 1.5–2 cm long, yellow, limb crenulate; stamens included, subequal, anthers belatedly spiralling; pistil included, exceeding stamens. *Fruiting calyx* persistent, slightly accrescent, closely cupping fruit; sepals 0.8–1.1 cm long, blackish brown outside. *Capsules* globose-ovoid, c. 12–13 mm, 4- or more-valved, septum persistent, papery, valve apices with a sharp, incurved tooth. *Seeds* 5–6 mm long, black, densely woolly with long brownish or greyish hairs.

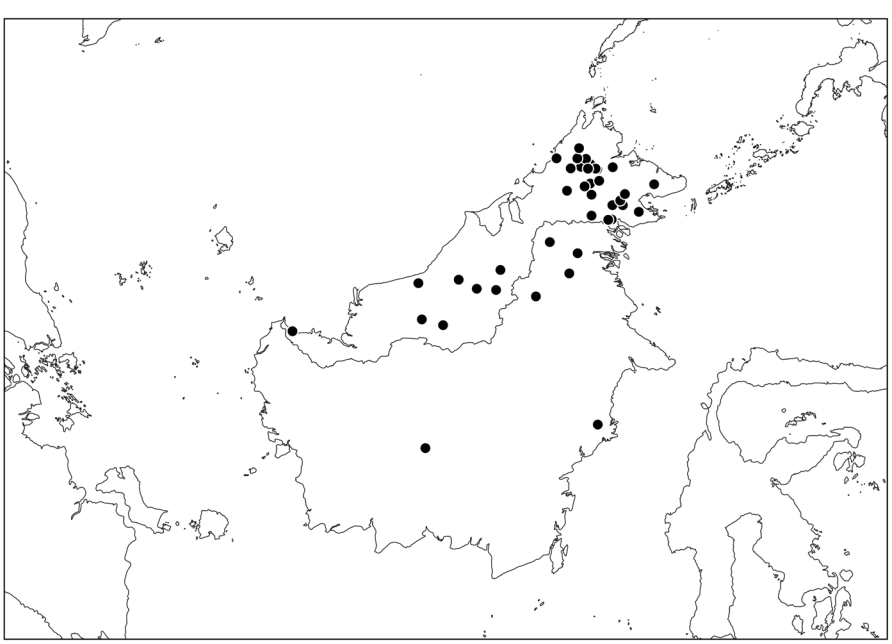
Previously published illustration — Campbell & Argent (1988: 346, f. 1, as *M. gracilis*).

Distribution — Endemic to Borneo: Malaysia (Sabah, Sarawak), Indonesia (Kalimantan Timur, K. Tengah). Not so far reported from Brunei but likely to occur there.

Habitat & Ecology — Scandent and climbing in open situations in thickets, forest margins, and in secondary disturbed vegetation and creeping in cleared areas; elevation 20–300 m. This species seems to thrive on forest disturbance and has often been collected along logging roads, tractor trails, roadsides, and at the edges of cleared forest. One gets the impression that it is more abundant now than it was when Van Ooststroom (1939b) first described it. A heavy, banana-like fragrance was reported for the flowers (*Argent & Campbell 411854*). Personally, I detected no fragrance at all. The seeds often persist in the opened capsules well into the next flowering cycle.

Vernacular names — Malaysia: Bilaran (Dusun-Kinabatangan, *G.H.S. Wood A 4250*).

Note — It is curious that Van Ooststroom (1939b), usually a keen and careful observer, did not mention the prominent sepal glands when he named this species: the glands give the flower buds a distinctive angled or 'hipped' appearance. These glands are well illustrated by Campbell & Argent (1988: f. 1, though the captions are reversed for parts C and D). Van Ooststroom cited two duplicates of the type gathering: one in BO and one (now destroyed) in B. Other duplicates of *Clemens 21133* that I have studied (not annotated by Van Ooststroom) show the sepal glands. The angled, 'hipped' appearance of the calyx is most noticeable on fully mature flower buds; in smaller, less developed buds and in opened flowers (when the sepals are spread outward by corolla anthesis) the basal glands are less noticeable. The sepal glands are very prominent on the type gathering for *M. gracilis* and there is no doubt that both type gatherings fit on a spectrum of variation.



Map 4 Distribution of *Decalobanthus clemensianus* (Ooststr.) A.R.Simões & Chatrou.

7. *Decalobanthus crassinervius* (Ooststr.) A.R.Simões & Chatrou — Map 5

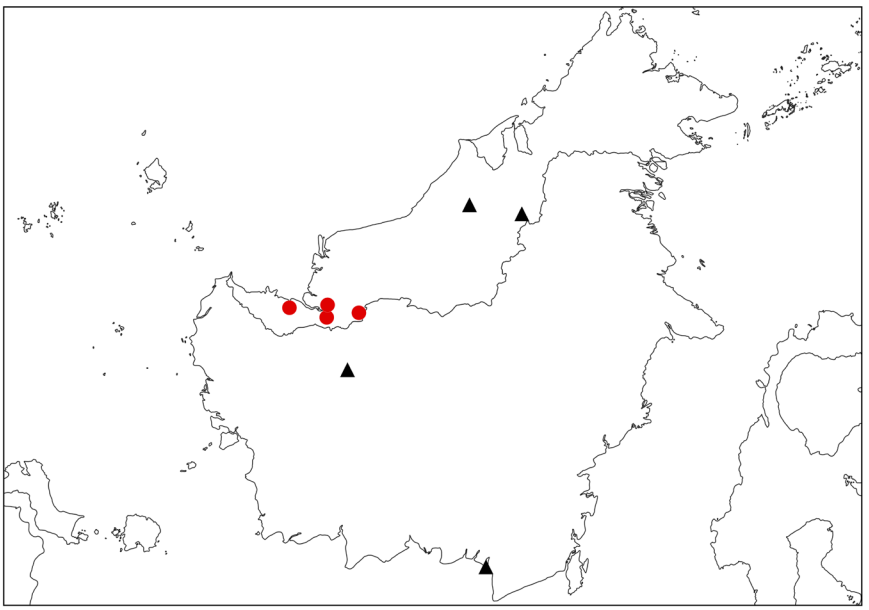
Decalobanthus crassinervius (Ooststr.) A.R.Simões & Chatrou in Simões et al. (2020: 55) 5. — *Merremia crassinervia* Ooststr. (1939b) 350. — Type: *Haviland & Hose 3523E* (holo L [L 0004224]; iso K [K000830846] as *3523K*, SAR as *3523A*), (Malaysia, Sarawak, Betong,) 'Saribas, Paku'.

Stems and branches pale lenticellate. *Leaves* basally attached, ovate to broadly ovate, 7–13 by 3.5–9 cm, bases cordate; secondary veins 8–10 on either side of the midvein. *Inflorescences* many-flowered, corymbose; peduncle 7–11(–17) cm long, terete; lower bracts sometimes foliose, upper bracts minute. *Flower* buds conical, tapering to an acute apex; sepals subequal, 1.1–1.2 cm long, outer 2 elliptic, convex, apices rounded and mucronulate, subcoriaceous; inner 3 broadly elliptic to orbicular, apices rounded and mucronulate, margins thinner; corolla funnelform, yellow, c. 2–2.5 cm long, glabrous, limb shallowly lobed; stamens and pistil included. *Fruits* and *seeds* unknown.

Previously published illustration — Van Ooststroom (1939b: 296, f. 1a).

Distribution — Endemic to Borneo: Malaysia (Sarawak).

Fig. 5 *Decalobanthus discoidespermus* (Donn.Sm.) Staples. a. Habit showing alternate, leathery, entire leaves with basal petiole attachment; b. mature fruit on vine, note absence of calyx and papery, indehiscent pericarp; c. flower in side view showing unequal sepals; d. mature fruit opened to show single seed, initially covered in velvety indumentum; e. corolla opened to expose stamens, note the pubescence on the filaments, pistil to left (a, b, d: Barry Hammel, voucher: *B. Hammel et al. 27078* in CR; c, e: Reinaldo Aguilar, voucher: *R. Aguilar 17796* in CR).



Map 5 Distribution of *Decalobanthus crassinervius* (Ooststr.) A.R.Simões & Chatrou (●) and *D. korthalsianus* (Ooststr.) A.R.Simões & Staples (▲).

Habitat & Ecology — Along a stream in shady, logged over forest; in secondary forest near a riverbank; along a logging road; on yellow clay soil. Elevation 70 m.

Note — Superficially, *D. crassinervius* resembles *D. bimbim* in terms of the narrow, tapering acute flower buds and leaf venation, but the leaf shape and texture are different and the inflorescence architecture even more so. Still known from only five collections (one unconfirmed), all from remote parts of Sarawak, *D. crassinervius* remains an enigmatic species.

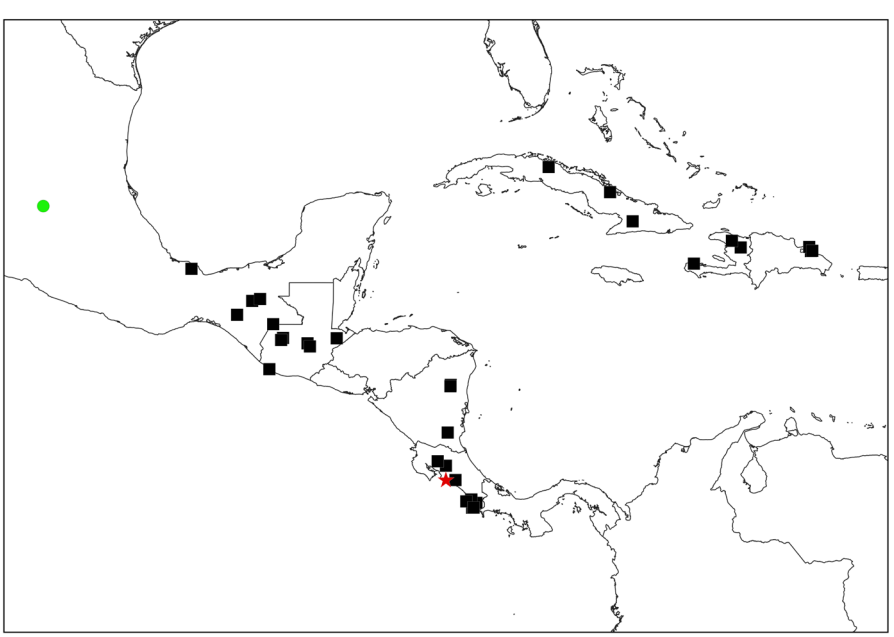
8. ***Decalobanthus discoidespermus*** (Donn.Sm.) Staples, *comb. nov.* — Fig. 5; Map 6

Ipomoea discoidesperma Donn.Sm., Bot. Gaz. 14 (1889) 27. — *Operculina discoidesperma* (Donn.Sm.) House (1909) 68. — *Merremia discoidesperma* (Donn.Sm.) C.A.O'Donnell (1941) 495. — Lectotype (first step designated by Standley & Williams (1970) 73, second step designated here; see Typification): *Von Türckheim 744* (lecto US [US00111388]; isolecto US [US00111389]*), Guatemala, Alta Verapaz, Pansamalá.

Operculina populifolia Hallier f. ex Urb. (1912) 342. — Lectotype (designated by Staples et al. (2020) 131): *Wright 3083* (lecto MO [MO-150302]), Cuba.

Stems and branches not lenticellate. *Leaves* basally attached, broadly ovate to suborbicular, 6–14 by 3.5–12 cm, bases rounded to emarginate; secondary veins 5–7 on either side of the midvein. *Inflorescences* cymose or flowers solitary; bracts caducous. *Flower* sepals equal, ovate, 20–26 by 10–16 mm, apically rounded to acute; corollas tubular-funnelform, 4.8–6 cm long, bright yellow, glabrous, limb 3–3.5 cm diam, entire or 5-sided; stamens unequal, included, filaments hairy above insertion point, anthers 3–5 mm long; pistil included, equalling or slightly exceeding stamens. *Fruiting calyx* accrescent, woody, blackish, deciduous. *Fruit* a utricle, globose, 3–4 cm diam, chartaceous, pale brown, tardily breaking irregularly. *Seed* 1, quatrefoil, flattened spheroidal, 1.8–2.5 cm diam, bearing a circular hilum on one side and an impressed cross on the reverse, black, velutinous at first, later glabrous and shiny.

Previously published illustrations — Gunn (1977: f. 6, 7). An excellent series of detailed colour photos taken in the field by Reinaldo Aguilar (https://flic.kr/p/2mdpYGA vouchered by *Aguilar 17796* in CR) is available online.



Map 6 Distribution of *Decalobanthus discoidespermus* (Donn.Sm.) Staples (wild plants = ■; cultivated plant = ●; seeds on ocean beaches = ✱).

Distribution — Pacific and Atlantic coasts of Middle America (southern Mexico, Guatemala, Nicaragua, Costa Rica), and the Greater Antilles (Cuba, Dominican Republic, Haiti) in the Caribbean. Absent from Belize, El Salvador, and Honduras, whether from low collecting density or lack of suitable habitats is unknown. Reports for Panamá are based solely on drift seeds found on beaches as pointed out by Gunn (1977); the species was not included in the 'Flora of Panama Convolvulaceae' (Austin 1975, 1978).

Habitat & Ecology — A species seemingly always found in forested habitats such as *selva alta perennifolia (primaria)* (tall evergreen primary forest), lower montane rain forest, cloud forest (broadleaf), and wet somewhat degraded rainforest. Soil types recorded include a limestone fissured ridge and deep laterite (on eruptive). Elevations range from 100–900(–1650) m.

Vernacular names — Cuba: Almorrana (Alain 1957), terciopelo (*Eggers 4981*), tomate de mar (Alain 1957). Guatemala: Boton de terciopelo (*Von Türckheim 744*), quiebra-cajete (Standley & Williams 1970). Mexico: Ppak i kaknab (Mayan; Gunn 1977: 237), quiebraplato amarillo (Spanish; *Dugés s.n.*). Nicaragua: Contra-venano (*E.P. Alexander s.n.*). English name for the seed: Mary's-bean (Gunn 1977).

Uses — The seeds are well documented to drift thousands of kilometres via ocean currents (Gunn & Dennis 1976, Gunn 1977) in both the North Atlantic and North Pacific. Several ethnobotanical uses are known in places where these seeds wash ashore (Gunn & Dennis 1976, Gunn 1977).

