

A revision of *Mucuna* (*Leguminosae*—*Phaseoleae*) in the Pacific

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Summary. An account of the 11 species of *Mucuna* Adans. found in the Pacific Islands is offered, with keys and distribution maps. One new species, *M. subumbellata*, and one variety, *M. sloanei* Fawcett & Rendle var. *persericea*, are described; one former variety, *M. urens* (L.) Medic. var. *glabra* Reinecke, is raised to specific rank. One New Guinean species, *M. albertisii* F. Muell., is reduced to synonymy under the Pacific species *M. platyphylla* A. Gray. All specimens cited have been seen.

***Mucuna* Adans.**, Fam. Pl. 2: 325 (1763); Prain, Journ. As. Soc. Bengal 66: 404 (1897), nom. conserv.

For synonymy and generic description see Wilmot-Deare (1984: 23).

The area covered by this revision is bounded as follows: on the south by New Caledonia and the Fiji Is (Australian and New Zealand Territories being excluded); on the west by Bougainville (other islands of Papua New Guinean territory being excluded) and on the north by the Mariana Is (the Japanese territory of the Bonin Is being excluded as already covered in the first revision (Wilmot-Deare 1984) of this series). To the east, the genus appears to be absent from the Galapagos Is and Easter I, the area here considered thus being bounded by the Tuamotus and Marquesas.

The eleven species found in the region, including one considered new, are described below. Of these, six and a new variety, *M. sloanei* Fawcett & Rendle var. *persericea*, are endemic, each being restricted to a small part of the region; three of the remainder are also found in Papua New Guinea, one of these extending to Indonesia; a further one occurs in South America while only one, *M. gigantea*, is more widespread. In addition four non-native species frequently or occasionally cultivated are mentioned and included in the keys. A further species, *M. albertisii* F. Muell., hitherto considered as endemic to Papua New Guinea, is reduced to synonymy under *M. platyphylla*.

KEYS TO SPECIES OF *MUCUNA* IN THE PACIFIC ISLANDS

A. Flowering material

1. Leaflets without stipels; flowers large, 5.5–8 cm long, red or bright yellow; vegetative parts glabrous or sparsely pubescent 2
- Leaflets with stipels; flowers various but often white; vegetative parts various but often densely pubescent 5
2. Keel and wings very long and straight throughout most of length, keel 6.5–8 cm, sharply upcurved in apical 0.5–1 cm, wings always distinctly shorter, 5.5–7 cm, markedly narrow ± 8 mm wide; calyx lobes all of

- similar size and shape, 4–6 mm long and wide, broadly triangular, obtusely rounded, upper lip of similar length (New Caledonia)
- **10. neocaledonica**
- Keel and wings long but curved throughout length; calyx lobes never broad and rounded, lowest (or all) relatively long and narrow, lowest lanceolate or acuminate and tail-like 3
3. Calyx with lowest lobe 4–6 mm long, laterals ± 2 mm, all very narrow, ± 1 mm throughout length, upper lip shorter than or equalling laterals (Solomon Is; New Hebrides) **11. elegans**
- Calyx with lowest lobe long and distinctly tail-like, at least 15 mm, usually 20 mm or more, laterals 10–15 mm long, 4–5 mm wide 4
4. Terminal leaflet \pm twice as long as wide, small, 9 cm long or less, fairly narrowly elliptic (cult. Hawaii) **ii. miniata**
- Terminal leaflet $\pm 1\frac{1}{2}$ times as long as wide, often large, 11 cm long or more, fairly broadly elliptic to ovate (cult. Tahiti) **i. bennettii**
5. Inflorescence axis simple and devoid of flowers throughout most of length, flowers all crowded at apex, secondary axes and pedicels of very varying lengths such as to form a pseudumbel; flowers greenish-white, small, 3–4(–5) cm long; vegetative parts glabrous or almost so 6
- Inflorescence axis extensively branched or not, flowers usually arising throughout length but if crowded near tip then pedicels and secondary axes not such as to form a pseudumbel; length and colour of flowers and indumentum of vegetative parts various 7
6. Flowers always small, standard up to 1.8 cm, wings and keel up to 2.8 cm long, white or greenish with red blotches and black dots; calyx 5 \times 8 mm (not readily distinguishable from following species without fruit) (Solomon Is.) **2. subumbellata**
- Flowers usually larger, standard (2–)3.5 cm, wings and keel (3–)3.5–4.2(–5) cm, greenish-white without blotches or dots (widespread) **1. gigantea**
7. Keel and wings up to 2–3.5(–4) cm, standard up to 2.5 cm long; either flowers golden-yellow and vegetative parts glabrous, or if vegetative parts pubescent then flowers white or purple, often not over 2 cm long 8
- Plant without above combination of characters; keel and wings (4.5–) 5–6 cm, standard 3–3.5 cm long, flower colour and vegetative indumentum various 9
8. Flowers white, 2–2.5 cm long (rarely 3 cm), standard 1.5 cm; stems and leaves with fairly abundant short pale fine spreading pubescence (Solomon Is) **8. mollissima**
- Flowers white or purple, 3–4 cm long, standard relatively short, 1.5–1.8 cm; stems and leaves with fairly abundant short pale fine adpressed hairs (widely cultivated) **iv. pruriens** var. **utilis**
- Flowers golden-yellow, 3–3.5(–4) cm long, standard 2–2.5 cm; vegetative parts glabrous (Solomon Is; Fiji) **3. brachycarpa**
9. Leaves and stem glabrous or very sparsely pale fine adpressed-pubescent; inflorescences white-flowered arising from old woody stems bearing very prominent warty lenticels; pedicels extremely long, ± 30 mm (even in young buds often ± 15 mm); calyx with small lobes 3–5 mm long, narrow, only 1 mm for most of length (Samoa) **7. glabra**
- Plant without above combination of characters; either leaves, at least

- below, abundantly pubescent and inflorescences arising from axils of even fairly young leaves, or flowers red and calyx almost unlobed; mature pedicels not exceeding 2 cm; old wood not prominently warty 10
10. Inflorescence extensively branched; secondary (flower-bearing) axes not reduced to knobs, up to 5 mm long; vegetative parts abundantly spreading-golden-pubescent; flowers white or greenish 11
- Inflorescence unbranched; secondary (flowering-bearing) axes reduced to knobs or not; pubescence and flower-colour various 12
11. Hairs on stem and leaves markedly long, 1.5–3 mm; bracts and bracteoles large and broad, usually 20–28 × 6–25 mm, stipels long, fine, 5–10 mm; keel fairly straight, upcurved abruptly in apical 5–10 mm; calyx tube usually wider than long, up to 1.8 cm wide (Fiji) **6. stanleyi**
- Hairs on stem and leaves short, 0.5–1 mm; bracts and bracteoles shorter and relatively narrower, 10–15 × 2–5 mm; stipels shorter, more robust, 2–4(–6) mm; keel curved, usually markedly, throughout length, although increasingly so near apex; calyx tube usually as long as wide, up to 1 cm wide (widespread) **5. platyphylla**
12. Flowers red, arising from old wood, keel and wings curved throughout most of length; secondary (flower-bearing) axes reduced to knobs (each bearing usually 3 flowers); calyx lobes usually reduced to minute teeth less than 1 mm long (rarely up to 4 mm); vegetative parts glabrous or sparsely adpressed-reddish-pubescent when young (cult. Hawaii) **iii. novoguineensis**
- Flowers yellow or white, arising from leaf-axils; keel and wings, and secondary axes, various; at least lowest calyx lobe conspicuous; vegetative parts with pale or golden pubescence 13
13. Calyx with lowest lobe 7–12 mm, laterals as long or nearly so, 5–7 mm long, all fairly broadly triangular, 4–5 mm wide; wings at least 4 times as long as wide, 5 × 1 cm, keel abruptly upcurved near apex; inflorescence often 15–20 cm long, secondary axes reduced to knobs and all markedly crowded near apex, remainder of axis devoid of flowers (SE Polynesia; Hawaii) 14
- Calyx with lowest lobe ±5 × 1.5 mm, lanceolate, laterals much shorter, very inconspicuous, ±1 mm long; wings often as long as above but always rather broader, 3 times as long as wide; keel curved throughout length; inflorescence short, ±7 cm, secondary axes not reduced (Marianas: Saipan) **4. pacifica**
14. Leaves beneath with sparse to abundant fairly short adpressed fine silvery hairs, covering often dense but never deep and thick, surface of epidermis usually visible beneath; calyx with sparse to abundant very short spreading fine pale hairs, surface clearly visible beneath (SE Polynesia; Hawaiian Is.) **9 (a) sloanei** var. **sloanei**
- Leaves beneath, and calyx, both with dense adpressed silky indumentum of rather coarser, longer, more yellowish-white hairs forming thick covering hiding surface (Maui only) . . . **9 (b) sloanei** var. **persericea**

B. *Fruiting material* (excluding *M. elegans*, *M. bennettii* and *M. miniata*, for which no fruit known)

1. Fruit coriaceous with 8–20 conspicuous lamellae arising from surface

- and running transversely or obliquely across face, also with pair of distinct wings along each margin 2
- Fruit without lamellae; either coriaceous with marginal wings or fleshy without wings although often with irregular longitudinal wrinkles . . 12
2. Seeds very large, 4–4.5 cm long and wide; lamellae and marginal wings reduced to low woody ridges less than 1 mm high, lamellae usually at least 20 on each face, completely transverse; pod linear-oblong, 15–27 × 4–5 cm (cult. Hawaii) **iii. novoguineensis**
- Seeds never over 2.5 cm in longest dimension; lamellae and marginal wings never all so reduced, lamellae usually fewer, always somewhat oblique; pod usually relatively shorter and broader 3
3. Leaflets without stipels, ± glabrous, terminal rhombic; fruit thickly coriaceous, almost woody, with dense covering of short spreading hairs, 1-seeded with lamellae robust, each of ± uniform height throughout length; no part of plant with irritant setae (New Caledonia) **10. neocaledonica**
- Leaflets with stipels, various but often markedly pubescent, terminal always ovate or elliptic; fruit various, often with lamellae less robust and more irregular in height or interrupted; irritant setae often present, especially on fruit 4
4. Leaves and stems almost glabrous; infructescences often arising from old thick stems 5
- Leaves, at least beneath, and often stems, abundantly hairy; infructescences arising from leaf-axils 7
5. Lamellae on fruit very irregular in height and often interrupted; marginal wings 7–10 mm wide; leaves usually with 5 pairs of lateral veins; infructescences arising from old stems; old stems with very prominent warty lenticels (Samoa) **7. glabra**
- Lamellae on fruit narrow, regular, continuous; marginal wings 3–4 mm wide; either leaves usually with 4 pairs of lateral veins or infructescences arising from leaf-axils; old stems not markedly warty 6
6. Fruit arising from old thick stems, broadly oblong, 7 × 4 cm, 2-seeded (Solomon Is.; Fiji) **3. brachycarpa**
- Fruit arising from leaf axils on young stems, narrowly linear-oblong, 11 × 3 cm (Solomon Is) **2. subumbellata**
7. Seeds ± discoid, brownish black, sometimes mottled, smooth ± shiny; indumentum on stems and leaves usually golden or brown; leaves usually thick 8
- Seeds not as above; indumentum on stems and leaves silvery or whitish; leaves usually rather thin, ± membranous 10
8. Hairs on stems and leaves very long, 1.5–3 mm, stipels 5–10 mm; lamellae of irregular height ranging from 1–5(–8) mm throughout length and running rather obliquely across pod face; marginal wings often up to 10 mm wide (Fiji) **6. stanleyi**
- Hairs on stems and leaves short, 0.5–1 mm long, stipels 2–4(–6) mm; lamellae of fairly uniform height 2–3 mm throughout length and running nearly transversely across pod face; marginal wings not over 5 mm wide 9
9. Leaflets membranous, indumentum pale gold or whitish, conspicuous but not dense; calyx with lowest lobe ± 5 mm long, laterals inconspicuous only 1 mm (Marianas: Saipan) **4. pacifica**

- Leaflets usually thickly chartaceous to coriaceous, indumentum usually golden-brown or orange-brown and often dense; calyx with lowest lobe 8–10 mm long, laterals 4–5 mm, rarely only 2 mm (widespread)
- **5. platyphylla**
10. Seeds smooth, asymmetrically compressed-ellipsoid, up to 8 mm in thickness, greyish, more rarely brownish; leaves and stems with short spreading soft whitish indumentum (Solomon Is.) .. **8. mollissima**
 Seeds rugose, asymmetrically sublenticular, ± 18 mm in thickness, brownish; leaves and stems with adpressed silvery or whitish indumentum (SE Polynesia; Hawaii) 11
11. Leaves beneath with sparse to abundant fairly short adpressed fine silvery hairs, covering often dense but never deep and thick, surface of epidermis usually visible beneath; calyx with sparse to abundant very short spreading fine pale hairs, surface clearly visible beneath (SE Polynesia; Hawaiian Is.) **9 (a) sloanei** var. **sloanei**
 Leaves beneath, and calyx, both with dense adpressed silky indumentum of rather coarser, longer, more yellowish-white hairs forming thick covering hiding the surface (Maui only) **9 (b) sloanei** var. **persericea**
12. Fruit coriaceous, oblong, large, 7–15 \times 4–5 cm, with pair of marginal wings; surface with reticulate pattern of raised lines giving pitted appearance (widespread) **1. gigantea**
 Fruit fleshy, linear, small, 3–9 \times 1–2 cm, often curved and torulose, unwinged but often with irregular longitudinal wrinkles near margin (widely cultivated) **iv. pruriens** var. **utilis**

Subgenus MUCUNA

Woody; seeds discoid, large and flat, with hilum extending around $\frac{3}{4}$ of the circumference.