Typification — John Donnell Smith (1889) did not designate a holotype per se and cited two different specimens, *Von Türckheim 744* and *S. Watson 412*, in the protologue, both of which, under the modern ICN (Turland et al. 2018), are to be considered syntypes. Standley & Williams (1970: 73) made an indirect first step lectotype choice when they stated the 'type' was 'from Pansamalá, *Türckheim 744'*. Later mentions of the 'holotype' by Gunn (1977: 250) and 'lectotype' by McDonald (1993: 65) reiterated this choice. However, there are two sheets of *Von Türckheim 744* in the US and I have here made a second step lectotypification by choosing the sheet with bar code US00111388 as the lectotype.

Note — The vegetative and floral morphology of this Neotropical species is congruent with the genus concept for *Decalobanthus* as proposed here. However molecular sequences extracted from herbarium vouchers proved ambiguous and so the species has not been placed in any molecular phylogenetic arrangement published to date. When conclusive molecular data is available, I fully expect this species will be placed in the *Decalobanthus* clade. Nevertheless, on a morphological basis alone I am confident that this species belongs in *Decalobanthus*.

9. *Decalobanthus distillatorius* (Blanco) Staples, *comb. nov.* — Fig. 6; Map 7

Convolvulus distillatorius Blanco (1837) 95. — *Merremia distillatori*a (Blanco) Merr. (1918) 325. — Neotype (designated here): *Quisumbing PNH 8061* (neo A; isoneo PNH), Philippines, Luzon Island, Quezon Prov., Mt. Ditumabo.
Merremia similis Elmer (1908) 335. — *Decalobanthus similis* (Elmer) A.R. Simões & Staples (2017) 571. — Lectotype (designated here): *Elmer 7341* (lecto NY [NY 336585]; isolecto E [E00273913]*, G [G00016042], K [K000830840]*, LE*), Philippines, Leyte, Palo.

Stems and branches farinose when young, later glabrescent, not lenticellate. *Leaves* basally attached, broadly ovate-orbicular, 8.5–20 by 8–20 cm, base broadly cordate; secondary veins 7–10 on either side of the midvein. *Inflorescences* umbelliform, 2–11-flowered; peduncles to 30(–60?) cm long; pedicels thickened toward apex, with a thick lobed ring at calyx base. *Flower* buds narrowly ovoid, acute; sepals convex, subequal, 1.5–1.8 cm long, obtuse or slightly retuse; corollas subrotate or broadly funnelform, 3–4 cm long, white or pale pinkish, yel-

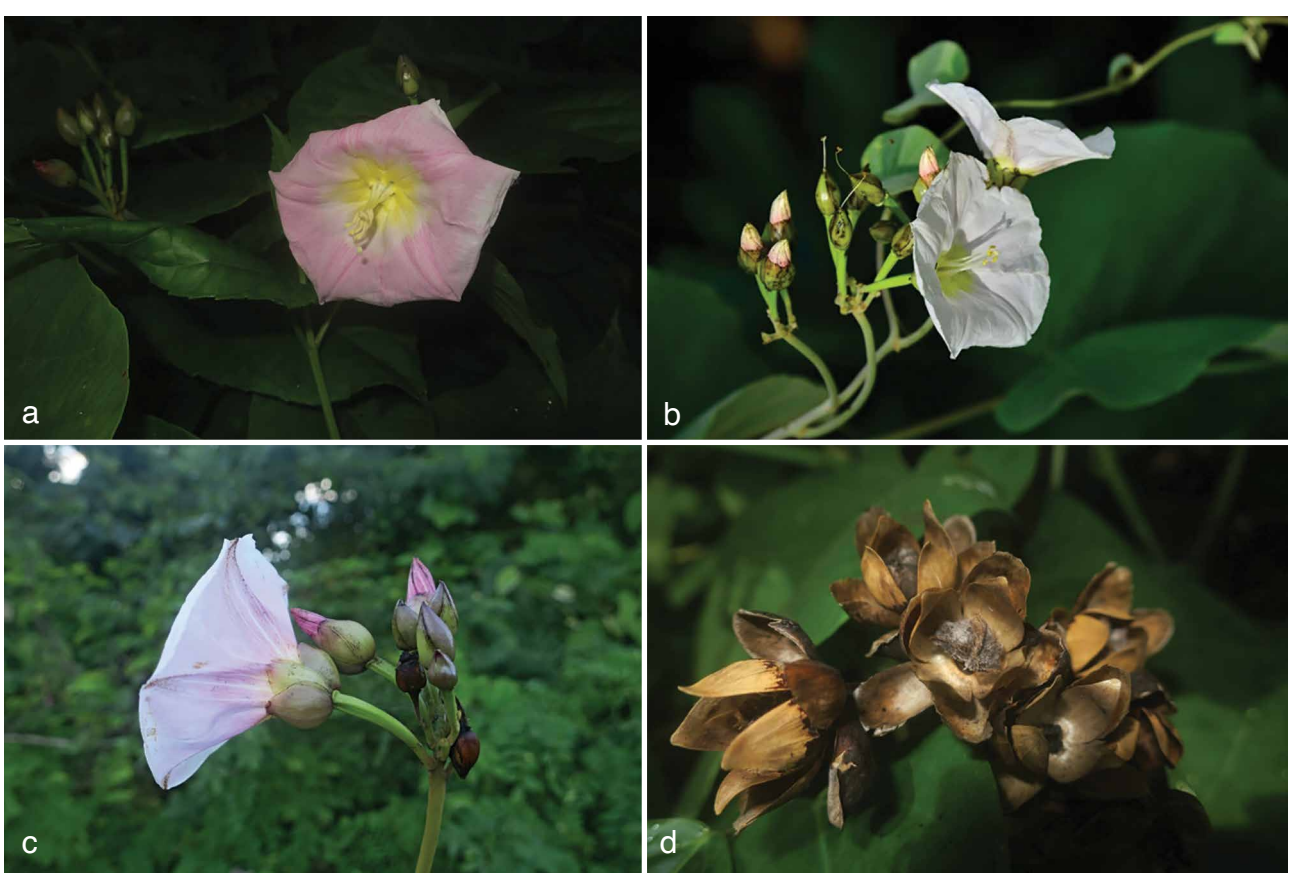
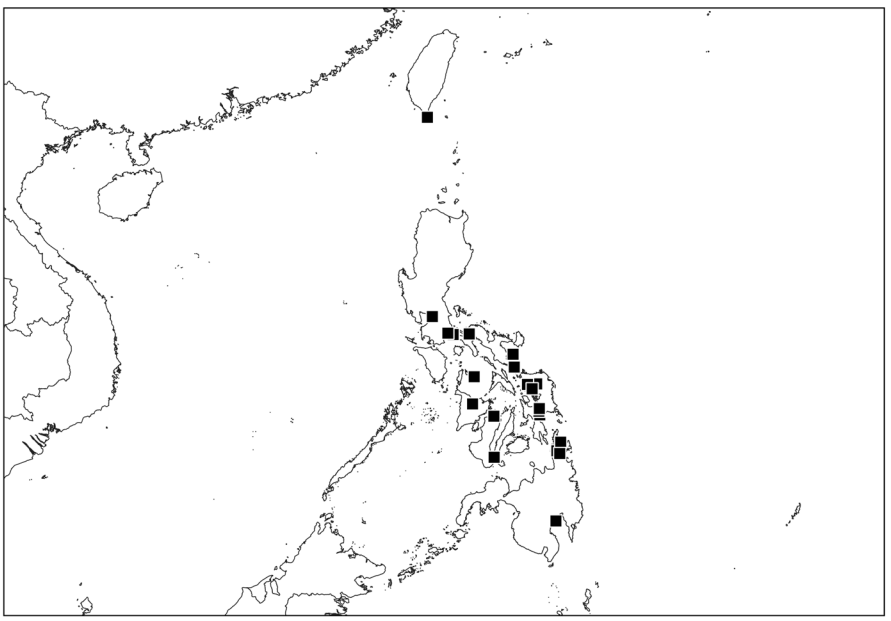


Fig. 6 *Decalobanthus distillatorius* (Blanco) Staples. a. Habit with pink colour morph, showing protruding stamens and broad, shallow corolla; b. colour variant with nearly white corolla; c. flower and buds, lateral view, note lobed ring at pedicel apex and glabrous, shiny sepals; d. old fruits showing 4-valved dehiscence with strong delamination of outer pericarp layer (a, c, d: Mark Gregory Q. Rule, voucher: *M.G.Q. Rule s.n.* in PNH; b: Jane Maestro-Scherer, no voucher).



Map 7 Distribution of *Decalobanthus distillatorius* (Blanco) Staples.

low inside tube base, limb slightly 5-sided, tips of midpetaline bands hairy; stamens protruding, 1.6–1.8 cm; pistils slightly exceeding stamens. *Fruiting calyx* cupular, enclosing the fruit; sepals to 2 cm long, brown-black abaxially. *Capsules* 4-valved, ovoid, 1.5–1.8 cm long. *Seeds* 4, ovoid-carinate, c. 6 mm long, black, sparsely tomentose and densely villous.

Previously published illustrations — Van Ooststroom (1939a: 264, f. 1v, calyx only); Chang (1971: 18, f. 3).

Distribution — Philippines (islands of Cebu, Leyte, Luzon, Mindanao, Negros, Panay, Romblon, Samar, Sibuyan) and southern tip of Taiwan.

Habitat & Ecology — In thickets and secondary forests at margins and in clearings, open areas of cliffs along roadside facing the sea; on rolling limestone hills and on clay loam soil. Elevation: sea level to 400 m.

Vernacular names — Philippines: Anipay (*Madulid et al.* (*1296* [*PNH 118273*]); bilángod (Egónget dialect; *R.B. Fox PNH 5047*); bulacan, buracan (Bisayan dialect, *Sulit PNH 14307*). Taiwan: 红花姬旋花 (transliteration = hong hua ji xuan hua; Fang & Staples 1995).

Uses — Blanco (1837) gave the epithet *distillatorius* based on the use of this liana as a source of potable liquid in the Philippines. Cutting the main stem of the liana near the ground allows a considerable volume of clear liquid to drain from the stems above that point; the liquid can be drunk safely. However, as Blanco (1837: 96) rightly noted, consuming very much of it leads to purging. Similar use is made of other *Decalobanthus* species on Borneo (Staples, pers. obs. 2011).

There are minor medicinal uses recorded in the Philippines: the flowers are used to treat ugut (boils), simply by placing a flower on the surface of the boil (*R.B. Fox PNH 5047*).

Notes — Van Ooststroom (1939b: 360) explicated the ambiguity surrounding the taxon *Convolvulus distillatorius* and whether it was indeed identical with the taxon Merrill had before him when he made the combination *Merremia distillatoria*. The specimens cited by Merrill disagree in some minor points with Blanco's original description. Van Ooststroom therefore set aside this ambiguous name and took up Elmer's later-published *M. similis*, for which the typification and original description are quite clear. However, Blanco's name is validly and legitimately published and it is by far the earliest available epithet; there is no reason under the modern ICN (Turland et al. 2018) to avoid taking it up, with a suitable typification to stabilise the usage. However, I found no authentic original material for this Blanco name. Stafleu & Cowan (1976: 229) mention that 400 Blanco specimens are known to be in MA: an inquiry to the curator at MA brought a reply that there are no Blanco specimens there filed as *C. distillatorius* or *M. similis* (García Ibáñez, pers. comm. July 2020). I personally searched the G herbaria during visits (2005, 2010) and found no Blanco specimens there linked to *C. distillatorius* or *M. similis*. No original material having been found in MA or the several herbaria at G, I propose a neotype as indicated above.

Chang (1971: 15, 1978: 385) and Lu (1972: 151) recorded *Merremia similis* from the extreme southern portion of Taiwan on the Hengchun Peninsula. This was the only occurrence of the species outside the Philippines. I searched for the plants in 1996 and failed to locate any. A search in 2010 again failed to locate any *D. distillatorius* (Yang Sheng-Zehn, pers. comm. 2010) but in December 2021 living plants were found again at Fenshuiling (Chen et al. 2022).

Likewise, for the Philippines there are few recent herbarium specimens seen for this species. However, photos of an unidentified climber were shared in an online plant forum (Co's Digital Flora of the Philippines 2020); these showed living plants of *D. distillatorius* from Romblon Island and (in a separate post) from Mindanao. Based on these photo records we know that *D. distillatorius* does survive in the Philippines but its conservation status there is unknown. Due to the extensive land clearing and deforestation that has occurred throughout the archipelago this species might warrant conservation protection.

10. ***Decalobanthus eberhardtii*** (Gagnep.) A.R.Simões & Staples — Fig. 7; Map 8

Decalobanthus eberhardtii (Gagnep.) A.R.Simões & Staples (2017) 570. — *Ipomoea eberhardtii* Gagnep. (1915a) 145. — *Merremia eberhardtii* (Gagnep.) T.N.Nguyen in Averyanov et al. (1988) 43. — Type: *Eberhardt 1708* (holo P [P00288066]; iso P [P00288067]), (Vietnam,) 'Annam: prov. de Thua-Thien, near Long-co'.

Stems and branches softly tomentose-villose (grey-white in life, drying yellowish). *Leaves* basally attached, orbicular or broadly ovate, 10–15 cm diam, bases cordate, basal lobes semi-orbicular and closely approaching; secondary veins 8 or 9 on either side of the midvein. *Inflorescences* several-flowered, cymose; peduncles 12–15 cm long; bracts and bracteoles

Fig. 7 *Decalobanthus eberhardtii* (Gagnep.) A.R.Simões & Staples. a. Habit of a cultivated plant, Rama IX Botanical Garden, Bangkok, Thailand (provenance: Vietnam); b. flowers in lateral view showing ashy-hairy sepals; c. fruits ripening, before delamination of distal pericarp (a: Veeraya Boontia, no voucher; b, c: Dang Tran Huu, no voucher).

long-filiform, deciduous. *Flower* buds narrowly ellipsoid, obtuse; sepals subequal, broadly ovate, to 1.8 by 1.2–1.5 cm, abaxially yellow-brown tomentose; corollas campanulate, up to 6 cm long, white, pale yellow inside tube base, limb 4–5 cm diam, inconspicuously 5-sided, midpetaline bands sericeous abaxially; stamens included, subequal, anthers ellipsoid, c. 5 mm long, spiralling; pistil included, slightly exceeding stamens. *Fruiting calyx* accrescent, cupping fruit, sepals stiffly chartaceous, dark brown abaxially. *Capsules* broadly ovoid-conical, 1.8–2 cm long, dark brown, apex becoming straw-yellow. *Seeds* 4, ovoid-trigonous, pubescent.