1. *Mucuna gigantea* (Willd.) DC., Prodr. 2: 405 (1825); Guillemain, Enum. Pl. Il. Société: 65 (1837); Seemann, Fl. Vitiensis: 59 (1865); Nadeaud, Enum. Pl. Tahiti: 80 (1873); Hillebrand, Fl. Haw. Is.: 101 (1888); Drake del Castillo, Ill. Fl. Insul. Maris Pacif.: 152 (1890) & Fl. Polynesie Franç.: 48 (1893); Burkill, Fl. Vavau in J. Linn. Soc. Bot. 35: 34 (1901); Rock, Leg. Pl. Hawaii: 200 & fig. 82 (1920); Sarasin & Roux, Nova Caledonia: 158 (1921); Degener, Fl. Hawaiiensis Fam. 169c: 6 (key only) (1946); Guillaumin, Fl. Nouv. Cal. Pan.: 148 (1948); Yuncker, Pl. Tonga in Bish. Mus. Bull. 220: 146 (1959); Whitmore, Guide to Forests of Brit. Sol. Is.: 192 (1966); Pope, Man. Wayside Pl. Hawaii: 97 & fig. 49 (1968); Stone, Fl. Guam, in Micronesica 6: 337 (1970); Sykes, Contrib. Fl. Niue: 157 (1970); Parham, Pl. Fiji Is.: 114 (ed. 2, 1972) & Pl. Samoa: 38 (1972); St John, List Fl. Pl. Hawaii: 189 (1973); Whistler, Coastal Fl. of Trop. Pacific: 72 (1980); Smith, Fl. Vitiensis Nov. 3: 211 (1985); Tateishi & Ohashi in Bot. Mag. Tokyo 94: 92 & fig. 1 (1981), q.v. for detailed list of references and synonyms; Wilmot-Dear in Kew Bull. 39: 56 (1984) & 42: 38 (1987). Type Rheede, Hort. Malab. 8: 63 t. 36 (1688).

subsp. ***gigantea* Ohashi & Tateishi** in Journ. Jap. Bot. 51(6): 164, fig. 2 (1976); Verdcourt, Man. N. Guinea Leg. 443 & fig. 106f (1979).



FIG. 1. *Mucuna gigantea*. **A** habit; **B** young inflorescence; **C** bracts; **D** flower; **E** calyx; **F** standard; **G** wing; **H** keel; **J** pistil. **A**, **D**–**J** from *Wight* s.n.; **B**, **C** from *Parkinson* 354. **A**, **B** $\times \frac{2}{3}$, **C**–**J** $\times 1$. Drawn by Eleanor Catherine.

Dolichos giganteus Willd., Sp. Pl. 3: 1041 (1802).

Carpopogon giganteum (Willd.) Roxb., Hort. Beng.: 54 (1814).

Stizolobium giganteum (Willd.) Spreng. in Linn., Syst. ed. 16, 4(2), Cur. Post.: 281 (1827).

For detailed description see Wilmot-Dear (1984: 56–57). In parts of the Pacific considerably more variation is seen than elsewhere. While throughout the rest of its range flowers measure 3–4.2 cm in length, in Vanuatu they reach 5 cm in the only 2 mature collections seen, and the fruit bears an indumentum of fairly fine non-irritant golden-brown hairs, totally lacking the usual irritant bristles. Since all other characters, including flower shape and relative proportions, are consistent with this taxon, this material is included here. Formal recognition at varietal or subspecific level would not be justified without examination of many more specimens, since subsp. *gigantea* already shows considerable, but continuous, variation at least in flower size. In Solomon and Samoan Is specimens have been seen whose fruits are unusual in containing 4 or 5, rather than the usual 2 or 3, seeds. Fig. 1, Fig. 8C. Map 1.

Rather more dubious is the only specimen seen from the Austral Is. (Tubuai, *Hallé* 6834 (P, US)) and one of several from Micronesia (Marianas, Guam, *Stone* 4326 (BISH)) whose leaves are more abundantly hairy than hitherto seen in *M. gigantea*. Since both are sterile their identity cannot be established for certain: another possibility is an abnormally sparsely hairy form of *M. platyphylla*.

SOLOMON IS. San Cristobal: *Brass* 2766 (A), *Comins* 70 (K) & *Runikera* in BSIP 12618 (K). Shortland Is.: *Guppy* 157 (K) & 118 (K). Oema: *Guppy* 271 (K).

VANUATU. Ambrym: *Cabalion* 2316 & 1531 (K). Vaté: *Bourdy* 112 (K). Tanna: *Barclay* 3486 (B).

NEW CALEDONIA. *Balansa* s.n. (K) & 2470 (P).

FIJI IS. Kandavu: *Smith* 320 (K). Vanua Levu: *Parham* 3 (K). Viti Levu: *Degener* 15391 (A, K), *Tothill* 113 (K), *Greenwood* 798 (K), *Seemann* 119 (BM, K) & *Koroiveibau et al.* 17297 (K). Ngau: *Smith* 7949 (A).

SAMOAN IS. Samoa group: *Powell* 168 & 178 (K) & *Whitmee* s.n. (K); Savaii: *Christophersen* 581 (K); Upolu: *Rechinger* 900 (BM), *Christophersen* 475 (K, US) & *Bristol* 2370 (A, BISH, K, US); Tutuila: *Whistler* W 2884 (BISH, K); Nu'ulua: *Whistler* W 4423 (K); Nu'utele: *Whistler* W 463 (BISH, US). Tonga group, Tongatabu: *Setchel et al.* 15193 (BISH, K); Niue: *Yuncker* 10110 (A, BISH, K, P); Nomuko: *Yuncker* 15804 (A, BISH, US); Tofua: *Scarth-Johnson* 165 (K), Vavau: *Crosby* 48 (K); Lifuka: *Yuncker* 15737 (A, US).

SE POLYNESIA. Cook Is., Aitutaki: *Stoddart* 2303 (BISH, US); Raratonga: *Wilder* 990 (BISH) & *Cheeseman* 539 (K). Society Is., Tahiti: *Grant* 4620 (BISH).

MICRONESIA. Marianas, Guam: *McGregor* 556 (BISH, US), *Stone* 4996 (BISH) & *Rodin* 820 (K, US); Rota: *Kanehira* 3632 (K) & *Fosberg & Moore* 58231 (US); Tinian: *Yoshio Kondo* 46 (BISH). Caroline Is., Kapingamarangi, Hare Islet: *Nieruy* 693 & 588 (US); Ponape: *Glassman* 2776 (US); Palau: *Hosokawa* 9237 (BISH); Truk: *Hosokawa* 8397 (BISH, US).

HAWAIIAN IS. Kauai: *Herbst* 2271 (A, BISH); *Fosberg* 12789 (BISH), *St John et al.* 23111 (BISH) & *Remy* 670 (A). Oahu: *Smith* 103 (BISH, US), *St John* 20029 (BISH) & *Davis & Kores* 91 (BISH). Molokai: *Degener* 17990 (A, K) &

St John 25265 (BISH). Maui: *Forbes* 227 (K), *Degener et al.* 2285 (US) & *St John* 24752 (BISH). Hawaii: *Melville & Degener* 71/1141 (K), *Degener* 17989 (A) & *Herbst & Spence* 5306 (BISH). Unlocalised: *U.S. Expl. Exped.* s.n. (K).

EXTERNAL DISTRIBUTION. Japan; India; Burma; Malesia; Australia.

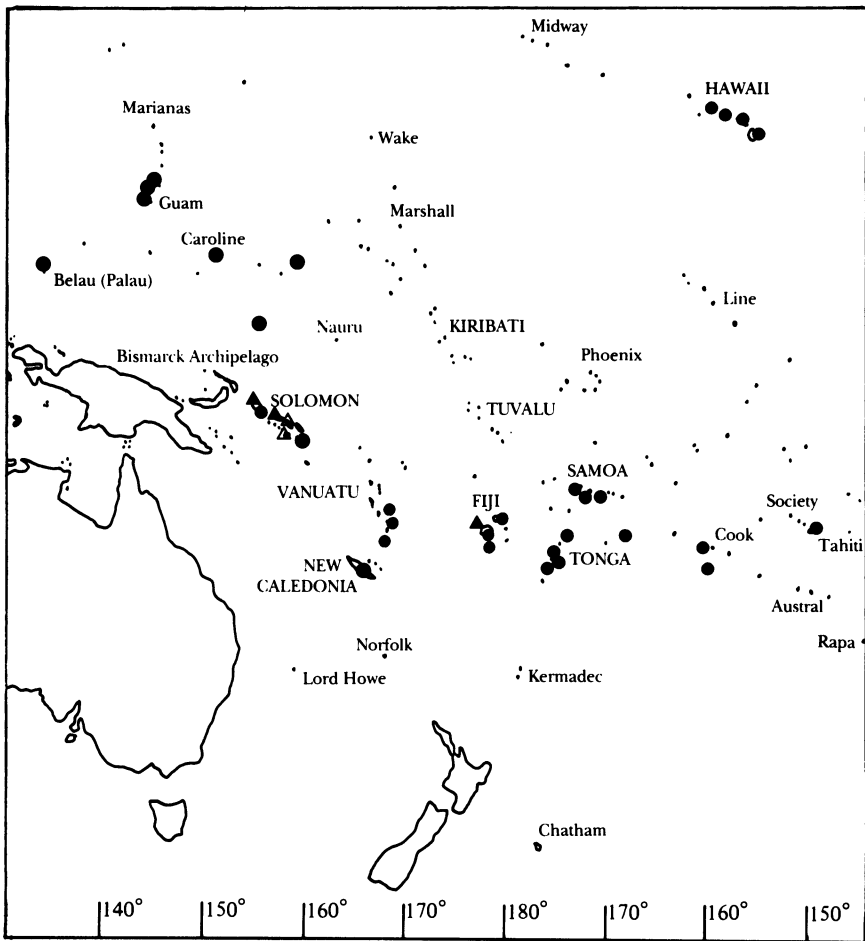
HABITAT. Forests, thickets; often coastal; sea level to 400 m alt.

2. *Mucuna subumbellata* *Wilmot-Dear* sp. nov. *M. giganteae* praecipue inflorescentiae florumque formis persimilis sed pagina fructuum lamellis ± 11 erectis oblique transversis ornata, floribus etiam saepe minoribus differt. *M. brachycarpae* fructus forma affinis sed leguminibus longioribus angustioribusque, inflorescentiis ex axillis foliorum nec ex caulibus vetustioribus crassisque orientibus, floribus omnibus ad apicem axis subumbellate dispositis nec per totam axem inflorescentiae orientibus multum differt. Typus: Solomon Is.: Ngela [Florida Is.], 25 Jan. 1933, *Brass* 3514 (holotypus A!; isotypi BM! BISH!).

M. brachycarpa sensu Merr. & Perry in *Journ. Arn. Arb.* 23: 405 (1942), non Rech.

M. 'sp. E' Verdcourt, *Man. New Guinea Leg.*: 460 (1979).

Without fruit, plant almost indistinguishable from *M. gigantea*. Climber into tops of trees. *Stems* and leaves glabrous. Terminal leaflets up to 8×4.5 cm, fairly narrowly ovate with acute somewhat acuminate apex and rounded or \pm truncate base; lateral leaflets fairly asymmetrical, abaxial half twice as wide as adaxial; lateral veins 3–4 pairs, slightly thinly prominent below, inconspicuous above; coarse and fine reticulation inconspicuous; thinly chartaceous; stipels up to 1 mm long. *Inflorescences* axillary, up to 17 cm long with 10–15 secondary axes, each bearing usually 3 flowers; form of inflorescence pseudumbellate as in *M. gigantea* due to crowding of secondary axes near apex and variation in length of these and pedicels; main axis with sparse pale short spreading indumentum, this denser and darker on secondary axes and pedicels; bracteoles narrowly ovate to lanceolate, up to 10×5 mm, with indumentum as axis. *Calyx* with indumentum as axis and also coarser red-brown irritant deciduous bristles; tube fairly broad, $\pm 5 \times 8$ mm, lowest lobe ± 4 mm, laterals 3 mm long, all fairly broadly triangular, ± 2 mm wide, upper lip shorter than laterals with broadly acute or slightly cleft apex. *Corolla* said to be greenish with red blotches and black dots, or white; standard 1.7–1.8 cm long, slightly over $\frac{1}{2}$ keel length, apex slightly cleft, basal auricles conspicuous, 1–2 mm long; wings straight throughout most of length, fairly wide, $2.5\text{--}2.8 \times 0.7\text{--}0.8$ cm, tapering to acute tip, basal claw 7 mm and auricle 3 mm long; keel \pm equalling wing, straight but abruptly moderately upcurved in apical 5 mm, basal claw 6 mm and auricle 1 mm long. *Fruit* rather similar to that of *M. brachycarpa*, $7\text{--}11 \times 3$ cm, thickly leathery, 3–4-seeded, broadly linear-oblong, laterally flattened, rounded at apex and base but extreme tip acute; surface with abundant short spreading pubescence and coarser irritant deciduous bristles, also with ± 11 low raised ribs 1–2 mm high running almost transversely across pod, these rarely branching or interrupted, generally \pm parallel, continuous and evenly-spaced; each margin bordered by similar ridge slightly wider than those on face. *Seeds* black, compressed subglobose, 1.4–1.7 cm diam., 0.9–1.2 cm in thickness. Fig. 2.



MAP 1. Distribution of *Mucuna brachycarpa* ▲ and green-flowered variant of *M. brachycarpa* ● and of *M. gigantea* ●, in the Pacific.

Endemic to Solomon Is. Map 2.

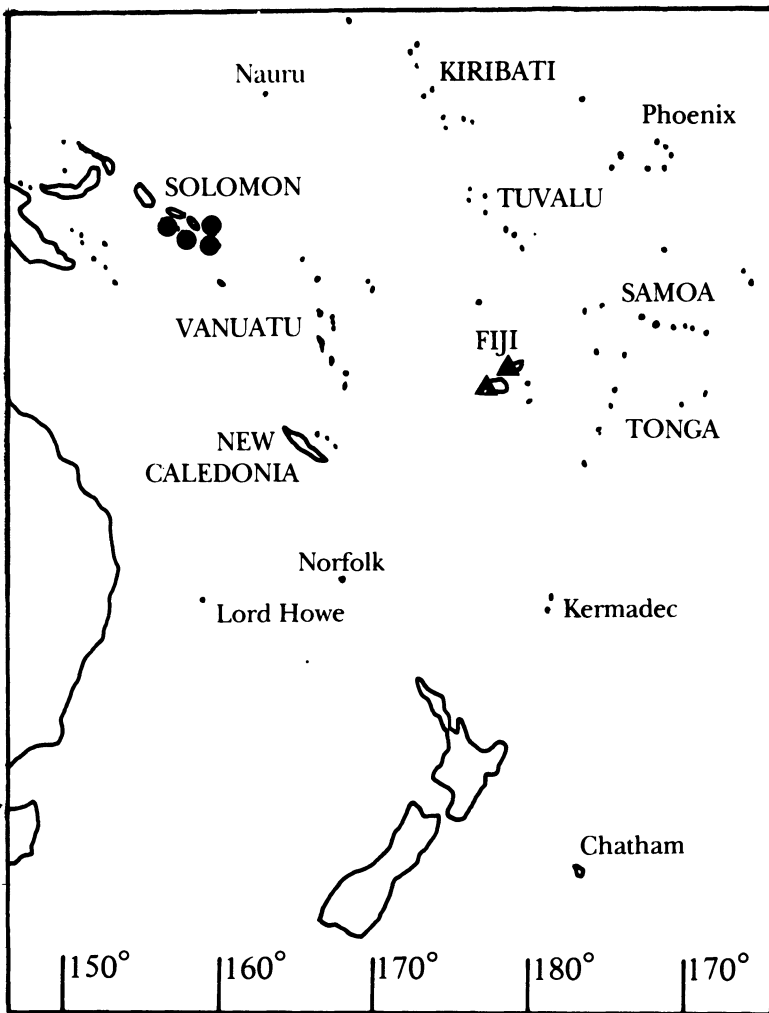
SOLOMON IS. Kolombangara: 4 July 1968, *Mauriasi et al.* in BSIP 11671 (K) (identification not absolutely certain; could be a small-flowered form of *M. gigantea*); Ngela; 25 Jan. 1933, *Brass* 3514 (holotype A; isotypes BISH, BM); Guadalcanal: 3 April 1964, *Morrison* 123 (L).

HABITAT. Coastal or hill rainforest; 5–75 m.

The existence of this rather intermediate species with its unusual pseudumbellate inflorescences and broadly oblong-linear pods adorned on faces and margin merely with low ridges provides a link between *M. gigantea*, with its similar inflorescences and pod of somewhat similar shape, marginally winged but totally lacking any facial ridges or lamellae, and the large group of species exhibiting the more usual falsely-racemose or condensed-paniculate inflorescences and facially lamellate pods, from which it has hitherto appeared very distant. It could be imagined that lamellae have failed to develop on fruit-faces of *M. gigantea*, or else have been gradually lost by reduction.



FIG. 2. *Mucuna subumbellata*. A leaf + inflorescence; B bract; C flower; D calyx; E standard; F wing; G keel; H pistil; J fruit; K seed. A-C, E from *Brass* 3514; D, F-H from *Mauriasi et al.* BSIP 11671; J, K from *Morrison* 123. A, D, F-K $\times \frac{2}{3}$; B, C, E $\times 1$. Drawn by Eleanor Catherine.



MAP 2. Distribution of *Mucuna subumbellata* ●, and of *M. stanleyi* ▲ in the SW Pacific.

3. *Mucuna brachycarpa* Rech. in Denkschr. Math.-Nat. Kl. Akad. Wiss. Wien 89: 562 (1913); Whitmore, Guide to For. of Brit. Sol. Is.: 192 (1966); Foreman, Check-list Vasc. Pl. Bougainville: 193 (1971); Verdcourt, Man. N. Guinea Leg.: 439 & frontispiece A & fig. 106c (1979) & in Kew Bull. 32(2): 459 (1979). Type: Bougainville: Kieta, *Rechinger* 4807 (holotype W; drawing of holotype K!).

Climber to 18 m; old woody stems with slightly warty lenticels, young stems with extremely sparse short adpressed pale hairs. *Leaves* 20–30 cm long; terminal leaflet 11–18 × 7–10 cm, fairly narrowly elliptic, acuminate at apex and broadly cuneate at base; lateral leaflets with abaxial half 1½–2 times as wide as adaxial; lateral veins usually 4 pairs, thinly prominent especially beneath, reticulation prominulous, inconspicuous; chartaceous, often fairly thickly so, glabrous; stipels ±1.5 mm long. *Inflorescences* 9–25 cm long arising,

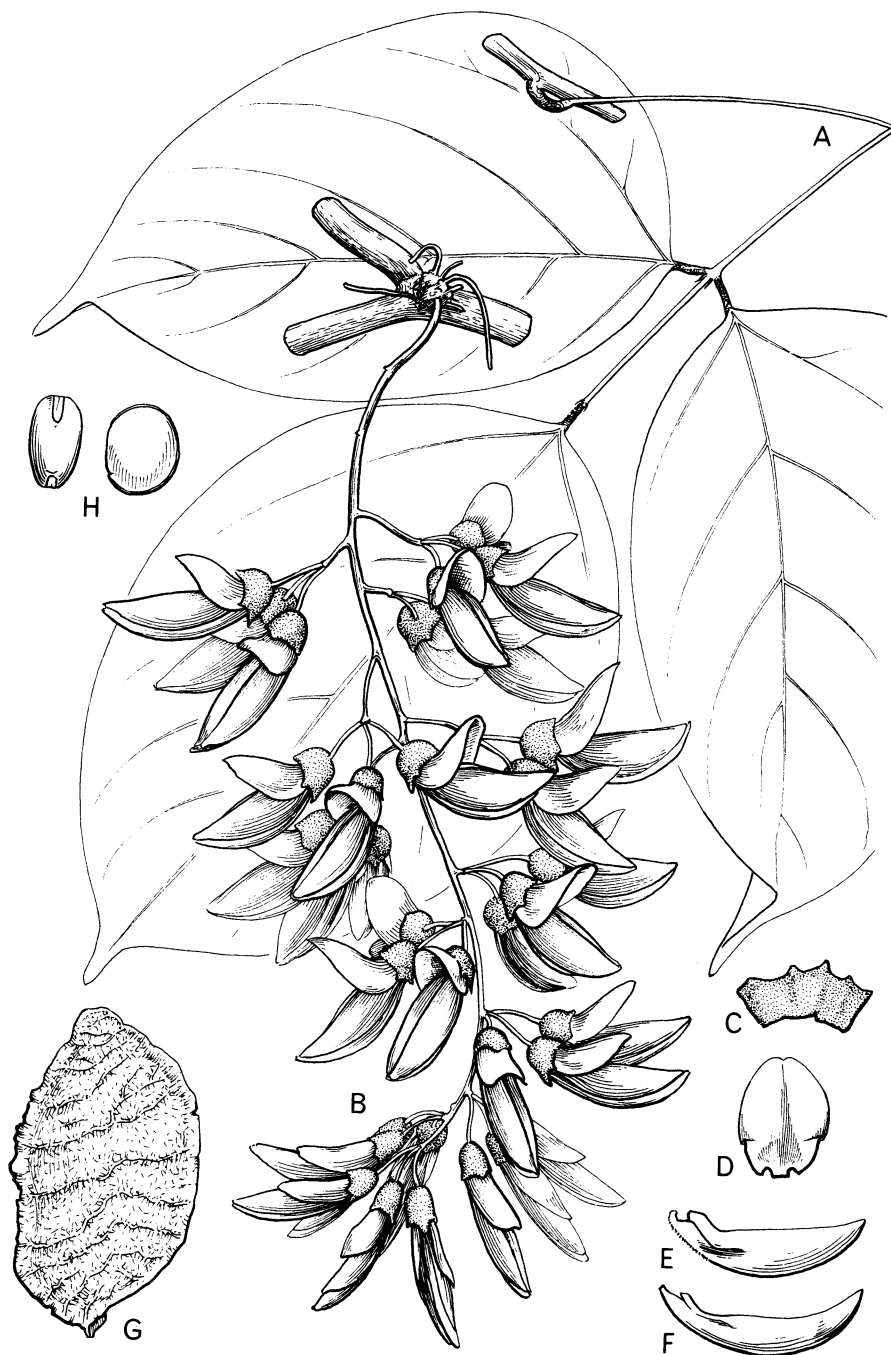


FIG. 3. *Mucuna brachycarpa*. A leaf; B inflorescence; C calyx; D standard; E wing; F keel; G fruit; H seed. A from Waterhouse 402; B from Voyce 7a. & Waterhouse s.n.; C-F from Craven & Schodde 538; G, H from drawing of Reehinger 4807. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.

sometimes several from the same point, from old warty stems; secondary axes 5–10, arising throughout axis length, ± 5 mm long; pedicels 1–1.3(–1.8) cm long; axis and pedicels with sparse spreading short fine brownish pubescence; bracts and bracteoles very early deciduous, not seen. *Calyx* pubescent as axis but densely and also with slightly coarser irritant bristles; tube rather narrow, 6 \times 6–7 mm; lobes very short, lowest ± 2 mm, laterals ± 1 mm, all broadly triangular; upper lip equalling laterals. *Flowers* bright golden-yellow; standard 2(–2.5) cm long, apex not cleft; wings curved throughout length, wide but narrowing markedly near apex, 3–3.5(–4) \times 0.6 cm; keel \pm equalling wing, curved throughout length. *Fruit* elliptic-oblong in outline, 7–9.5 \times 3.5–4 cm, laterally flattened, 2-seeded, surface with short dense erect pubescence and irritant bristles, also with ± 12 oblique low ridges resembling those of *M. subumbellata*; each margin with a similar ridge. *Seeds* black, \pm discoid, 1.7–1.8 \times 1.3 cm, 1 cm in thickness. Fig. 3.