Previously published illustration — Staples (2018: 279, f. 14.3).

Distribution — Endemic in Vietnam (Quang Nam-Dà Nang, Thùa Thiên Huê).

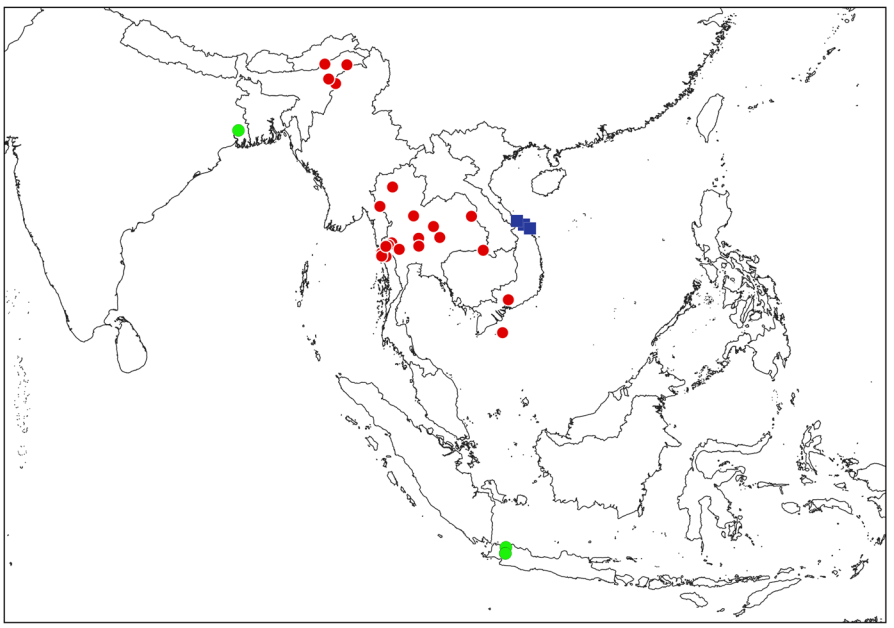
Habitat & Ecology — Collection labels record little information aside from the plants grow in hillside thickets near the sea and inland on slopes and ravines along the Huê divide. Nothing has been recorded about the soil types or elevation.

Note — Known from just two confirmed collections made near Huê in Thùa Thiên Huê province. Additional literature reports (Averyanov et al. 1988: 43) from offshore islands of Quang Nam-Dà Nang province require confirmation. This species is cultivated in Thailand, at Rama IX Park in Bangkok; photos that document this horticultural use circulated via social media (*Convolvulaceae* group on Facebook 2018–2019).

11. ***Decalobanthus elmeri*** (Merr.) A.R.Simões & Staples — Fig. 8; Map 9

Decalobanthus elmeri (Merr.) A.R.Simões & Staples (2017) 571. — *Merremia elmeri* Merr. (1929) 261. — Lectotype (designated here): *Elmer 20396* (holo PNH†; lecto UC [UC 312124]*; isolecto A [00054675, 00054676], B [B_10_0241996], BISH [BISH1001148], BO, F [F0054919F], G [G00227278], K [K000830844], L [L 0004225], M [M0184783], MO [MO-694472], NY [NY00336582], PNH, SING [SING0052312] , U [U 0001429]), (Malaysia,) British North Borneo (Sabah), Elphinstone province (Tawau district), Tawao.

Merremia elmeri Merr. var. *glaberrima* Ooststr. (1939b) 359. — *Decalobanthus elmeri* (Merr.) A.R.Simões & Staples var. *glaberrimus* (Ooststr.) A.R.Simões & Staples (2017) 571. — Type: *Hallier 3370* (holo L [L 0004226]; iso BO sheet numbers 935.7 2025a, 935.7 2025b, 935.7 2025c, K [K000830843], L [L 0004227], P [P00600291], SAR ×2), (Indonesia, Kalimantan Barat, Sungai Kenepai,) 'Borneo. W. Division, Sungai Saniai'.



Map 8 Distribution of *Decalobanthus eberhardtii* (Gagnep.) A.R.Simões & Staples (■); *D. mammosus* (Lour.) A.R.Simões & Staples (wild plants = ●, cultivated plants = ●).

Stems not lenticellate; all parts glabrous or reddish hairy. *Leaves* peltately attached, broadly ovate to orbicular, 6–25 by 5–21 cm, bases rounded to slightly retuse; secondary veins 8–10 on either side of the midvein. *Inflorescences* 1 or 2 in leaf axils, many-flowered, corymbose; lowermost bracts sometimes foliaceous, not peltate, upper bracts tiny, caducous. *Flower* buds ovoid, acute or obtuse; sepals subequal, broadly elliptic to elliptic-oblong, 0.9–1.3(–1.5) cm long, convex, obtuse, longitudinally striate abaxially; corollas funnelform-campanulate, 3–3.5 cm long, white, outside minutely granulose-glandular, tube base greyish, limb recurved; stamens protruding, anther connectives villose (or glabrous); pistils protruding, shorter than stamens. *Fruiting calyxes* slightly accrescent, cupping fruit; sepals blackish abaxially. *Capsules* subglobose-conical, 1.3–1.4 cm diam, several-valved, pericarp striate outside. *Seeds* 4, 5–6.5 mm long, brownish black, short-pubescent, margins with longer hairs.

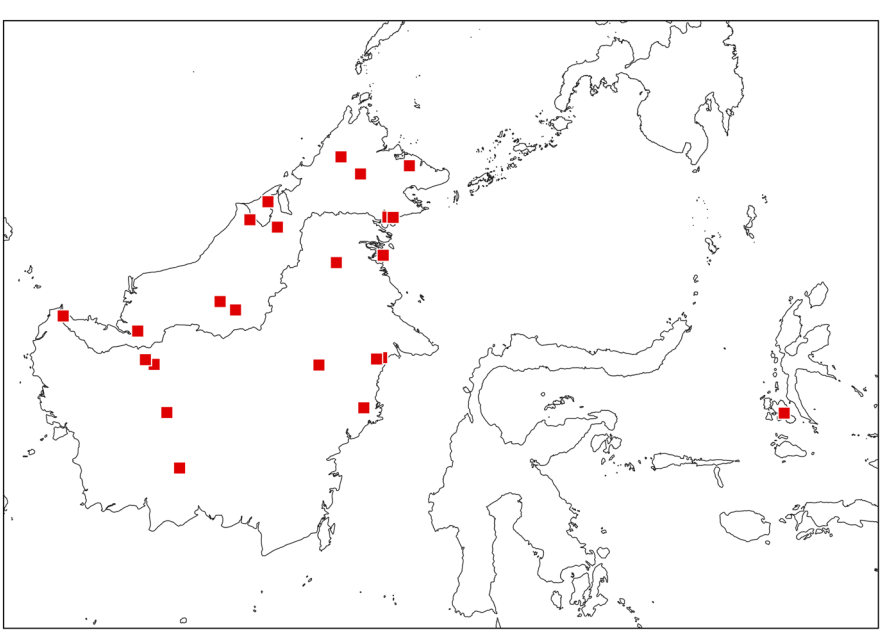
Previously published illustrations — Van Ooststroom (1939b: 349, f. 3d, 3e).

Distribution — Formerly thought to be endemic to Borneo (Brunei, Malaysian Sabah and Sarawak, Indonesian Kalimantan Barat, K. Tengah, K. Timur); recently one collection seen from Bacan Island on the eastern side of Sulawesi. Not documented, so far, on the island of Sulawesi, which lies in between.

Habitat & Ecology — Found in diverse kinds of natural areas like mixed dipterocarp forest, rain forest, primary forest clearings, steep hilly country, edges of swamps, riverbanks; as well as in disturbed habitats: along logging roads, in abandoned *ladang* at roadside in *belukar* about 2 years old, covering open thickets in wet places in newly cleared land, secondary forest. Numerous soil types are recorded: clay-rich alluvium, red clay, yellow loam, alluvial sandy clay, sand; elevations range from sea level to 550(–1280) m.

One collector noted that the vigorous vines can become “a dangerous weed in young rubber” (*H.F. Comber 4085*).

Typification — Merrill (1929: 7) stated that the holotypes for his new species are in the Philippine National Herbarium (PNH) with isotypes in UC. However, the holotype for *M. elmeri* was



Map 9 Distribution of *Decalobanthus elmeri* (Merr.) A.R.Simões & Staples.

Fig. 8 *Decalobanthus elmeri* (Merr.) A.R.Simões & Staples. a. Leaves showing peltate attachment of petioles; b. inflorescence with many buds in a more or less flat-topped, corymbiform arrangement; c. flower showing wide-spreading corolla limb and stamen filaments (all Ong Jyh Seng, no voucher).

destroyed during the second World War and the sheet now filed in PNH is an isotype obtained after the war (D. Madulid pers. comm. 2011). I am therefore designating a lectotype using the duplicate in UC, which has Elmer's handwritten field notes attached to the sheet.

Notes — Morphologically similar to *D. peltatus* in the peltate leaf attachment and mainly differing by its smaller and more numerous flowers; the corollas are always white and minutely granulose-glandular outside; the corolla tube bases are grey-black inside and out. Also, many specimens of *D. elmeri* have dense indumentum on the axial parts as well as the abaxial surfaces of the leaves (glabrous in *D. peltatus*).

There is an intriguing comment on the label of *Coode & Ferguson 7368* from Brunei: "Flowers creamy-yellow, opening in mid-afternoon, withered by 10 a.m. next morning – in contrast with the bright yellow *Merremia* which is open all the time." Could it be that *D. elmeri* is nocturnally flowering? Further field observations are needed on this point.

12. *Decalobanthus korthalsianus* (Ooststr.) A.R.Simões & Staples — Map 5

Decalobanthus korthalsianus (Ooststr.) A.R.Simões & Staples (2017) 571. — *Merremia korthalsiana* Ooststr. (1938) 175. — Type: *Korthals 237* (holo on 2 sheets L [L.0004236, L.0004237]), (Indonesia, Kalimantan Selatan, Dusun,) 'Dutch S.E. Borneo, Doesoen'.

Stems and branches drying angular substriate, not lenticellate; young parts puberulent, later glabrate. *Leaves* basally attached, broadly ovate or orbicular, 6–15 by 4–14 cm, bases broadly and shallowly cordate or truncate; secondary veins 7–10 on either side of the midvein. *Inflorescences* corymbose, many-flowered, crowded, appearing ± flat-topped; peduncles 12–20 cm long; lower bracts foliaceous, 1.5–4 cm long, upper bracts linear-subulate, 2.5–4 mm long, pubescent. *Flower* buds ovoid, acutish; sepals equal or outer slightly shorter, broadly elliptic or orbicular, 0.9–1 cm long, black when dry, shining, apex broadly rounded; corollas broadly funnelform or campanulate,

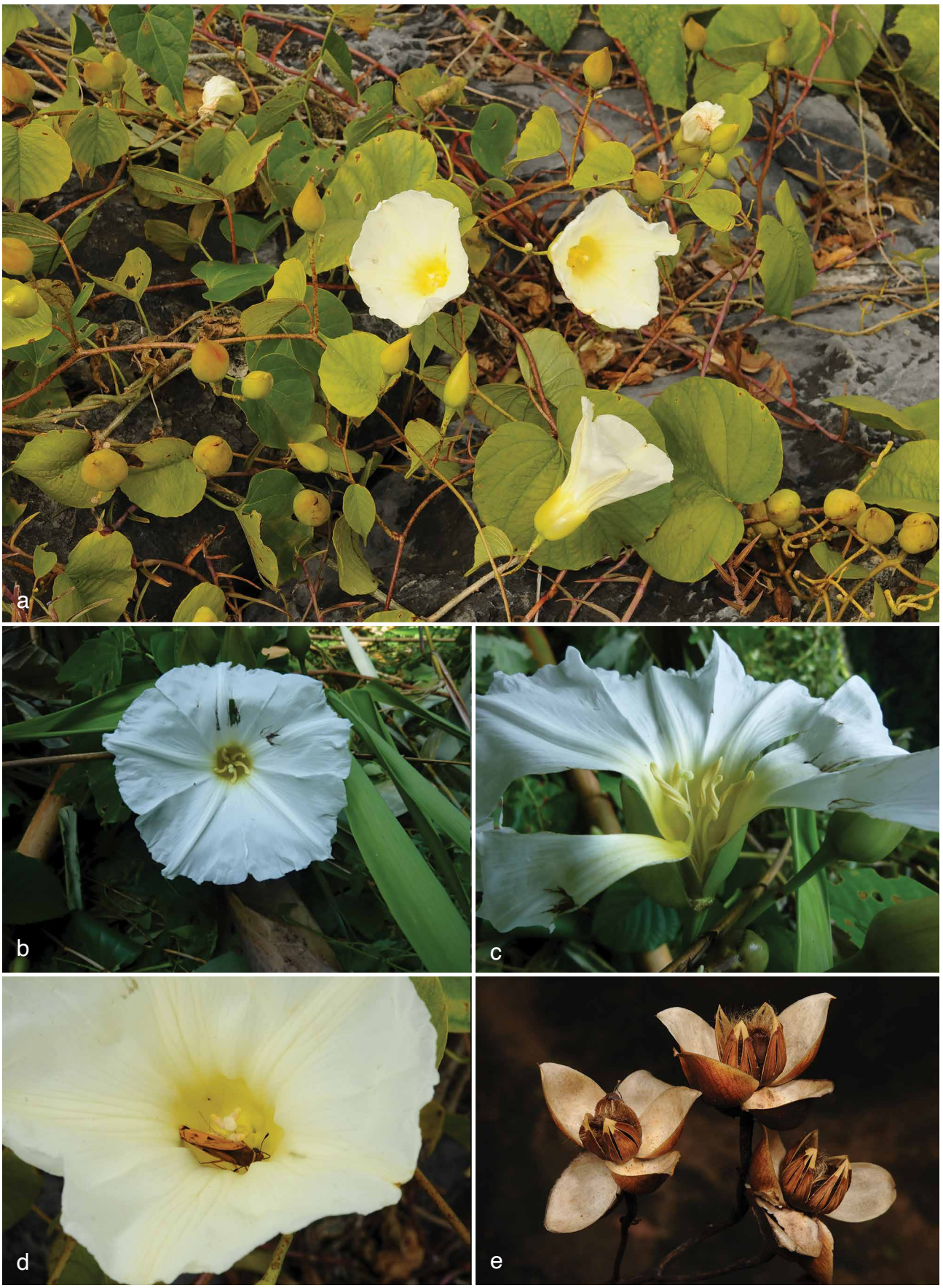


Fig. 9 *Decalobanthus mammosus* (Lour.) A.R.Simões & Staples. a. Habit with pale yellow colour morph; b. flower in frontal view, white colour morph; c. opened corolla showing spirally twisting stamens and pistil; d. hesperiid visitor in pale yellow flower; e. dehiscing fruits showing delaminating capsule valves with multiple secondary splits in valves (a, d, e: Preecha Karaket, voucher: *Staples et al. 1336* in SING; b, c: George Staples, voucher: *Staples et al. 1346* in SING).