Endemic to Melanesia and ?Fiji (see note below). Map 1.

BOUGAINVILLE. *Millar* NGF 38399 (L); *Waterhouse* 402 (L, K), 115 (A, FHO) & 67 (K); *Voyce* 7A (A, K, L); *van Royen* NGF 16361 (A, K, L); *Craven et al.* 538 (A, K, L); *Schodde & Craven* 3600 (L); *Lavarack et al.* NGF 31194 (A, K, L).

SOLOMON IS. Choiseul: *Whitmore's collectors* BSIP 5668 (K, L).

Fiji. Viti Levu: *Greenwood* 1109 (A, BISH, K), *Horne* 721 (K); Ba: *Koroiveibau* 14750 (BISH, K).

HABITAT. Forests, often coastal or near rivers; sea level to 600 m.

This species has not hitherto been recorded from Fiji, and its occurrence there gives it a rather odd distribution, but the several flowering specimens seen conform well and I therefore see no reason to exclude them.

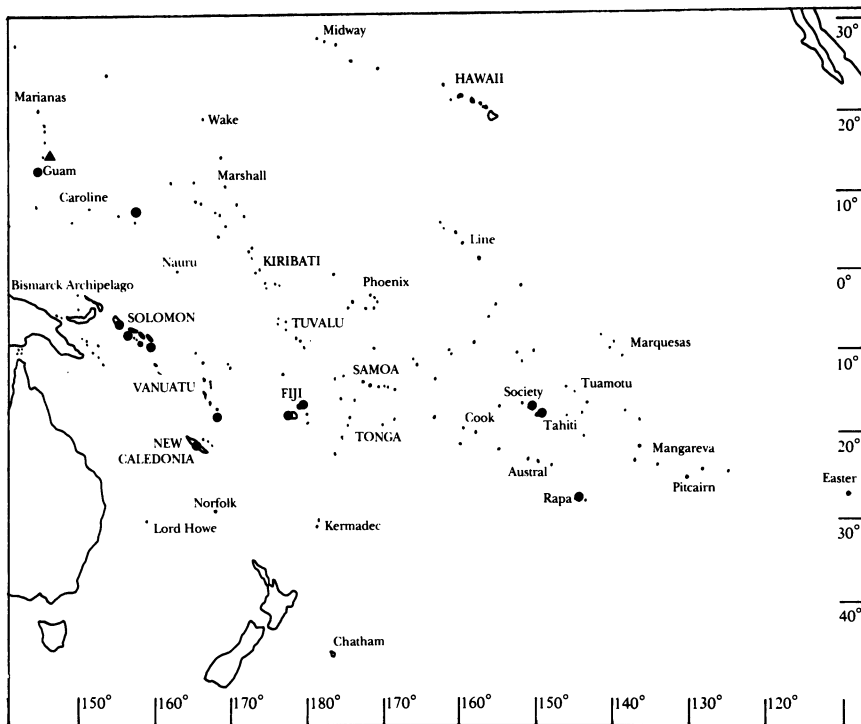
Two specimens from Solomon Is. (*Whitmore* in BSIP 2245, Santa Ysabel, & *ibid.* in R 556013, Guadalcanal) mentioned as '*sp. C*' by Verdcourt (Man. N. Guinea Leg.: 459 (1979) should probably be included under this species as yellowish-green-flowered variants, since in most respects they conform fairly well to this species. Map 1.

4. *Mucuna pacifica* *Hosokawa* in Trans. Nat. Hist. Soc. Formosa 25: 123 (1935). Type: Marianas: Saipan: *Hosokawa* 6725 (holotype ?TAI, not traced; isotype BISH!).

Climber in trees; young stems and petioles with fairly abundant pale or golden short spreading pubescence. *Leaves* 20–23 cm; terminal leaflets 9.5–12 \times 6.5–11 cm, elliptic–ovate, often broadly so, with acute shortly acuminate apex and cuneate or rounded base; lateral leaflets fairly asymmetrical, abaxial half $1\frac{3}{4}$ –2 \times as wide as adaxial; lateral veins 5–6 pairs, curving abruptly near margin, prominent; reticulation inconspicuous above, thinly slightly prominent beneath; membranous with pale \pm adpressed pubescence conspicuous but not dense both sides; stipels ± 2 mm long. *Inflorescences* ± 7 cm long, axillary, main axis stout, side branches 5–6, 0.5–1 cm long, pedicels up to 1.5 cm long, all pubescent like the stem; bracts not seen. *Calyx* with pubescence like the stem but dense, and coarser irritant red bristles; tube broad, 1 \times 1.5 cm; lowest lobe conspicuous, lanceolate, 5 \times 1.5 mm, laterals and upper lip not well-marked, up to 1 mm long. *Corolla* pale green; standard relatively long, ± 3 –5 cm, almost $\frac{3}{4}$ flower length, apex cleft to



FIG. 4. *Mucuna pacifica*. A leaf; B inflorescence; C calyx; D standard; E wing; F keel; G pistil; H fruit; J seed. A from Hosokawa 6647, B-G from Kanehira & Hatusima 4312; H, J from Hosokawa 6725. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.



MAP 3. Distribution of *Mucuna pacifica* ▲, and of *M. platyphylla* ● in the Pacific.

2 mm; wings 4.5–4.8 × 1.3–1.5 cm, rather broad, length scarcely 3 × width, lower margin markedly curved throughout length; keel usually slightly exceeding wings, 4.5–5 cm, curved throughout length. Fruit resembling that of *M. platyphylla*, broadly linear-oblong, rounded at apex and base, 12 × 3 cm, 1 cm in thickness; surface with pale erect pubescence slightly coarser and more reddish than that of stem, and deciduous irritant red bristles; also with ±10 obliquely transverse narrow lamellae uniformly 2–3 mm high, ± unbranched, parallel and regularly spaced; each margin with pair of wings 3–4 mm wide. *Seeds* brownish black, smooth, asymmetrically sublenticular, 2.2 × 1.9 cm, 8 mm in thickness. Fig. 4.

Endemic to Marianas: known only from Saipan. Map 3.

MICRONESIA. Marianas, Saipan: 17 July 1933, *Hosokawa* 6647 (TAI) & 6725 (isotype BISH); 25 March 1938, *Kanehira et al.* 4312 (A); 28 Dec. 1964, *Stone* 5165 (US).

HABITAT. Roadsides and amongst *Pandanus*, *Claoxylon* or *Artocarpus* forest; low altitude or up to 300 m.

The flowers of this species, unknown when its description was originally published, appear not to have been described before. It shows very close affinity with *M. platyphylla*, from which it differs mainly in its membranous leaves, smaller less branched inflorescence, very reduced lateral calyx-lobes, and wings of corolla much broader relative to their length.

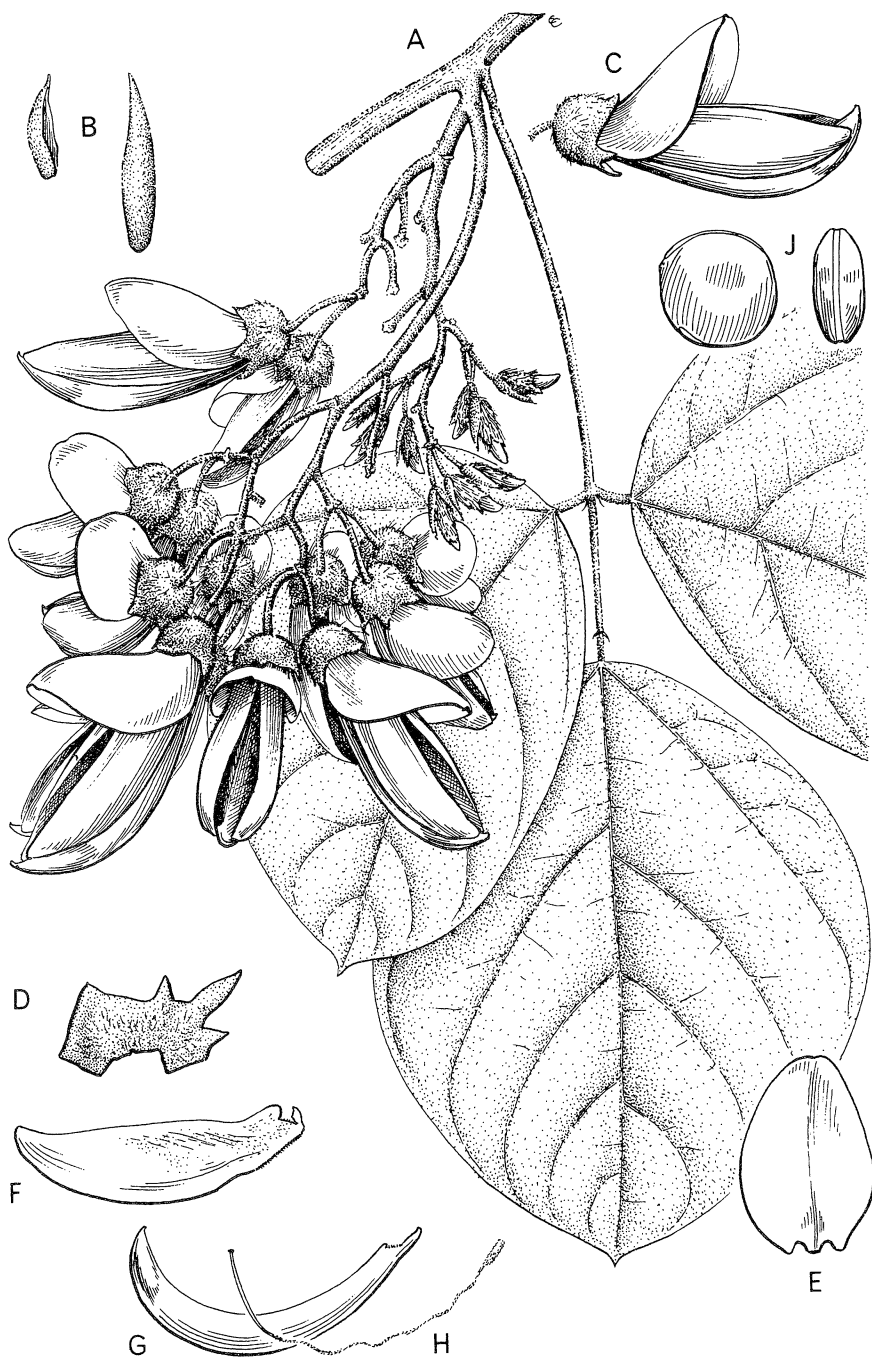


FIG. 5. *Mucuna platyphylla*. A habit; B bracts; C flower; D calyx; E standard; F wing; G keel; H pistil; J seed. A, C-H from *Van Royen* 4844; B from *Van Royen & Sleumer* 6175; J from *Damanu* KU24. B $\times 2$, A, C-J $\times \frac{1}{2}$. Drawn by Eleanor Catherine.

5. *Mucuna platyphylla* A. Gray, Bot. U.S. Expl. Exped. 1: 443 (1854); Seemann, Fl. Vit.: 59 (1865); Nadeaud, Enum. Pl. Tahiti: 80 (1873); Drake del Castillo, Ill. Fl. Insul. Maris Pacif.: 152 (1890) & Fl. Polynésie Français: 49 (1893); Guillaumin, Fl. Nouv. Cal. Phan. 148 (1948); Stone, Fl. Guam, in Micronesica 6: 337 (1970); Parham, Pl. Fiji Is.: 115 (2nd ed. 1972); Whistler, Coastal Fl. of Trop. Pacific: 72 (1980); Smith, Fl. Vit. Nov. 3: 213 (1985). Type: Fiji, Ovalau or Viti Levu, Rewa: 1840, *U.S. Expl. Exped.* s.n. (U.S. Herbarium 47902) (holotype US!; isotype A!).

M. albertisii F. Muell., Descr. Notes Papuan Pl.: 1: 64 (1876); Burck in Ann. Jard. Bot. Buit. 11: 190 (1893); Verdcourt, Man. N. Guinea Leg.: 437 & fig. 106a (1979). Type: Papua New Guinea, Fly R.: *D'Albertis* s.n. (holotype MEL); **synon. nov.**

M. platyphylla var. *neocaledonica* Bak. f. in Journ. Linn. Soc. Bot. 45: 295 (1921). Type: New Caledonia, Bae Ba: *Compton* 1385 (holotype BM!).

M. forbesii Bak. f., Journ. Bot. 61, suppl. 11 (1923). Type: Papua New Guinea, Sogere, *Forbes* 148 (BM).

M. ponapeana Hosokawa in Trans. Nat. Hist. Soc. Formosa 25: 123 (1935). Type: Caroline Is., Ponape, near Nampil: 25 Aug. 1933, *Hosokawa* 6036 (holotype ?TAI, not traced); **synon. nov.** Although type has not been seen, another cited specimen seen, *Hosokawa* 5926 (TAI), together with the description, appear adequate for deciding the identity of this name.

Large climber up to 30 m long; stems and petiole with very short (0.5–1 mm), spreading, red-brown (rarely pale) velvety usually dense pubescence. *Leaves* up to 30 cm long; terminal leaflet 7–16 × 5–16 cm, broadly elliptic with abruptly acute often acuminate apex and rounded to broadly cuneate base; lateral leaflets fairly asymmetrical, abaxial half twice width of adaxial; lateral veins 4–6 pairs, curving sharply but only near margin, prominent beneath, coarse and fine reticulation prominent beneath; coriaceous, often thickly so, young leaves often rather silky-pubescent either side, older leaves often glabrous above, usually densely hairy like the stem beneath; stipels often robust, 3–4(–6) mm long. *Inflorescences* axillary, up to 25 cm long, often very branched and often several arising together from same leaf-axil, flowers arising usually in groups of 3 from tertiary or quaternary axes 5–10 mm long, pedicels ±6–15 mm long; axes and pedicels densely pubescent like the stem and also with longer coarser irritant reddish hairs; bracts and bracteoles narrowly ovate, acute or acuminate, 10–15 × 2–5 mm, pubescent as axis. *Calyx* pubescent as axis; tube cup-shaped, not very broad, 7–10 × 10 mm; lowest lobe 8–10 × 3–4 mm, narrowly triangular, laterals 4–5 × 2–3 mm, upper lip equalling laterals. *Flowers* greenish white; standard 3.2–4 cm long, apex cleft to 2 mm, basal auricles 2 mm; wings 4.2–6.5 × 0.8–1 cm, fairly narrow, curved throughout length especially lower margin, and tapering to a narrow fairly acute apex, basal claw 5 mm and auricle 3 mm long; keel ± equalling wing, curved, usually markedly, throughout length. *Fruit* leathery, 8–16 × 4–5 cm, laterally flattened, up to 1.5 cm in thickness, (2–)3–4-seeded, linear-oblong or oblong, apex and base rather rounded; surface pubescent and sparsely irritant-hairy like the axis and with ±11 obliquely transverse narrow lamellae as in *M. pacifica*; each margin winged as in *M. pacifica*. Seeds blackish (brown-grey when young), smooth, almost discoid, 1.7–2.2 cm diam., ±8 mm in thickness. Fig. 5. Map 3.

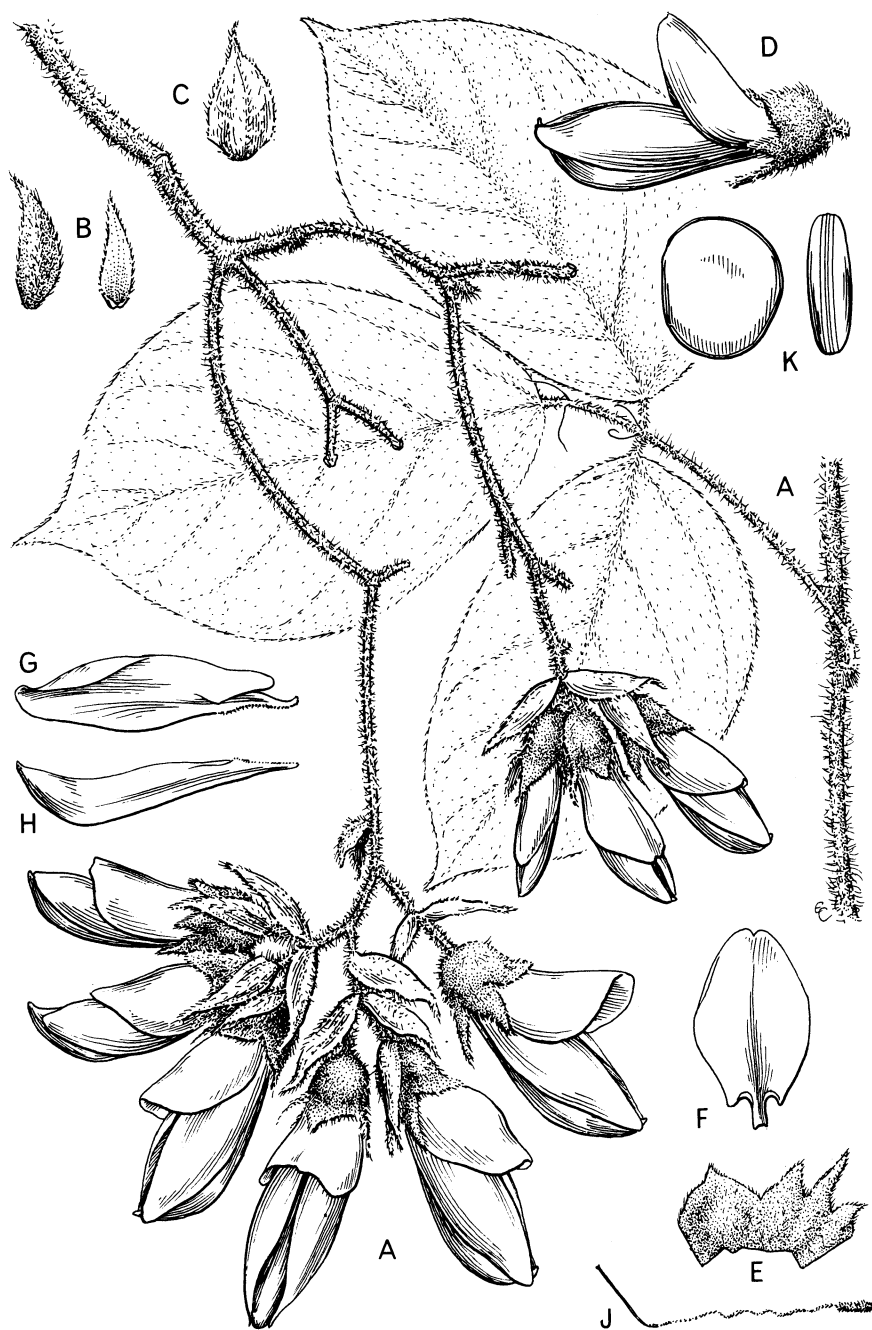


FIG. 6. *Mucuna stanleyi*. A leaf & inflorescence; B, C bracts & bracteoles; D flower; E calyx; F standard; G wing; H keel; J pistil; K seed. A, B, D-J from Coode & Lelean NGF 29916; C from Millar NGF 14574; K from Streimann NGF 27892. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.

BOUGAINVILLE. *Voyce* 7 (K).

SOLOMON IS. Kolombangara: *Mauriasi et al.* in BSIP 9571 (K); Guadalcanal: *Whitmore et al.* BSIP 4395 (K).

VANUATU. Erromanga: *Cabalion* 2215 (K); Pentecost: *ibid.* 1133 (P).

NEW CALEDONIA. *Mackee* 40510 (K); *Vieillard* 2560 (K, P); *Compton* 1385 (BM).

FIJI IS. Viti Levu: *Seemann* 120 (A, BM, K) & 1860 (K); *Parks* 20394 (A, BISH), *Koroiveibau* 11424 (BISH), *Howard* H109 (K). Vanua Levu: *Howard* H100 (K). Unlocalised: *U.S. Expl. Exped.* s.n. (holotype US; isotype A).

SE POLYNESIA. Austral Is., Rapa: *St John et al.* 15484 (A, BISH, K, US), *Stokes* 103 & 153 & 398 (BISH) & *Fosberg* 11503 (BISH). Society Is., Raiatea: *Moore* 557 (BISH); Tahiti: *Banks & Solander* s.n. (BM) & *Grant* 4372 (BISH).

MICRONESIA. Marianas, Guam: *Stone & Hardin* 5004 (A, BISH). Caroline Is.: Ponape: *Hosokawa* 5926 & 5845 (TAI), *Stone* 5376 (BISH) & *Glassman* 2765 (BISH, US).

EXTERNAL DISTRIBUTION. Papua New Guinea.

HABITAT. Forests and thickets; 10–300 m.

Said to be cultivated in Hawaii (St John, List Fl. Pl. Hawaii: 189 (1973), under name *M. albertisii*).

After examination of type material it is clear that *M. albertisii*, whose affinities are discussed by Verdcourt (1979: 438 & 457), is conspecific with *M. platyphylla*.

6. *Mucuna stanleyi* *C. T. White* in Proc. Roy. Soc. Queensl. 34: 36 (1922); Smith, Fl. Vit. Nov. 3: 214 (1985); Verdcourt, Man. N. Guinea Leg.: 455 (1979). Type: Papua New Guinea, Papua: Mafulu, *White* 497 (holotype BRI; isotype K!).

Climber to several m, vegetatively rather similar to *M. platyphylla* but pubescence on vegetative parts and inflorescence axis with some or all hairs distinctly long, 1.5–3 mm. *Leaves* (apart from nature of pubescence) very like those of *M. platyphylla* but often ovate rather than elliptic; stipels usually longer and finer, 5–10 mm long. *Inflorescence* resembling that of *M. platyphylla* but fine pubescence longer and irritant bristles lacking, long less coarse hairs only present; bracts and bracteoles also very different, all large and broad, triangular to broadly ovate-elliptic, 20–28 × (6–)10–16 mm, indumented like the axis but also with longer slightly coarser silky (not bristly) hairs. *Calyx* with hairs as on bracts; tube rather broader than in *M. platyphylla*, 10 × 13–18 mm, lobes often larger and broader, lowest 10–12(–20) × 8 mm, laterals 5–9 × 3–4 mm. *Flowers* yellowish green (keel sometimes said to have purple markings); standard 3–4 cm long; wings markedly pubescent in basal part, 4–6 × 1–1.5 cm, upper margin ± straight, lower margin markedly curved; keel ± equalling wings, straight for most of length, up-curved abruptly in apical 0.5–1 cm. *Fruit* leathery, 8.5–15 × 3–4.5 cm, laterally flattened ± 1.5 cm in thickness, 2–5-seeded, oblong-elliptic but often swollen around seeds, lower margin often more convex than upper; surface velvety-pubescent and also with much denser covering, of rather coarser bristles, than in *M. platyphylla*; lamellae more obliquely transverse and each of irregular height and therefore with uneven margin, 1–5(–8) mm high; marginal wings wider than in *M. platyphylla*, 0.5–1 cm. Seeds similar to *M. platyphylla* but often larger, up to 2.8 × 2.5 cm. Fig. 6, Fig. 8B. Map 2.