2–2.5 cm long, yellow, limb shallowly lobed, glabrous outside; stamens included; pistil included. *Fruits* and *seeds* not seen.

Distribution — Endemic to Borneo: Malaysia (Sarawak), Indonesia (Kalimantan Barat, K. Selatan).

Habitat & Ecology — Mostly in secondary forests; elevation between 150–300 m.

Vernacular name — Malaysia: akar solop (Sarawak; *Richards 2219*).

Note — It has been suggested (A.R. Simões, pers. comm.) that this taxon may be conspecific with *D. clemensianus*. However, after careful examination of the few older collections (just four) that are available, I am maintaining this taxon. In my experience Van Ooststroom had an exceptional 'eye' for recognizing and delimiting species on morphological criteria and I trust his judgement. But in a parallel situation with *D. crassinervius*, there are just a few older collections that can confidently be assigned to *D. korthalsianus* and there are no recent collections that correspond with them. Why is that? When new collections and molecular samples can be made there will be new insights into species delimitation in *Decalobanthus*.

13. ***Decalobanthus mammosus*** (Lour.) A.R.Simões & Staples — Fig. 9; Map 8

Decalobanthus mammosus (Lour.) A.R.Simões & Staples (2017) 571. — *Convolvulus mammosus* Lour. (1790) 108. — *Ipomoea mammosa* (Lour.) Choisy (1834) 475. — *Merremia mammosa* (Lour.) Hallier f. (1897) 164. — Lectotype (designated by Simões & Staples 2017: 571): [icon] Rumphius, Herb. Amboin. 5 (1747) 370, t. 131.

Ipomoea gomezii C.B.Clarke in Hook.f. (1883) 211, Gagnep. (1915b) 254. — Lectotype (designated here, see note): *Gomez s.n.* (lecto K [K000830866]; isolecto K [K000830867]), Burma, (Myanmar, Tenasserim Division,) 'Tavoy'.

Stems and branches glabrous, not lenticellate. *Roots* fasciculate tubers to 25 cm long. *Leaves* basally attached, orbicular to transversely elliptic, 6–12 by 5–15 cm, bases cordate; secondary veins 7–9 on either side of the midvein. *Inflorescences* cymose-paniculate, 3–30-flowered; peduncles 3–15 cm long; bracts deciduous. *Flower* buds ellipsoid, acute; sepals subequal, convex, glabrous, outer 3 broadly ovate to broadly elliptic, 24–36 mm long, apices obtuse; corollas broadly funnelform, 7–12 cm long, pale yellow or white with yellow inside tube, outer surface minutely gland-dotted; stamens included, subequal, anthers strongly spiralling; pistil included, equalling or shorter than stamens. *Fruiting calyxes* accrescent, enclosing fruit. *Capsules* 4-valved, ovoid, 2–2.5 cm long; valves with secondary splits that do not reach apex. *Seeds* 4, c. 8 mm long, brown pubescent, margins with 5–8 mm long, paler hairs, later glabrescent.

Previously published illustrations — Staples (2010: colour plate LI, f. 3.1, 3.2; 2018: 295, f. 14.12).

Distribution — India (Assam, Nagaland), Myanmar, Thailand, Vietnam. So far not documented from Bangladesh, Laos or Cambodia but almost certainly present there. Formerly, and perhaps still, cultivated in Bogor Botanical Garden (Indonesia, Java) and Calcutta Botanic Garden (India, West Bengal).

Habitat & Ecology — Rampant climber forming vine blankets over trees, thickets, along roadsides in various habitats including: mixed deciduous forest, disturbed, degraded overgrown roadside thickets in primary evergreen seasonal hardwood forest, hill evergreen forest, on diverse soils including karst limestone, solid sandstone hillsides with shallow soil pockets, shale bedrock, and 'salty' soil; at elevations from 50–450 m in Thailand and 1220–1525 m in Myanmar. Full sun exposure and moisture regimes varying from seasonally dry to continuously moist.

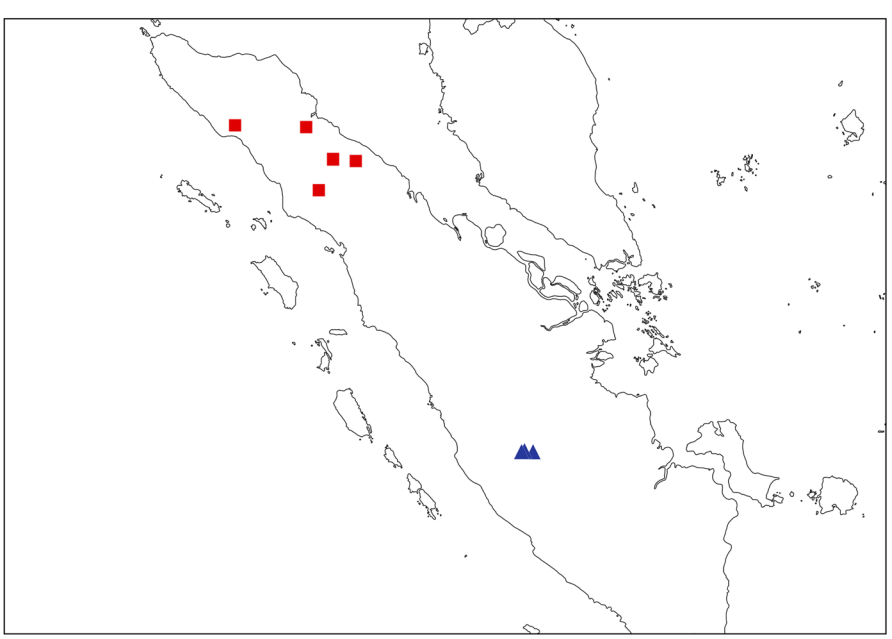
Vernacular names — Thailand: หัวล้านชนกน (hua lan chon kan) (Songkhla & Khunwasi 1993: 50). Vietnam: Khoai tù (De Loureiro 1790: 108).

Uses — The tubers are edible and used medicinally in Java (*Backer 33473*).

Typification — Clarke (in Hooker 1883) based his *Ipomoea gomezii* on two collections (syntypes); only one collection was found in Kew, the Kurz specimen cited from the 'Andamans' was not located. The lectotype chosen fixes the application of Clarke's name and reduces it to synonymy.

Note — Van Ooststroom (in Van Ooststroom & Hoogland 1953: 451) stated this is a perennial plant with stems that grow annually from the underground tubers. Where I have collected the plants in western Thailand they are enormous lianas, covering tall trees. It is difficult to imagine such rampant growth produced annually; this needs to be investigated further. There is geographical variation in corolla colour: in Myanmar and the adjacent western provinces of Thailand the corollas are large (8–12 cm long), pure white with a yellow tube; further east in the Central and Eastern regions of Thailand the corollas are smaller (7–8 cm long), pale yellow with a darker tube.

One of the inexplicable oddities about this species is its seeming rarity (or absence) in Vietnam. De Loureiro (1790: 108) stated



Map 10 Distribution of *Decalobanthus ooststroomii* Staples (■) and *D. sumatranus* Ooststr. (▲).

in the protologue that his new species was '*frequenter cultus in agris Cochinchinae*'. No De Loureiro specimen for it has been found. Only one later collection has been seen from Vietnam: *F.J. Harmand* collected it on the island of Poulo Condor in the late 19th century. A thorough search of the Paris herbarium in 2015 disclosed no other collections of *D. mammosus* from Vietnam, Cambodia nor Laos. It would not be easy to overlook such an expansive climber with large, eye-catching flowers and one has to wonder whether De Loureiro's comment was accurate at the time or if this species later disappeared from Vietnam.

14. *Decalobanthus ooststroomii* Staples, *nom. & stat. nov.* — Fig. 10; Map 10

Merremia boisiana (Gagnep.) Ooststr. var. *sumatrana* Ooststr., Blumea 3 (1939b) 344, non *D. sumatranus* Ooststr. — *Decalobanthus boisianus* var. *sumatranus* (Ooststr.) A.R.Simões & Staples (2017) 569. — Type: *Lörzing 4723* (holo L [L 0836954]; iso BO sheet numbers 1705910, 1705925, 1705926), (Indonesia,) Sumatra, Sibolangit.

Stems and branches grey to fulvous pubescent, later glabrescent, not lenticellate. *Leaves* basally attached, broadly ovate, up to 20 by 16 cm, bases subcordate to shallowly cordate, abaxially greyish pubescent; secondary veins 6–8 on either side of the midvein. *Inflorescences* many-flowered, crowded panicles or thyrses; peduncles 8–16 cm long. *Flower* buds ovoid, obtuse to acute; sepals 4–6 mm long, rounded to obtuse; corollas flaring funnelform, 1.1–1.5 cm long, white, base of tube inside pale yellowish, limb erect, crenulate; hairs on midpetaline bands drying white on darker background; stamens and pistil included. *Fruits* and *seeds* not seen.

Distribution — Endemic to northern Sumatra (Aceh, Sumatera Utara).

Habitat & Ecology — Collectors report it is common in thickets and secondary regrowth, at edges of recently logged primary forest, in clearings, sprawling on roadsides, the soil types not stated; elevations ranging from 50–600(–1200) m.

Nomenclature — Because the epithet *sumatranus* is preoccupied in *Decalobanthus*, I propose a new name for this taxon at specific rank: *D. ooststroomii*. Simon Jan Van Ooststroom (1906–1982) first recognized this taxon and he made exceptional contributions to the study of Malesian and Asian *Convolvulaceae*.

Notes — Known from just a few collections from northern Sumatra these Sumatran populations are quite distinct from the continental Asian ones and I am elevating them to specific rank. Visits to BO in 2008 and ANDA in 2012 did not disclose any recent collections. Interestingly, Van Ooststroom (1939b: 343) singled out *Yates 975* from East Coast Sumatra as being the typical var. *boisiana* while all other specimens collected from Sumatra he considered var. *sumatranus*. The *Yates* duplicates were distributed without label data; only the set in the UC herbarium has complete field notes attached and these describe a vine with white flowers, so I am including *Yates 975* in my concept for *D. ooststroomii*. Wang et al. (2007) reduced var. *sumatranus* under their concept of *M. boisiana* var. *fulvopilosa*, which I do not accept.

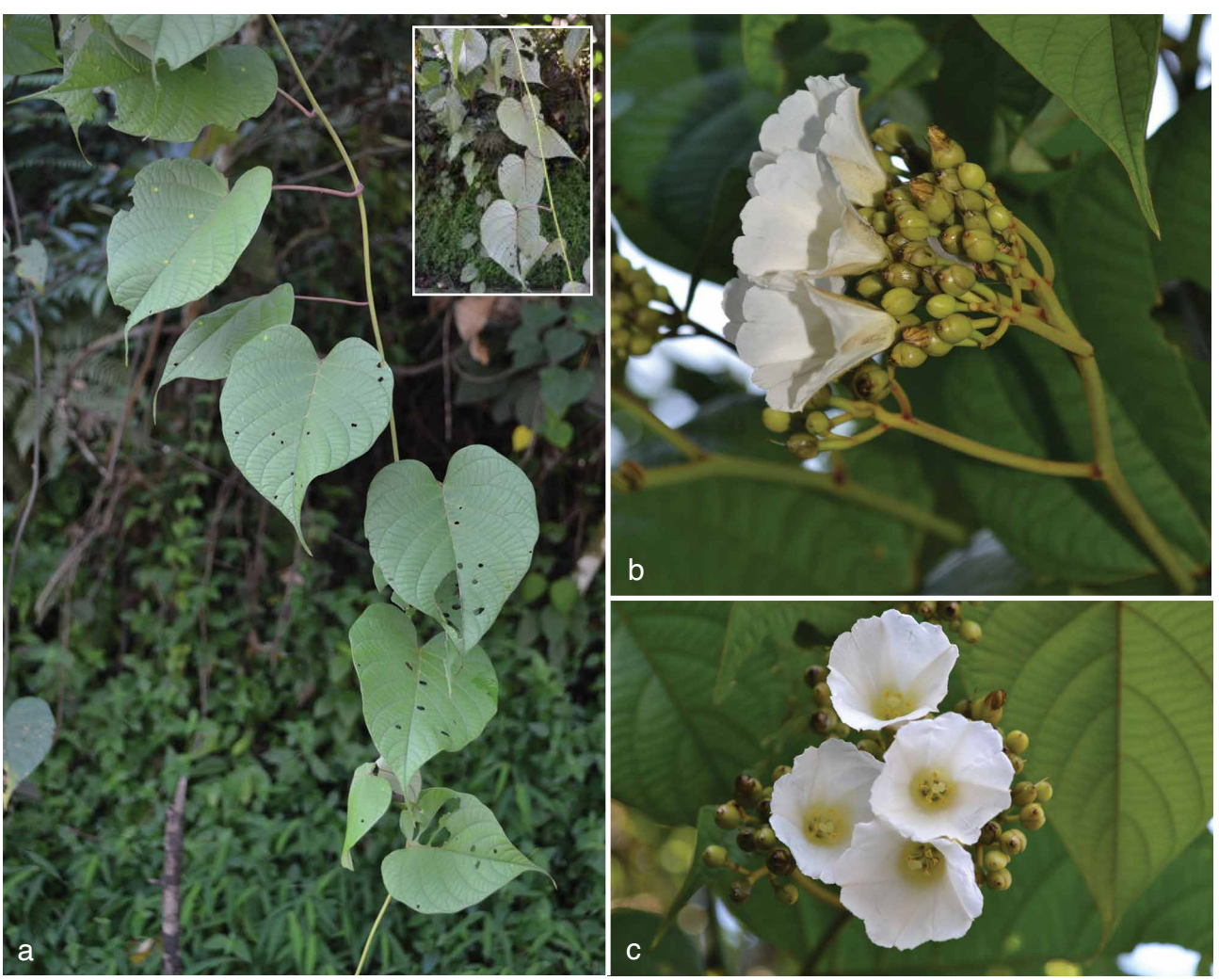


Fig. 10 *Decalobanthus ooststroomii* Staples. a. Habit with basally attached, cordate leaves in adaxial view, inset: leaves in abaxial view showing greyish pubescence; b. dense inflorescence with crowded buds and flowers with erect, crenulate corolla limb; c. flowers in front view with spirally twisted anthers (all Hafni Rahmadani, no voucher).

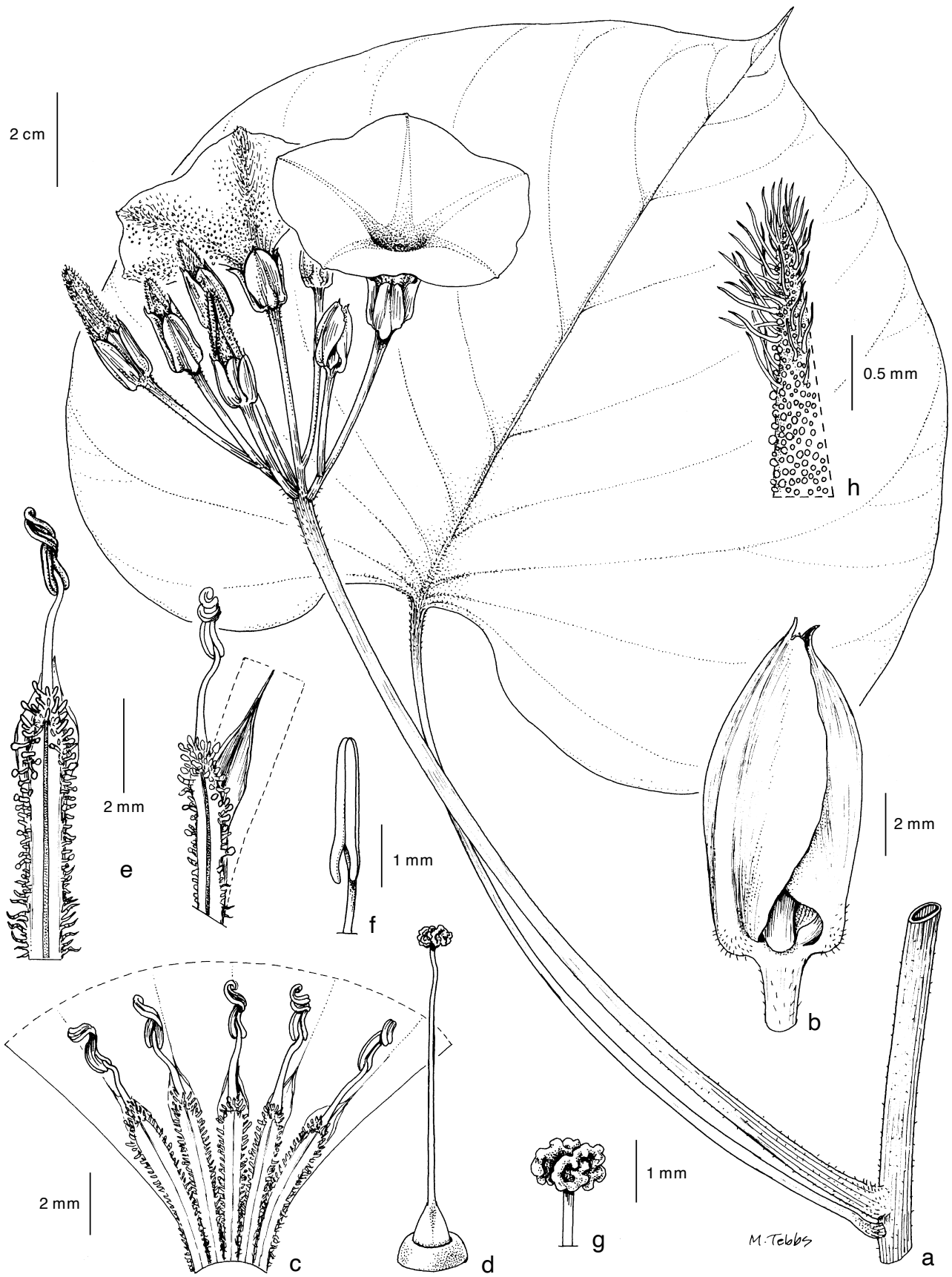


Fig. 11 *Decalobanthus pacificus* (Ooststr.) A.R.Simões & Staples. a. Leaf and inflorescence; b. calyx in bud; c. corolla opened; d. pistil; e. stamens, showing pubescent filament bases and spirally dehisced anthers; f. anther prior to dehiscence; g. stigma; h. section from outer apex of corolla lobe, showing hairs and glands (all *Fosberg 58373* in BISH, US). — Drawn by Margaret Tebbs, reproduced with permission, © the Board of Trustees of the Royal Botanic Gardens, Kew, from Staples (2009: 335, f. 1).

Photos of live plants from Sumatra were sent to me for identification (H. Rahmadani, pers. com. 2011–2012), but no vouchers were seen. One of Rahmadani's photographs was reproduced in the recent publication by Simões et al. (2020: f. 2D) and while correctly identified as var. *sumatranus* the photo is wrongly attributed to Jana Leong and said to be from Vietnam. The caption for this f. 2 has other errors and misattributions and compounds the confusion for *D. boisianus* by wrongly identifying f. 2E as yellow-flowered var. *sumatranus*; this photo actually shows *D. bimbim*.

15. *Decalobanthus pacificus* (Ooststr.) A.R.Simões & Staples — Fig. 11; Map 3

Decalobanthus pacificus (Ooststr.) A.R.Simões & Staples (2017) 571. — *Merremia pacifica* Ooststr. (1939a) 263. — Type: *A.C. Smith 1690* (holo BISH [BISH1001149]; iso GH [00054679], K [K000195199], L [L 0004238], NY [NY00336584]), Fiji, Vanua Levu, Mbua, Mt. Seatura.

Stems and branches glabrous, not lenticellate. *Leaves* basally attached, suborbicular, 10.5–22 by 8–22 cm, bases cordate; secondary veins 8–10 on either side of the midvein. *Inflorescences* umbelliform, 7–30-flowered; peduncle 13–34 cm long; bracts deciduous; pedicels 5-angled, thickened apically, grooved around calyx base. *Flower* buds ellipsoid-oblong, obtuse; sepals subequal, concave, outer 2 broadly obovate, 1–1.5 cm long, bases with thick medial boss, margins thin; corolla broadly funnelform to campanulate, 3.3–5 cm long, white, yellow inside at tube base, outside minutely golden gland-dotted, limb 5-angled; stamens included, unequal, strongly spiralling; pistil included. *Fruiting calyxes* persistent, tardily reflexing. *Capsules* narrowly ovoid-oblong, 1.3–4 cm long, valves splitting into many segments, basally indehiscent. *Seeds* 6–7 mm long, black, at first covered in wavy, 7–8 mm long, brown hairs, older seeds ± velvety pubescent.

Previously published illustrations — Van Ooststroom (1939a: 264, f. 1a–g; 1958: 560, f. 4).

Distribution — Widespread in the southwestern Pacific islands: Federated States of Micronesia (Pohnpei); Papua New Guinea (Bougainville, Buka, Rossel, East New Britain); Solomon Islands (Guadalcanal, Vanikoro, Kolombangara, New Georgia, Savo, Faro, San Cristoval); Vanuatu (Maewo); Fiji (Ovalau, Vanua Levu, Viti Levu).

Habitat & Ecology — In margins of primary rain forest, permanently wet coastal swamps, riversides, along logging roads and in secondary regrowth, along roadsides, in gardens and coconut plantations, on volcanic basaltic clays; elevations from sea level to 500 m.

Vernacular names — Federated States of Micronesia (Pohnpei): iol wah pwetepwet (*E.A. Amor 66* and *92*). Fiji (Vanua Levu): Veliyawa (*A.C. Smith 1690*). Papua New Guinea (Buka): Gova (Petats; *Waterhouse 41B*). Solomon Islands (Kolombangara): Ambui (Kwar'ae, *Bacon PB-1*), tabui, tambui (Kwara'ae; *Whitmore BSIP4420*) – (San Cristoval): gapi mafui (*Comins 204*) – (Guadalcanal): tambui (*Morrison 181*) – (New Georgia): mou (*Waterhouse 13*). Vanuatu (Maewo): gawe tagwatagwa (*Bourdy 675*).

Notes — Often wrongly identified in herbaria as *Merremia peltata*. There are several features of *D. pacificus* that aid in correct recognition of the species: basal leaf attachment; smaller flowers arranged in umbelliform inflorescences; the tiny, glistening golden glands on the outside of the corolla; the capsule splitting into numerous small valves at the apex but remaining firmly fused at the base, the capsule base closely invested at first by the accrescent calyx, which at length reflexes away from the fruit; and the unusually long, silky hairs that initially cover the seeds.

In re-examining Pacific island material, now that more herbarium specimens are available, it has become apparent that the distinctness of the ring or ridge where the pedicel joins the calyx varies considerably; Van Ooststroom (1939a) termed this an 'epicalyx'. In some cases the 'epicalyx' ring is sharply delineated and the groove deep and distinct; in other cases it is barely detectable. These angular ridges of tissue may be an artefact of drying and study of fresh material would elucidate what the shape of the pedicel apex and calyx base region is like in living plants.

The collection *Fosberg 58373*, from Pohnpei, is a mixture of *D. pacificus* and *D. peltatus*: the duplicate in P is *D. peltatus* while other duplicates seen (in BISH, K, L, US) are *D. pacificus.* Any additional duplicates of *Fosberg 58373* should be examined carefully to ascertain which species they are. Petiole attachment on mature cauline leaves will immediately separate these two species: peltate blade attachment in *D. peltatus*; basal blade attachment in *D. pacificus*.

16. *Decalobanthus peltatus* (L.) A.R.Simões & Staples — Fig. 12, 13, 14, 15; Map 11

Decalobanthus peltatus (L.) A.R.Simões & Staples (2017) 571. — *Convolvulus peltatus* L. (1753) 1194. — *Ipomoea peltata* (L.) Choisy (1834) 452. — *Merremia peltata* (L.) Merr. (1917) 441. — Lectotype (designated by Merrill (1917) 441, see notes): [icon] '*Convolvulus laevis Indicus major*' in Rumphius, Herb. Amboin. 5 (1747) t. 157 (Fig. 13). Epitype (designated here): *Robinson 401* (epi US [US03147977]; isoepi L [L.2722073], P [P00600280]), (Indonesia,) Amboina (Ambon).

Ipomoea nymphaeifolia Blume (1825) 719, non Griseb. (1866) 203. — *Merremia nymphaeifolia* (Blume) Hallier f. (1896) 127. — Lectotype (designated by Van Ooststroom 1939b: 355): *C.L. Blume 1505 '304'* (lecto L [L 0866915]), (Indonesia,) Java, Salak.

Ipomoea menispermacea Domin (1928) 535. — Type: *Domin 7928* (holo PR, accession 530538), (Australia,) 'Nordost-Queensland: Regenwälder bei Harveys Creek'.

Stems and branches glabrous, not lenticellate. *Leaves* peltately attached (small leaves below inflorescences sometimes basally attached), broadly ovate to orbicular, 7–30 cm long, bases rounded or retuse; secondary veins 7–10 on either side of the midvein. *Inflorescences* 1 or 2 in leaf axils, paniculate, several-flowered or flowers solitary; peduncles 5–15 cm long. *Flower* buds ovoid, acute; sepals subequal, concave, broadly ovate, 1.8–2.5 cm long; corollas 4–6 cm long, limb 5-sided, dimorphic: Morph 1: campanulate, ± waxy, white or bright yellow; stamens included; Morph 2: broadly bowl-shaped, diaphanous, white or pale yellow; stamens protruding; anthers strongly spiralled, connectives long hairy (or glabrous); pistil exceeding stamens. *Fruiting calyxes* accrescent, cupping fruit, black-brown. *Capsules* broadly ovoid, 2.5–3 cm long; valves 4, splitting lengthwise into several segments. *Seeds* trigonous, c. 6–8 mm long, brown hairy, margins long tomentose.

Previously published illustrations — Heine (1984: pl. 12, 13); Bosser & Heine (2000: pl. 7); Staples (2010: colour plate LI, f. 4); Staples & Syahida-Emiza (2015: 294, pl. 40D, 295, pl. 41A, B).

Distribution — Wide-ranging throughout the tropical Indo-Pacific from eastern tropical Africa (Pemba island), to Madagascar, Réunion, Mayotte, Seychelles, Andaman Islands, Nicobar Islands, peninsular Thailand, Malaysia (peninsular, Sabah, Sarawak), Singapore, Indonesia (Java, Kalimantan, Maluku, Sulawesi, Sumatra), Philippines (Bohol, Luzon, Mindanao, Mindoro, Palawan, Sulu), New Guinea (Indonesian, Papua, New Ireland), Solomon Islands (Guadalcanal, San Cristoval, Vanikoro), New Caledonia, Vanuatu (Efate, Epi, Erromanga, Espiritu Santo, Vanua Lava), Australia (Queensland), eastward throughout the Pacific Islands (Cook Islands, Fiji, French Polynesia, Micronesia, Niue, Palau, Samoa, Tonga, Wallis and Futuna) as far north as Hawai'i (naturalized on Kaua'i).