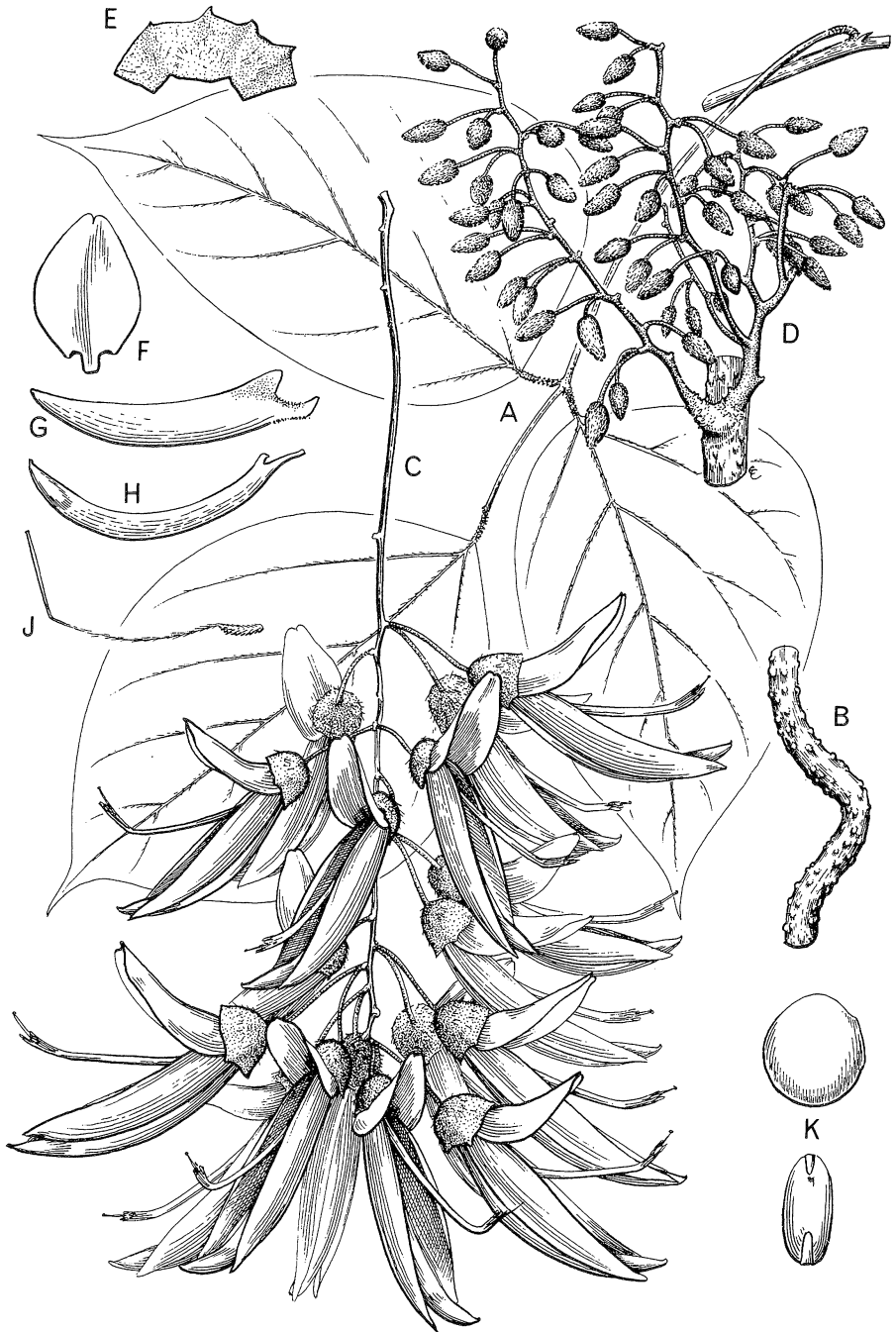
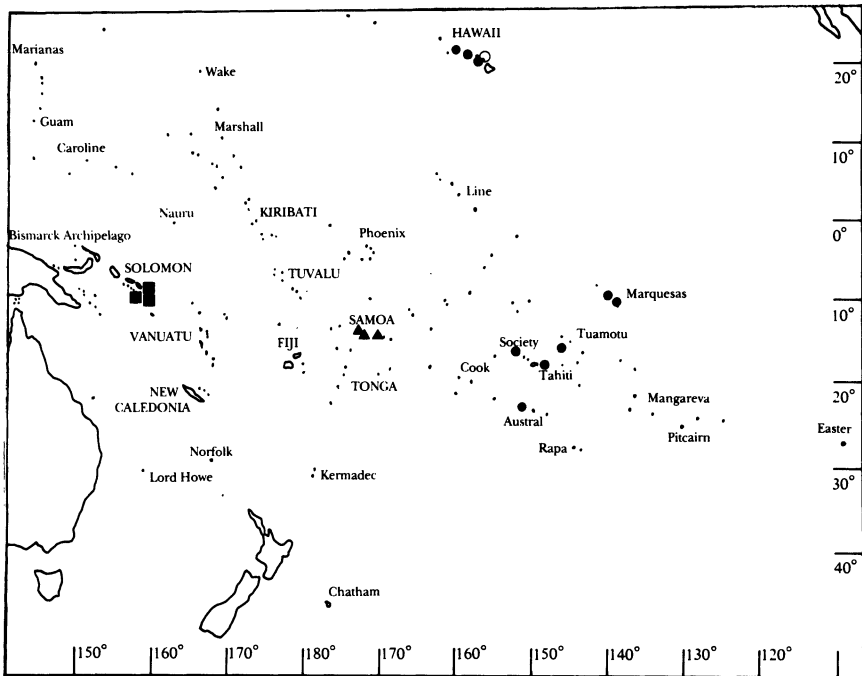


FIG. 7. *Mucuna glabra*. A leaf; B older stem; C inflorescence; D young inflorescence; E calyx; F standard; G wing; H keel; J pistil; K seed. A, C, E–J from Reinecke 219; B, K from Cox 342; D from Whistler 2014. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.



MAP 4. Distribution of *Mucuna glabra* ▲, and of *M. mollissima* ■ and of *M. sloanei* var. *sloanei* ● and var. *persericea* ○, in the Pacific.

Fiji is. Viti Levu: *Parks* 20473 (BISH); Lock I. (K); *Greenwood* 1288 (A, BISH, US) & 254B (K); *Degener* 14308 (A); *Gillespie* 4387 (BISH); *Koroiveibau* 14990 (BISH, K); *Melville* 7012 (K); *Kuruvoli* 14990 (K); *Smith* 4001 (A, BISH, US). Vanua Levu: *Smith* 1734 (A, K, US) & 1517 (A, BISH, K, US).

EXTERNAL DISTRIBUTION. Papua New Guinea. It is surprising that the species is not recorded from the Solomon Is.

HABITAT. Forests and forest edges; 100–800 m alt.

As noted by Verdcourt (1979: 457) this species and *M. platyphylla* occasionally intergrade, but are in general very distinct and therefore best considered as separate species. Three collections seen. *Smith* 7130, 6289, & 4405 (A, K), from Viti Levu, are somewhat intermediate but closer to *M. stanleyi*. It is possible that such intermediates are, in fact, hybrids.

7. *Mucuna glabra* (Reinecke) Wilmot-Dear stat. nov.

M. urens (L.) Medic. var. *glabra* Reinecke in Engl., Bot. Jahr. 25: 639 (1898); Rechanger, in Denkschr. Math.-Nat. Kl. Akad. Wiss. Wien 85: 291 (1910). Type: Upolu: *Reinecke* 219 (holotype B†; isotypes A! BISH! E!).

Large climber; old woody stems up to 3 cm diam., very rough with numerous prominent warty lenticels; young stems and petioles with sparse adpressed pale pubescence. *Leaves* 20–35 cm long; terminal leaflet, 13–16 × 8–12 cm, elliptic or ovate, broad or narrow, with apex acute often distinctly

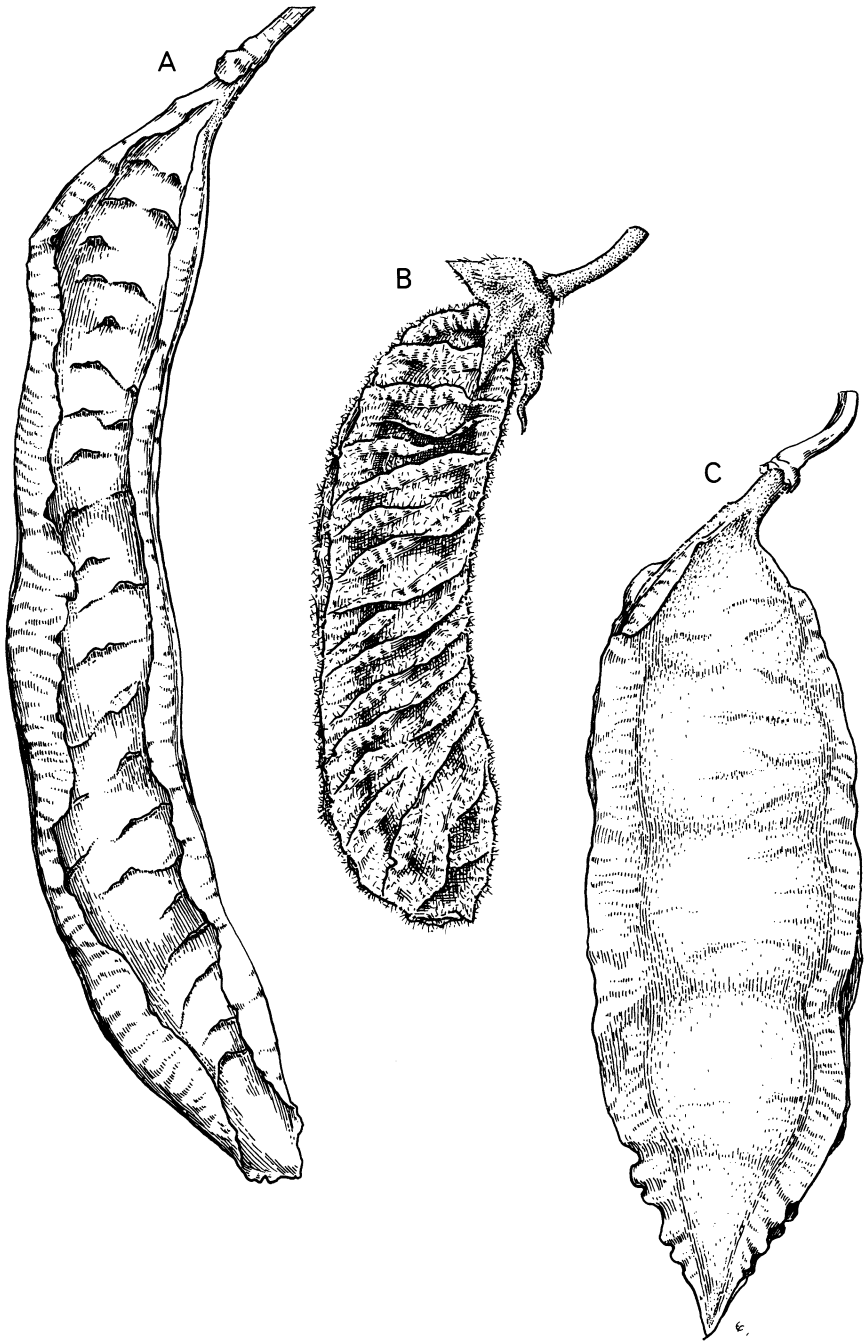


FIG. 8. *Mucuna* fruits. **A** *M. glabra* from Cox 342; **B** *M. stanleyi* from Streimann NGF 27892; **C** *M. gigantea* from Whitmee s.n. All $\times \frac{2}{3}$. Drawn by Eleanor Catherine.

acuminate and base broadly cuneate; lateral leaflets not very asymmetrical, abaxial half $1\frac{1}{2}$ times as wide as adaxial or slightly more; lateral veins 5, curving only near margin, prominent both sides, reticulation slightly prominulous beneath; membranous, very sparsely hairy like the stem below, glabrous except along veins above; stipels fine, ± 2 mm long. *Inflorescences* arising from old warty stems, sometimes more than one together, branching several times, final (flower-bearing) axes completely reduced to knobs each bearing usually 3 flowers, pedicels very long, ± 3 cm and even in young buds already as long as the mature pedicels of other species, ± 1.5 cm; axes and pedicels pubescent as stem but hairs denser and somewhat longer; bracts and bracteoles very early deciduous, not seen. *Calyx* with short pale adpressed pubescence and sparse irritant golden bristles; cup-shaped, narrow or fairly broad, $9 \times 12-18$ mm; lowest lobe 3–5 mm, laterals 2–4 mm long, all narrowing rapidly to 1 mm wide, thus \pm acuminate; upper lip often equalling laterals. *Flowers* greenish or yellowish white; standard ± 3 cm long, only $\pm \frac{1}{2}$ flower-length, wings 5.5×1 cm, fairly narrow and tapering gradually to a narrow acute almost horny tip, slightly upcurved throughout length; keel often exceeding wings, (5.5–)6–6.5 cm, narrow and curved throughout length. *Fruit* thickly leathery, almost woody, $15-22 \times 4$ cm, very flattened 1–1.5 cm in thickness, 2–5-seeded, linear-oblong, one margin often rather more convex, or whole pod somewhat curved, apex and base \pm acute; surface with dense fine short \pm adpressed red-brown pubescence, also with many almost transverse lamellae, each of very irregular height ranging from 1–4 mm and often interrupted completely for part of their length, their margins therefore extremely undulate or irregularly dentate; each margin with pair of fairly wide wings 7–10 mm wide but also of variable width throughout length. Seeds dark red-brown, shiny, almost discoid, $2-2.5 \times 1.8-2.4$ cm, 6–8 mm in thickness. Fig. 7, Fig. 8A.