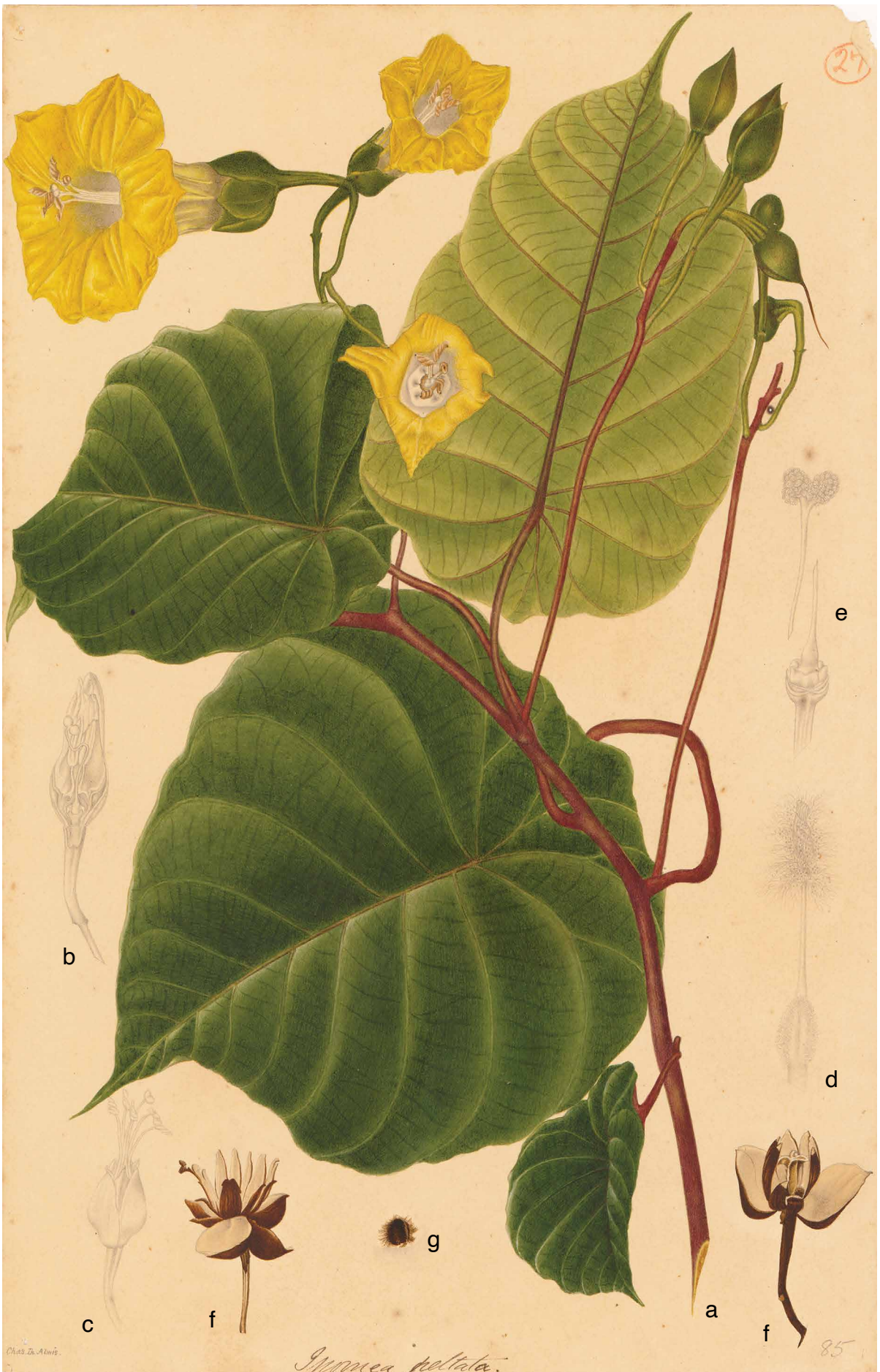


Fig. 12 *Decalobanthus peltatus* (L.) A.R.Simões & Staples. a. Habit of leaves and flowers; b. mature flower bud, opened; c. calyx and stamens; d. stamen with dense hair tuft covering anther; e. pistil; f. opened capsule, two views; g. seed. Painted by Charles de Alwis. Reproduced with permission, courtesy of Singapore Botanic Gardens Archives.

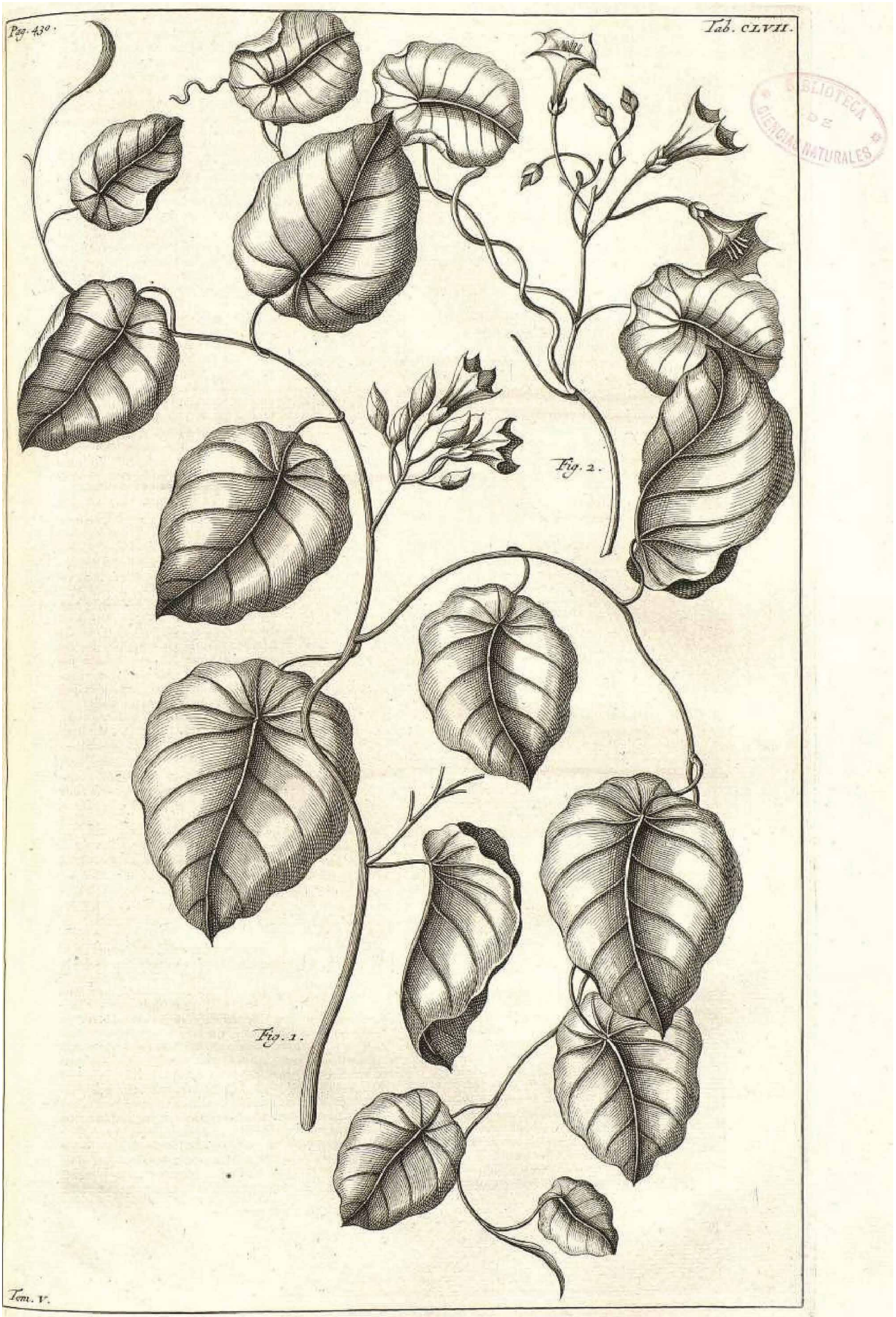


Fig. 13 *Decalobanthus peltatus* (L.) A.R.Simões & Staples. Plate 157 by Rumphius, chosen as lectotype by Merrill (1917: 441); see comments in text.

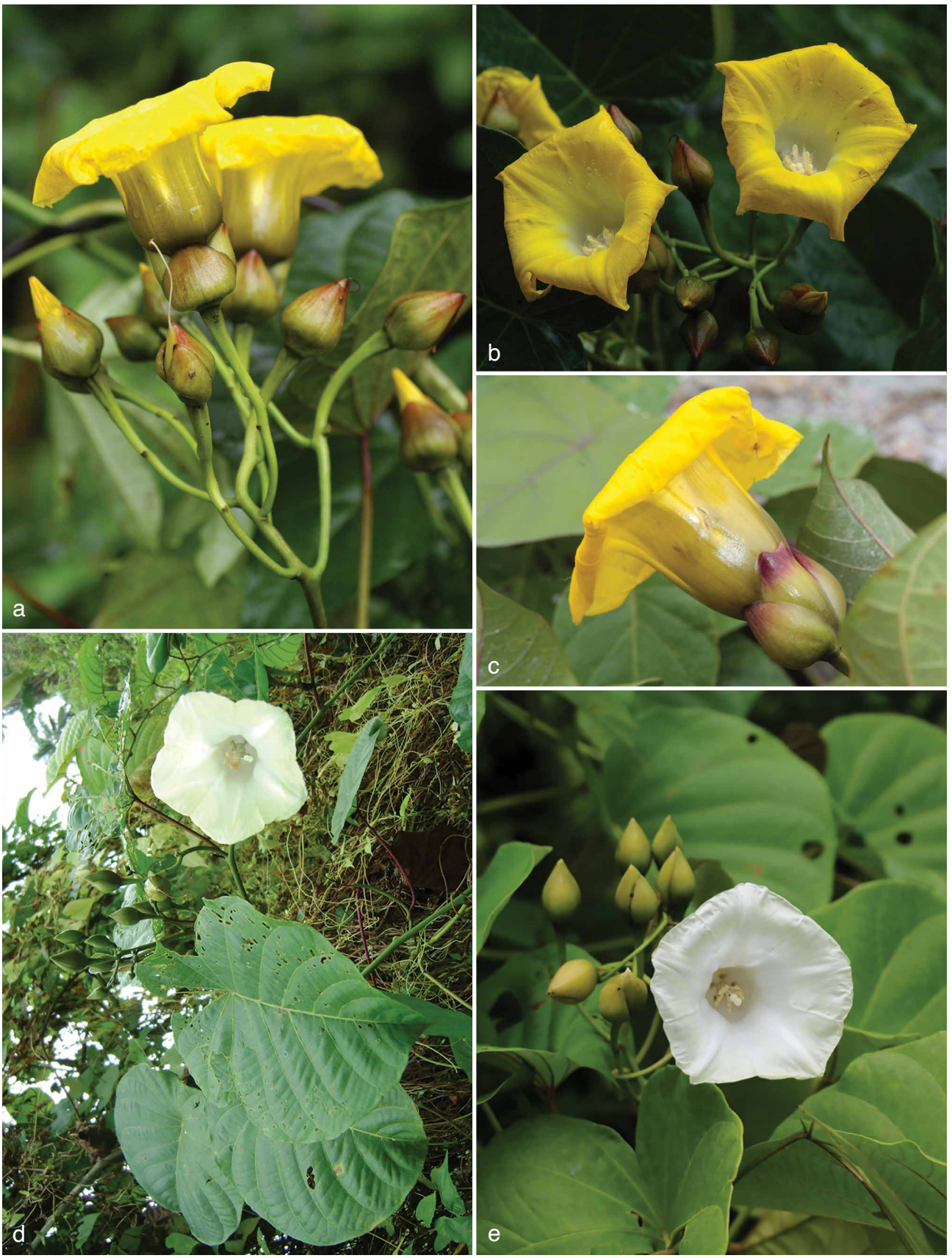
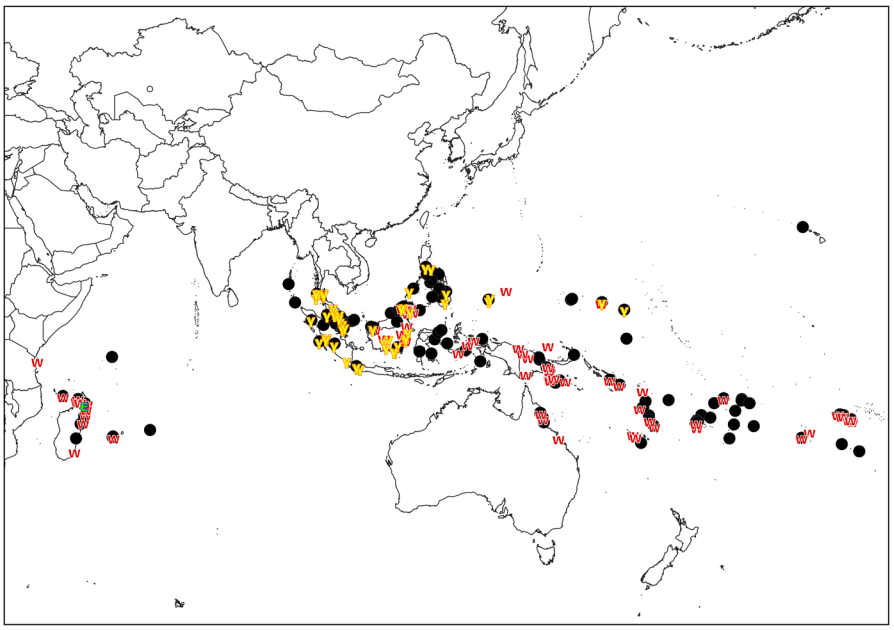


Fig. 14 *Decalobanthus peltatus* (L.) A.R.Simões & Staples. Variations in corolla morphology and colouration, 1: a–c: Campanulate corolla, waxy texture, bright yellow colour, included stamens; d, e, campanulate corolla, white colour, included stamens (a, b: Rachun Pooma, Peninsular Thailand, voucher: *Pooma et al. 6529* in BKF; c: Imin Kamin, Peninsular Malaysia, voucher: *Imin K. et al. FRI-74568* in KEP; d: Joju P. Alappatt, Andaman Islands, no voucher); e: Jean-François Butaud, Tahiti, no voucher).

Fig. 15 *Decalobanthus peltatus* (L.) A.R.Simões & Staples. Variations in corolla morphology and colouration, 2: a. Cauline leaf showing peltate attachment of petiole; b. Borneo form with white and pale yellow corollas collected from same population (or same plant) showing broadly rotate corollas with thinly membranous texture and spreading limb (at mid-morning); c. flower from same plant as A, Borneo form with white corolla, thinly membranous texture, reflexed corolla limb and protruding stamens (at mid-afternoon), note the prominent hair tufts on the exserted anthers; d. New Guinea plant showing corolla with broad rotate shape and very short tube, protruding stamens; e. Sumatra plant with broadly rotate corolla, pale yellow colour, and thinly membranous texture (at mid-afternoon) (a, c: George Staples, voucher: *Sugau et al. SAN-152853* in SAN; b: George Staples, voucher: *Sugau et al. SAN-152876* in SAN; d: Serena Lee, voucher: *S. Lee et al. SL-346* in SING; e: George Staples, voucher: *Nurainas et al. 2535* in ANDA).



Map 11 Distribution of *Decalobanthus peltatus* (L.) A.R.Simões & Staples (Y = yellow corollas; W = white corollas; ● = fruiting specimens or corolla colour not indicated; E = plants with basally attached leaves that are non-peltate).

Habitat & Ecology — *Decalobanthus peltatus* has an enormous ecological amplitude and tolerates, or even thrives with, human disturbance. It has been reported by collectors in the following natural habitats and ecosystems: evergreen forest; primary alluvial lowland forest; riverbanks; in *Inocarpus-Hibiscus* forest; and the edges of closed broadleaf rainforest. Collectors record it from a wide array of disturbed places such as: logged over dipterocarp forest; secondary forest regrowth; roadsides and logging roads; *belukar* scrub and edges of *alang-alang* (*Imperata, Poaceae*) fields; margins of palm and pine plantations; old taro cultivation areas; covering deforested areas on slopes; in disturbed *Hibiscus-Psidium* forest scrub; margins of mangroves; and along stony railway embankments. Soil types are diverse and include: coral and karst limestones; well-drained alluvial flats; clay loam; sandy loam; lava fields; orange soil on dolerite; gneiss; quartzite; forest soil on basalt; and in the pioneer vegetation stages on talus. Elevations reported range from sea level to 600(–1200) m.

This species is becoming a serious weed in the Pacific. Its distribution now reaches as far east as the Hawaiian Islands, where *D. peltatus* was recently documented as naturalized on the island of Kaua'i (Wood 2012). There is a growing literature advocating weed removal and control methods for *D. peltatus* on numerous Pacific islands (Bacon 1982, Paynter et al. 2006). It is a curious fact that only plants with white, campanulate corollas are implicated as weedy invasive species (see Notes).

Vernacular names — Federated States of Micronesia (Chuuk): Fitay (*C.Y.C. Wong 288*); (Kosrae): pala (*Fosberg 26572*). Fiji: see compilation by Smith (1991: 50 as *Merremia peltata*). Indonesia (Java): Aroy tjaraü-úng (*Blume '64'*) – (Sumatra): Andor bararoeng (*Rahmat si Boeea 1645*) – (Kalimantan): Belaran (Samboja, *Slik FS-9*). Madagascar: see compilation by Deroin (2001: 114). Malaysia: (Akar) laran (*Kadir A-2540*) – (Sabah): (akar) larau (Brunei; *Cuadra A2233*), bagon (Suluk; *Anthony A775*), balaan (Murut Pansiangan; *Anthony A775*); biloran (*Puasa FMS-36752*); kachabung (akar) (Dusun; *Cuadra A2233*). Malesian region: Van Ooststroom (1939b: 356) provides a comprehensive catalogue of vernacular names used throughout the Malesian region. Micronesia: see the compilation by Fosberg & Sachet (1977: 27). Papua New Guinea: Bamul (*Weiblen WS2A2061*), bohurèh (Orokaiva language, Mumuni; *Hoogland 3354*). Philippines: Bulakan (Luzon island; *Sulit PNH 7060*), boracan (*Madulid et al. 7180*), burac-buracan (Palawan island; *Vidal 3353bis*). Samoa: Fue lau tetele, fue to (*Bristol 2268*). Solomon Islands: Abiu (*Whitmore 6293*). Tahiti: Pohue (*Fosberg 63680*), pohue tafifi (*Moore 211*). Thailand: อ็นลึน (transliteration: en lûn; *Kerr 15681*); ย่านเอ็นเหลือง (yaan en luang; Staples 2010); ยานขีเดือน (yan khi duean; *Khunwasi 43*); ย่านเหล็น (yan len; *Kerr 17112*). Vanuatu: Nafélé, tavélé (*Drake 5*), nosiviliau (*Cabalion 3045*). Wallis & Futuna: Faliava (*Yen X-73*).

Uses — Fosberg & Sachet (1977: 27) report that the leaves and seeds are used as an abortifacient in Ponape. On the island of Chuuk (Truk) "the leaves are pounded and placed in breadfruit *poi* to make it taste good (*C.C.Y. Wong 288*). In Papua New Guinea the latex is applied to wounds and the stems are used for tying bundles of firewood (*Weiblen WS2A2061*).

Typification — There is a pernicious error in the literature regarding the typification for *Convolvulus peltatus* L.: Merrill (1917: 441) designated Rumphius' plate 157, f. 1 and 2 as the 'type' and according to the modern ICN (Turland et al. 2018) this constitutes effective lectotypification. In the thorough translation of Rumphius' Herbarium Amboinensis that is now available (Beekman 2011) we see that Rumphius made a clear and detailed verbal distinction in his text accompanying plate 157 (Fig. 13) between two quite different plants: plate 157 f. 1 purports to show a purple-flowered plant, which he contrasts with f. 2, showing the white-flowered 'Haylale'. Only the white-flowered plant is consistent with what we know today as *D. peltatus*. As Merrill (1917) rightly points out, however, the two figures are 'not clearly separable' and Merrill assumed that both figures refer to one species, despite what Rumphius' text says. This lectotypification clearly fixes the application of the epithet *peltatus*. It is therefore terribly unfortunate that Linnaeus, when he published *Convolvulus peltatus* (Linnaeus 1753: 1194), actually cited Rumphius' plate 159, which shows the plant we know today as *Ipomoea pes-caprae* (L.) R.Br. Merrill (1917) corrected this error made by Linnaeus; unfortunately, Merrill's correction escaped the notice of several authors for late twentieth century floras: beginning with Verdcourt (1963: 50) and continuing through Heine (1984: 38), Bosser & Heine (2000: 18), and Deroin (2001: 114), all of whom perpetuated the incorrect plate number 159.

Contrasting with the white-flowered plant long interpreted as *M. peltata* is the yellow-flowered taxon distinguished by

Hallier (1896, 1913) as *M. nymphaeifolia*. I located five sheets in L that appear to be original material (syntypes) for *Ipomoea nymphaeifolia* (Blume 1825); one of the sheets was labelled by Van Ooststroom as the 'type' and this one can be confirmed now as the lectotype.

Note — Living plants of *D. peltatus* display two different corolla morphologies, each with two colour forms. One morphotype has a campanulate, more or less waxy, corolla with a reflexed limb that may be bright yellow or white (Fig. 14); the other morphotype has a broadly bowl-shaped, thinly membranous corolla with wide-spreading limb that may be white or pale yellow (Fig. 15). These differences are not evident on herbarium specimens but they are very obvious in the field. It is not possible, at the present state of knowledge, to separate discrete taxa and the variability has been maintained (as has long been the case) under one scientific name. Recently even slight variations in floral morphology, when backed up with field observations that corroborate differences in natural history and ecology, have been used for recognition of discrete 'cryptic' species teased out of morphologically variable ones (Santos et al. 2019). It is possible that future scrutiny will demonstrate multiple taxa can be distinguished from the polymorphic concept of *D. peltatus* that is kept up here. Herbarium specimens are totally inadequate for this purpose: field study combined with appropriate molecular tools need to be applied.

One final morphological anomaly should be pointed out to indicate a need for future study: Deroin (2001: 114) has highlighted three collections from a remote valley (vallée de la Lokoho) in north-eastern Madagascar that have basally attached leaves; in other respects, such as calyx and corolla morphology and size, these specimens can be accommodated in *D. peltatus* where he kept them. Whether these non-peltate specimens represent a genetic mutation or an edaphic adaptation, as Deroin postulated, or whether they represent an unidentified taxon in *Decalobanthus* remains to be discovered.

One of the distinctive features of *D. peltatus* on herbarium specimens (shared with *D. elmeri*) is the tufts of long hairs usually (but not always) present on the anther connectives (Fig. 14, 15). The purpose of these extraordinary, long trichomes is unknown; possibly they play some role in pollination. Why some flowers have them and others do not is also a mystery.

17. *Decalobanthus pulcher* (Ooststr.) A.R.Simões & Staples — Map 12

Decalobanthus pulcher (Ooststr.) A.R.Simões & Staples (2017) 571. — *Merremia pulchra* Ooststr. (1939b) 348. — Type: *G.K. Gns 14* (holo SING [SING0052313]), (Brunei, Muara district,) Brunei Bay.

Stems and branches glabrous, lenticellate. *Leaves* basally attached, ovate, 7–11 by 5–6.5 cm, rugose, drying bicoloured: blackish adaxially, reddish brown abaxially, bases cordate; secondary veins 6–7 on either side of the midvein. *Inflorescences* fundamentally cymose, or aggregated in raceme-like clusters, or flowers solitary; peduncles c. 3–6 cm, terete. *Flower* buds ellipsoid, obtuse; sepals oblong to elliptic-oblong, 2.5–3 cm long, apices obtuse; corollas broadly funnelform, c. 6 cm long, bright yellow, glabrous. *Fruiting calyxes* accrescent, spreading from fruit. *Fruits* indehiscent, berry-like, depressed globose, 1.8–2 cm diam, ridged, brown-black, apex with indurate style base. *Seeds* up to 11, carinate, 6–7 mm long, brownish, glabrous.

Previously published illustration — Van Ooststroom (1939b: 349, f. 3a–c).

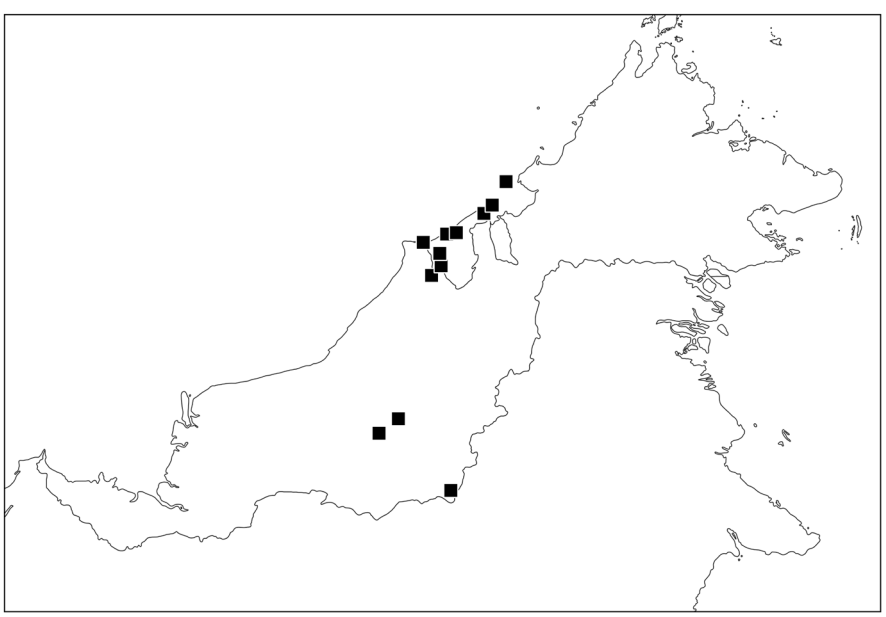
Distribution — Endemic to Borneo: Brunei, Malaysia (Sarawak, Labuan Island). Not found, so far, in Sabah; an unlocalized report from the southern Philippines (mentioned by Van Ooststroom & Hoogland 1953: 451) remains unconfirmed.

Habitat & Ecology — In *belukar* (secondary forest regrowth), along roadsides, trailing on bare soil and in grass vegetation, in hill dipterocarp forest along logging road, in mossy high forest, primary lowland forest; soils include heavy clay, ultisol, igneous derived soil, dacite spur; elevation: 20–850(–1100) m.

Vernacular names — Brunei: Akau belaan (Dusun; *Voeks RV-552*), akar melabok (Iban; *Nangkat NN-148*).

Uses — The mature fruits said to have an oily exudate or sap used in the past for shampooing hair (*Nangkat NN-148*); flower bud extract (used) as hair oil (*Voeks RV-552*).

Note — One of the most spectacular species, with large, bright golden yellow blossoms. Collectors report the vines attain 100–120 feet in length (*Anderson & Paie S.28489, Ashton S.19005*). The indehiscent fruit with many seeds is an anomaly in the family. Perhaps the collection in which it was observed is abnormal in terms of fruit development; it was one of the only fruiting specimens studied.



Map 12 Distribution of *Decalobanthus pulcher* (Ooststr.) A.R.Simões & Staples.

18. *Decalobanthus sumatranus* Ooststr. — Fig. 16; Map 10

Decalobanthus sumatranus Ooststr. (1936) 99. — Type: *O. Posthumus 571* (holo BO, sheet number 173567), (Indonesia,) Sumatra, Jambi, near Bangko, along road to Korintji (= Kerinci).

Stems and branches glabrous, lenticellate. *Leaves* basally attached, ovate or narrowly ovate, 4–6 by 2–4 cm, bases truncate or slightly retuse; secondary veins 6–7 on either side of the midvein. *Inflorescences* paniculate, 3- to many-flowered; peduncles 1.5–3.5 cm long; bracts caducous. *Flower* buds ellipsoid, rounded apically; sepals subequal, 2–2.5 cm long, outer ones basally with 2 prominent dark glands abaxially; corolla salver-shaped, 5–6 cm long, yellow, waxy, tube narrowly obconical to cylindrical, limb 10-lobed, the lobes spreading-reflexed; stamens included, anthers tardily spirally twisting; pistil included, slightly longer than stamens. *Fruiting calyxes* slightly accrescent, enclosing fruit; sepals blackish abaxially. *Capsules* 4-valved, depressed globose, 1.8–2 cm diam, brown. *Seeds* 4, carinate, 4.5–5 mm long, blackish.