Endemic to Samoan Is. Map 4.

SAMOAN IS. Samoa: Savai: *Christopherson* 2907 & 1896 (BISH) & *Whistler* 1683 (US). Upolu: *Reinecke* 219 (isotypes A, BISH, E), *Whistler* 2014 (BISH) & *Cox* 342 (A, BISH, K). Tau: *Whistler* 3157 (K). Olonone: *Vaupel* 383 (US).

HABITAT. Inland forest or pioneer on lava; 200–750 m.

USES. Fluid from internodes said to be used by travellers for drinking.

8. *Mucuna mollissima* *Teysm. & Binn. ex Kurz* in Journ. As. Soc. Bengal 43: 187 (1874). Type: Moluccas: Halmaheira, in horto Bogoriensi culta (holotype ?BO).

M. cyanosperma K. Schum. in Schum. & Hollr., Fl. Kais. Wilhelms Land: 98 (1889); Burck in Ann. Jard. Bot. Buit. 11: 183 t. xiii (1893); Whitmore, Guide to For. of Brit. Sol. Is.: 192 (1966). Type: German New Guinea: "Schöne Aussicht bei Hatzfeldthafen", *Holtrung* 411 (holotype B†).

Stizolobium mollissimum (Teysm. & Binn. ex Kurz) Piper in Proc. Biol. Soc. Washington 30: 53 (1917).

Mucuna baileyana Merr. & Perry in Journ. Arn. Arb. 23: 404 (1942). Type: Papua New Guinea: Papua, Vailala R., Ihu: *Brass* 1104 (holotype A!; isotype K!).

M. clemensiae Merr. & Perry in Journ. Arn. Arb. 29: 156 (1948). Type: NE New Guinea, Tobou: *Clemens* 6573 (holotype A!).

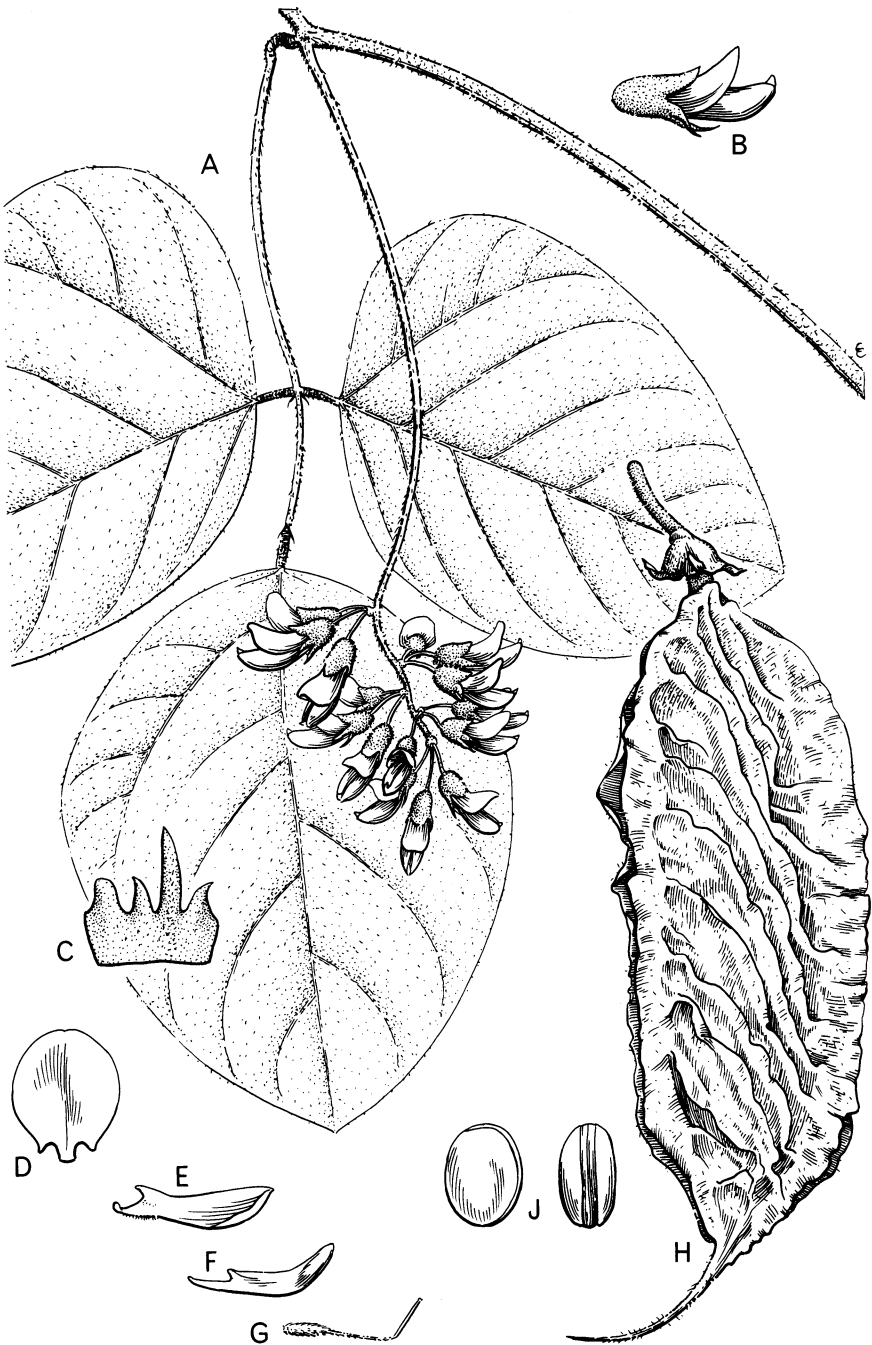


FIG. 9. *Mucuna mollissima*. A habit; B flower; C calyx; D standard; E wing; F keel; G pistil; H fruit; J seed. A from Streimann & Kairo NGF 39313 & Gjellerup 235; B-G from Gjellerup 235; H from Brown W/264; J from Guppy s.n. A, H, J $\times \frac{3}{4}$; B-G $\times 1$. Drawn by Eleanor Catherine.

M. urens var. *papuana* F. M. Bailey in Qld. Ag. Journ. 24: 20–21 (1910). Type: Papua, Boku: Mrs H. Schlenker s.n. (holotype BRI; isotype K!). This variety is mentioned, but not described, by the same author in Qld. Ag. Journ. 9: 410 (1901).

Large climber; young stems and petioles with fine pale spreading short dense pubescence. *Leaves* 20–35 cm long, terminal leaflet 9–17 × 8–15 cm, very broadly elliptic or ovate with acute apex and rounded base; laterals fairly asymmetrical, abaxial half twice width of adaxial or almost so; lateral veins 4–5 pairs, prominent both sides, reticulation visible above, slightly raised below; membranous or thinly chartaceous, with abundant adpressed or ± erect pale silky pubescence both sides but longer and denser below; stipels fairly robust, 2–4 mm long. *Inflorescences* axillary, 10–30 cm long, raceme-like with 5–7 secondary axes, these reduced to knobs, pedicels 5–10 mm long; axis and pedicels pubescent like the stem; bracts and bracteoles soon deciduous, ±10 × 2 mm, narrowly lanceolate and acute. *Calyx* densely grey- or silvery-pubescent and with reddish irritant bristles; tube not very broad, ±8 × 10 mm, lowest lobe 8–10 mm, laterals 5–6 mm long, all 3–4 mm wide, triangular or acuminate; upper lip well-marked, often equalling laterals and slightly cleft. *Flowers* white; standard 1.4–1.6(–2) cm long; wings 2–2.5(–3) × 0.4 cm; keel ± equalling wings, straight throughout most of length, upcurved abruptly near tip. *Fruit* leathery, 11–14 × 3–3.5 cm, markedly laterally flattened ±1.5 cm in thickness, 4-seeded, oblong, acute at apex and base, surface with fine dense pale spreading pubescence and light brown coarser irritant hairs, also with ±10 very oblique conspicuous lamellae 3–5 mm broad with slightly undulate margins; pod margins with pair of conspicuous wings 5–8 mm wide. Seeds very distinctive in appearance, asymmetrically compressed-ellipsoid, smooth, pale grey (more rarely brownish) with black hilum, 1.8 × 1.2–1.5 cm, 8 mm in thickness. Fig. 9. Map 4.

SOLOMON IS. Malaita: Baunani, *Brown* 264 (BM). Savo: *Gafui et al.* BSIP. 14728 (K). Guadalcanal: *Nakisi* in BSIP 7339 (K). Faro Is.: *Guppy* 47 (K).

EXTERNAL DISTRIBUTION. Papua New Guinea; Kai Is.; Moluccas.

HABITAT. Forests or plantations; sea level to 30 m.

9. *Mucuna sloanei* *Fawcett & Rendle* in Journ. Bot. Lond. 55: 36 (1917). Type: Jamaica, Rio Cabre, Guanaboa, Sloane Herb. vol. 3: 69 (BM).

Dolichos urens Jacq., Select. Stirp. Amer. Aust.: 202 (1763); Jouan in Cherbourg Mem. Soc. Sc. Nat. XI: 106 (1865); non L.

Mucuna urens auctt.; Hillebrand, Fl. Hawaiian Is.: 101 (1888); Drake del Castillo, Ill. Fl. Insul. Maris Pacif.: 152 (1890); Rock, Leg. Pl. Hawaii: 197 & 200 (1920); Degener, Fl. Hawaiiensis Fam. 169c: 6 (1946); St John, List Fl. Pl. Hawaii: 189 (1973) (where stated to be cultivated); non (L.) Medic.

a. var. *sloanei*

Climber to at least 6 m; young stems and petioles with fairly long pale fine sparse adpressed hairs or glabrescent. Leaves 17–25 cm long; terminal leaflet 8.5–12 × 4–7.5 cm, elliptic or ovate, often fairly narrow; laterals fairly asymmetrical, abaxial half twice width of adaxial; lateral veins 4–5 pairs, curved, thinly prominent both sides, reticulation inconspicuous; thinly chartaceous with sparse adpressed silvery or pale golden silky pubescence, or glabrous,