Previously published illustrations — Van Ooststroom (1936: 100, f. 1); Van Ooststroom & Hoogland (1953: 457, f. 34); Staples (2013: 10–11, colour photos).

Distribution — Endemic to Sumatra.

Habitat & Ecology — The type collection was found on a roadside in an open sunny place on weathered tuff; recent collections were made on a roadside in secondary regrowth at the edge of an abandoned rubber (*Hevea*) plantation, the soil was reddish clay mixed with stones; elevation 60–170 m.

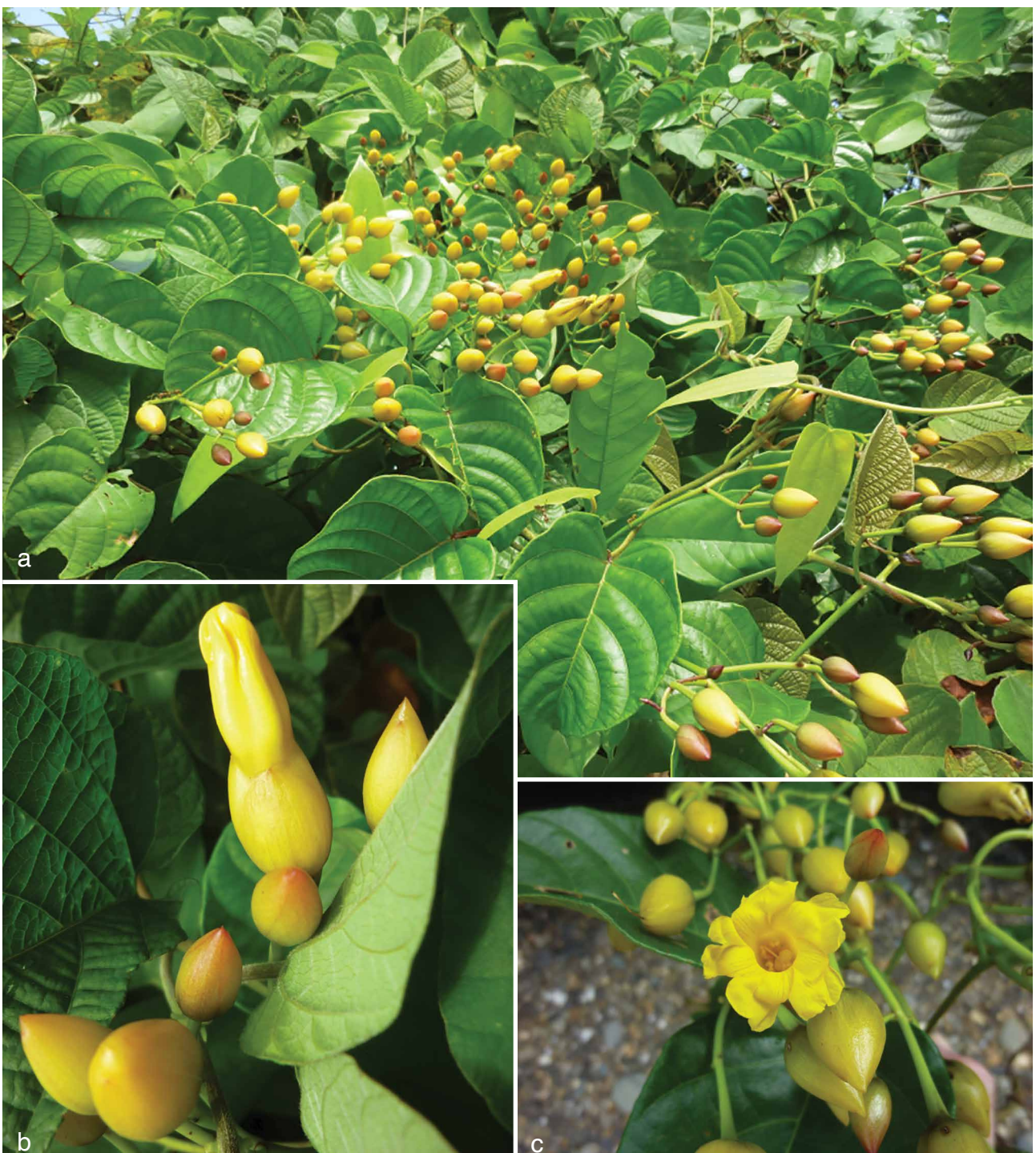


Fig. 16 *Decalobanthus sumatranus* Ooststr. a. Habit showing basal leaf attachment of petioles, loose thyrsoid inflorescences; b. mature flower bud, the corolla has a thick, waxy texture; c. flower in frontal view showing lobing of corolla limb (all George Staples, vouchers: a: *Nurainas et al. 2536* in ANDA; b, c: *Nurainas et al. 2532* in ANDA).

The vines were populated with large red ants that bit viciously when the plants were handled for collecting. Flowers were just opening at 10:30 a.m. and had no detectable fragrance.

Vernacular name — Akar tanah (Van Ooststroom 1936: 100).

Note — There are some specimens from Borneo that come very near to *D. sumatranus* in morphological characters and may be conspecific with it, or perhaps they represent a new species; the material is inadequate to settle this matter.

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I anticipate that this will be my final taxonomic publication so I wish to thank everyone who has aided me throughout my career in my efforts to understand the intricacies of *Convolvulaceae* systematics and taxonomy; as Ray Fosberg said it so well, the taxonomy of this family truly is a tangle of morning glories. Any progress I made depended heavily on the assistance so generously provided by others. I am very grateful.

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IDENTIFICATION LIST

The numbers after the collector numbers are the same ones used in the text and refer to the following species:

Decalobanthus
1. *D. bimbim*
2. *D. boisianus*
2b. *D. boisianus* var. *fulvopilosus*
3. *D. borneensis*
4. *D. bracteatus*
5. *D. calyculatus*
6. *D. clemensianus*
7. *D. crassinervius*
8. *D. discoidespermus*
9. *D. distillatorius*
10. *D. eberhardtii*
11. *D. elmeri*
12. *D. korthalsianus*
13. *D. mammosus*
14. *D. ooststroomii*
15. *D. pacificus*
16. *D. peltatus*
17. *D. pulcher*
18. *D. sumatranus*

Only numbered collections are included. Flower colour for *D. peltatus,* where known, is designated as: 16, w = white corolla; 16, Y = yellow corolla. Madagascan plants of *D. peltatus* with basal leaf attachment are designated as: 16, non-peltate.

Abbott 416: 8; 2404: 8 – Adamson 11: 16 – Aguilar 1228: 8; 17796: 8 – Alston 14781: 14 – Alviana et al. SAN 153327: 11 – Alvins 284: 16; 2217: 16 – Ambol AA-45: 16 – Ambriansyah & Arifin AA-190: 16, Y – Ambriansyah et al. AA-1201: 16, Y; AA-1340: 16, w – Amdjah 918: 11 – Amin & Asik SAN 60086: 6 – Amin & Ismail SAN 67448 : 6 – Amin & Soinin SAN 96729: 6 – Amin & Suin SAN 110540: 16, w – Amin et al. SAN 96557: 6; SAN 108102: 11; SAN 116419: 6; SAN 117823: 16, Y; SAN 121515: 16, w; SAN 121576: 11; SAN 121593: 3 – Ammann et al. AJ-442: 16, w – Amor 48: 16, Y; 66: 15; 92: 15 – Anderson, E.F. 4285: 3 – Anderson, J.A.R. & Paie 28489: 17 – Anthony A-775: 16, w – Arbain & Tamin 5925: 16 – Argent 87502: 16 – Argent & Campbell 411854: 6 – Argent & Iqbar 9980: 16, Y; 9986: 14 – Argent et al. 93119: 16, Y; 108280: 16, w; 1987171: 6 – Arifin, Z. BRF-1812: 6 – Ashton S.19005: 17; S.19795: 11 – Averyanov et al. HAL-7078: 2; VH-1063: 2; VH-1380: 2 – Awang & Yakup S.8280: 17.
Backer 33473: 13 – Bacon PB-1: 15; PB-2: 4 – Bakhuizen van den Brink 7815: 16, Y – Banyeng et al. S. 57355: 16 – Barbon et al. PPI 1671: 16, Y – Baré 114: 16 – Bartlett 8159: 16 – Bauman-Bodenheim 11317: 16 – Beaman 5172: 8 – Beaman et al. 9641: 3; 10150: 6 – Beccari PB 665: 16, Y; PB 3954: 7; PB 3955: 11 – Beijing Youth Team 1026: 2; 1123: 2 – Bello 326: 8 – Bermejos BS-265: 16 – B.G.O. staff 2427: 13; 3556: 16 – Bhargava 3375: 16 – Bicknell 241: 9 – Blewett B-19: 6; B-20: 6 – Bloembergen S. 4612: 16 – Blume '64': 16, Y; '304': 16, Y; 1505: 16, Y – Boeea 1330: 16; 1645: 16 – Bois 138: 2 – Bon 2700: 1; 4801: 2b – Bor 16699: 13 – Bourdy 448: 16; 675: 15 – Brand SAN 20096: 16, w – Brass 2712: 16, w; 8191: 16, w; 24283 p.p.: 16, w (mixed with *Operculina riedeliana*); 27264: 16, w; 28540: 15 – Brass & White 145: 16, w – Breedlove 10166: 8; 35190: 8; 35285: 8 – Bristol 2268: 16 – Brooke [Miss W.M.A.] 8281: 11 – Bryan 584: 16 – BS series 265: 16; 1971: 9; 7342: 9; 11611: 9; 13292: 9; 13307: 16, Y; 31391: 9; 34758: 9; 83537: 9 – BSIP series 123: 15; 1613: 4; 4420: 15; 7324: 15; 7855: 16, w – Burger & Matta-U. 4766: 8 – Burgess 9253: 3; FRI 9222: 16; FRI 9253: 16; FRI 10161: 3; SAN 25166: 11 – Burkill & Mohd. Haniff 15701: 16, Y – Burley et al. NGS 651: 16, Y – Buwalda 7966: 16, Y – BW series 11347: 16.
Cabalion 316: 16, w; 3045: 16 – Cadet 3943: 16, w; 6009: 16 – Cai J. et al. 14CS-9182: 1 – Campbell EC-34: 3 – Campbell et al. SAN 112058: 16, w – Cao Z.Y. & Wang 165: 2 – Carr 12632: 16, w – Celestino BS7342: 9 – Chai S.34126: 7 – Chang CE 2467: 9; 6760: 9 – Chang ZX ZXC002691: 2; ZXC002831: 9 – Cheeseman 16K: 16 – Chen BH 4193: 2; 4194: 2 – Chen CF et al. SITW 02243: 15 – Chen PH 3450: 9 – Chen PH & Chung AC 3429–3434: 2 – Chevalier 32397: 2; 32471: 2 – Chin SC 2706: 6 – China Plant Federation Guangxi Team 1299: 2; 4552: 2 – Christophersen 23: 16; 576: 16 – Christophersen & Hume 1897: 16 – Chung SW 14949: 9 – Chung SW & Huang WJ 14929: 2 – Chung SW et al. SITW 05590: 15 – Church et al. 538: 11 – Clase et al. 6104: 8 – Clemens J & Clemens MS 3238: 2;

4091: 10; 21133: 6; 21134 p.p.: 6, p.p. 11; 21527: 6 – Clemens MS 256: 16 – Comber 4085: 11 – Comins 204: 15 – Coode & Ferguson 7368: 11 – Coode et al. MC-7958: 11 – Cours 3311: 16, non-peltate; 4971: 16 – Croat & Hannon 94107: 16, w; 94182: 16, Y – Crosby 131: 16 – C.S.S. 259: 16, Y – Cuadra A-2233: 16, w – Cuong 127: 2 – Cuong et al. 824: 1.

Daim Andau 88: 6 – Day 575: 16 – Dayang Awa et al. S.47474: 11 – De Wilde & De Wilde-Duyfjes 19591: 14 – Deroin & Badré 13: 16, w; 123: 16, Y; 203: 16 – Derry 377: 16 – Dewol SAN 97036: 6 – Dewol & Mansus SAN 67472: 6 – Domin 7928: 16 – Drake 5: 16, w.

Eberhardt 1708: 10; 1710: 2 – Edaño PNH 15617: 9 – Ekiek 58: 15 – Ekman 3685: 8; 4698: 8; 15169: 8 – Elmer 7341: 9; 10836: 16, Y; 12061: 9; 15602: 9; 15605: 16; 20260: 3; 20396: 11; 20990: 3 – Enggoh 10530: 16.

Falanruw MVCF-5392: 16 – Fedilis SAN 82187: 16 – Fedilis & Sumbing SAN 101411: 6 – Feng K.M. 5379: 2 – Flecker 4016: 16 – Fleury [under Chevalier number] 32397: 2; 32471: 2 – Florence 3620: 16, w; 3698: 16, w; 4831: 16; 5023: 16, w; 6130: 16; 12080: 16 – Florence & Sykes 11240: 16 – Florence & Tahuaitu 11760: 16, w – Florence et al. 11487: 16, w – Forbes 1837: 16, Y – Ford 426B: 2 – Fosberg 26572: 16, Y; 58373 p.p.: 15; 58373 p.p.: 16, w; 61187: 16, w; 63526: 16, w; 63680: 16, w; 64918: 16, w – Fox PNH 5047: 9 – Frake, C.O. PNH 38133: 16 – FRI series 9222: 16; 9253: 16; 10161: 3; 27379: 16, Y; 47157: 3; 70356: 16, Y; 71964: 16; 74568: 16, Y – Friedmann 3533: 16; 4351: 16, Y – Frohne PNH 35127: 9.

Gao X.P. 55243: 2 – Geesink 9221: 6 – Geesink et al. 8905: 6 – Geh & Samsuri, A. GSY-403: 6; GSY-1005: 17 – Gibot & Diwol S. SAN 95362: 16 – Gibot & Lee, Y.F. SAN 96805: 6 – Gibot & Saigol, P. SAN 90220: 6 – Gns 14: 17 – Goh et al. SAN 137099: 3; SAN 137099: 16 – Goverse & Adriansyah Berau-432: 16, w – Grant 4271: 16 – Green RSNH-1316: 16, w – Guppy 197: 15.

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