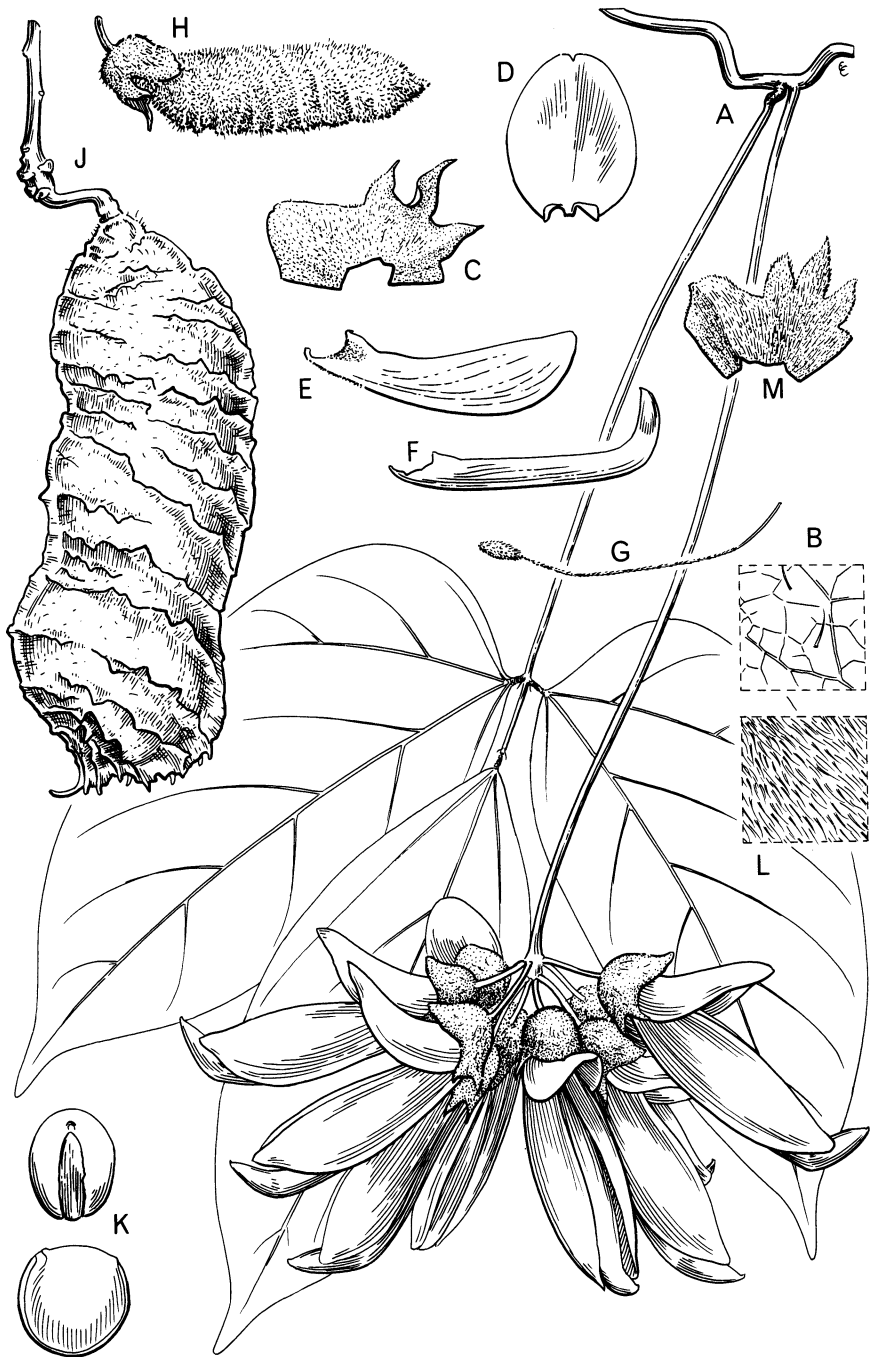


FIG. 10. *Mucuna sloanei*. A–K var. *sloanei*. A habit; B detail of leaf surface; C calyx; D standard; E wing; F keel; G pistil; H young fruit; J mature fruit; K seed. A, B from Nagata 2484; C–G from Judd s.n.; H from Schäfer 5578; J, K from St John & Zimmerman 16979. L, M var. *persicea*. L detail of leaf surface, M calyx; from Mann & Brigham 395. B, L $\times 8$, rest $\times \frac{2}{3}$. Drawn by Eleanor Catherine.

above, similarly but usually densely pubescent below; stipels filiform, ± 3 mm long. *Inflorescences* axillary, single, devoid of bracts or branches throughout most of length, secondary (flower-bearing) axes all crowded near apex; pedicels ± 8 mm long; axes and pedicels pubescent like the stem but more densely so, bracts ovate-lanceolate, $\pm 18 \times 5$ mm, bracteoles broadly ovate, $20-30 \times 14-20$ mm, pubescent like the stem. *Calyx* with sparse or dense pale spreading short pubescence and reddish irritant bristles; tube broadly cup-shaped, $8-12 \times 15-18$ mm, lobes $7-12 \times 4-5$ mm, lowest longest, all fairly broadly triangular, upper lip \pm equalling laterals. *Flowers* bright yellow; standard $2.8-3.5$ cm long, often almost $2/3$ flower length, basal auricles rather large, $3-4$ mm; wing $5-5.5 \times 1$ cm, fairly narrow with abruptly acute apex; keel \pm equalling wing, straight throughout most of length, abruptly upcurved only near apex. *Fruit* thickly coriaceous, $10-12 \times 4$ cm, flattened but extremely swollen around seeds, 2-3-seeded, broadly oblong with acute base and apex, one margin \pm straight, other markedly convex; surface with short dense spreading pale fine pubescence and irritant red bristles, also with ± 14 obliquely transverse conspicuous lamellae very similar in appearance to those of *M. mollissima*; margins with pair of wings of more irregular width than those of *M. mollissima*, edges often appearing irregularly dentate. Seeds asymmetrically sublenticular, brownish black, rugose, large, 2.3 cm diam., 1.8 cm in thickness. Fig. 10. Map 4.

SE POLYNESIA. Society Is.: Meetia, *St John* 14220 (BISH, K); Bora Bora, *Dumont d'Urville* s.n. (P). Austral Is.: Rimatara, *St John & Zimmerman* 16979 (BISH). Tuamotu Is.: Niau, *Quayle* 820 (BISH). Marquesas: Hiva Oa: *Schaefer* 5578 & 5555 (K), *Pacific Ent. Survey Exped.* 115 (BISH) & *Mumford et al.* 115 (BISH); Nukuhiva: *Braun* 395 (BISH).

HAWAIIAN IS. Kauai: *Rock* 2165 (A). Oahu: 5 Dec. 1948, *Kerr* s.n. (BISH); *Nagata* 2484 (BISH). Maui: *Degener* 19325 (A) & 2284 (E, K, US); *Pearsall* 27 (BISH). Hawaii: 12 Nov. 1937, *Judd* s.n. (BISH, K); *Remy* 671 (P).

EXTERNAL DISTRIBUTION. S America.

HABITAT. Forests and thickets, often by rivers and streams; sea level to 300 m alt.

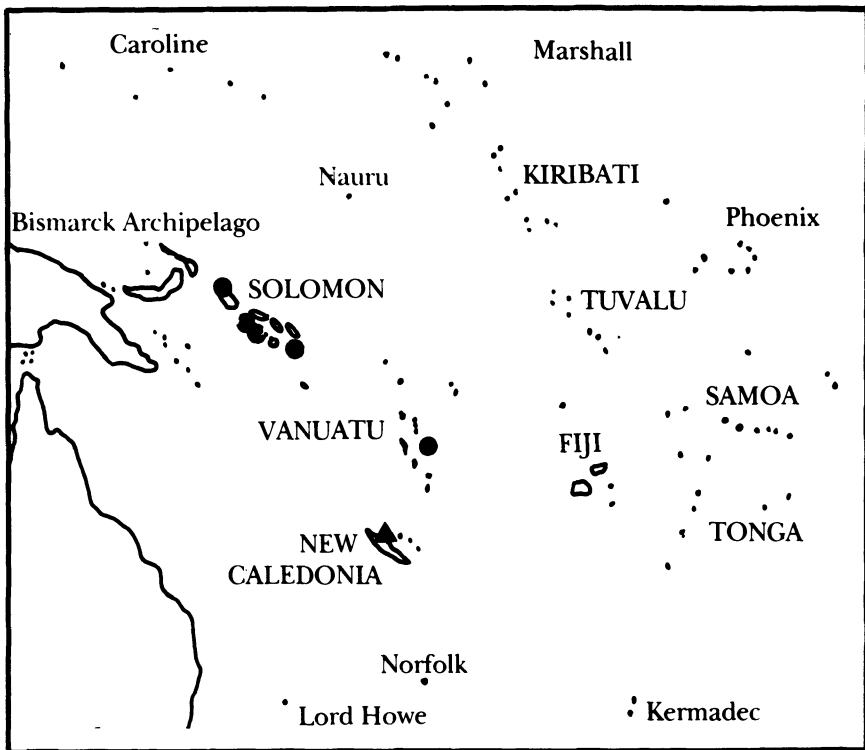
b. var. persericea *Wilmot-Dear* var. nov. a var. typica foliis saepe crassioribus et subtus semper pilis argyroluteis sericeis sed longioribus validioribusque tam densissime dispositis ut epidermis folii omnino celatus est, calyce pilis argyroluteis sericeis longissimis densissime similiter vestito nec indumento brevi patenti sparso vel densiusculo indutus differt. Typus: Ins. Hawaiiensis: Maui: Keauae Valley, 19 July 1927, *Degener & Wielke* 2286 (holotypus K!; isotypi A! BISH! US!).

Plant identical to the typical variety in most respects but leaf-indumentum beneath of still silky but longer, coarser, more golden-silvery, hairs forming so dense and thick a covering that epidermis completely invisible beneath. *Calyx* with similarly dense silvery-gold silky covering (but hairs much longer than those of leaves) instead of the short spreading fine indumentum of the typical variety, also with a few reddish-gold irritant bristles. *Bracts* and upper leaf-surface often more densely adpressed-pubescent than in typical variety, and leaves often thicker. Fig. 10.

Endemic to Hawaiian Is; known only from Maui. Map 4.



FIG. 11. *Mucuna neocaledonica*. A leaf; B inflorescence; C calyx; D standard; E wing; F keel; G fruit. A–F from McPherson 5261; G from Compton 1959. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.



MAP 5. Distribution of *Mucuna neocaledonica* ▲, and of *M. elegans* ● in the SW Pacific.

HAWAIIAN IS. Maui: 4 July 1961, *Degener & Degener* 30175 (holotype K; isotypes A, BISH, E, US); 19 July 1927: *Degener* 17991 (A, BISH) & *ibid.* & *Wiebke* 2286 (A, BISH, US); July 1920, *Swezey* s.n. (BISH); Makawao, *Mann & Brigham* 395 (A, BISH).

HABITAT. As for typical var.; no altitude data.

Although this variant differs only in indumentum, since the differences are so well-marked with no intermediates and since it appears to be restricted to Maui, it is considered worthy of formal recognition at varietal level. Possibly this is the true local race, the typical variety being a later introduction from other Hawaiian islands.

10. *Mucuna neocaledonica* *E. G. Baker* in *Journ. Linn. Soc., Bot.* 45: 295 (1921); *Guillaumin, Fl. Nouv. Cal. Phan.*: 148 (1948); *Mackee, Pl. Introd. Cult. New Cal.*: 82 (1985). Types: New Caledonia: Ignambi, 6 Aug. 1914, *Compton* 1665 & *Tonine*, 1 Oct. 1914, *Compton* 1959 (syntypes BM!).

Climber to 18 m or more; stems and petioles glabrous. *Leaves* up to 24 cm long; terminal leaflet 10–11 × 7–8 cm, ± rhombic in outline and rather broad with shortly acuminate apex and broadly cuneate base; laterals not very markedly asymmetrical, abaxial half 1½ times as wide as adaxial or a little more; lateral veins 4–5 pairs, straight throughout most of length, curving only near margin, thinly but extremely prominent both sides, reticulation



FIG. 12. *Mucuna elegans*. A leaf; B inflorescence; C flower; D calyx; E standard; F wing; G keel; H pistil. A from Whitmore & Womersley BSIP 856, B-H from Joyce 25. All $\times \frac{1}{2}$. Drawn by Eleanor Catherine.

visible but not conspicuous; thinly chartaceous, drying often rather light green with pale veins, glabrous or with extremely sparse very short fine golden hairs beneath; stipels absent. *Inflorescences* axillary, short, 2–6 cm, few-flowered, secondary axes completely reduced; pedicels 1.5–2 cm long with abundant extremely short and fine spreading pubescence, axis similarly but very sparsely hairy; bracts and bracteoles not seen. *Calyx* densely pubescent like pedicels; tube not very broad, 14 × 15 mm; lobes all large, broadly triangular and obtusely rounded, 4–6 mm long, upper lip well-marked ± equalling lobes. Flowers said to be yellowish-ivory and pink-tinged, or orange darkening purple; standard 3.5–4 cm long, hardly over $\frac{1}{2}$ flower-length; wing 5.5–7 × 0.8 cm, very long, straight and narrow, acute and slightly upcurved at tip; keel always exceeding wings by ± 1 cm, 6.5–8 cm long, narrow, straight for most of length, markedly upcurved at apex. *Fruit* thickly coriaceous, 10 × 5 cm, very flattened, ± 1.3 cm in thickness, 1-seeded, asymmetrically elliptic-oblong in outline, acute at base and apex; surface with dense indumentum of very short spreading red-brown rather coarse velvety hairs, also with ± 12 obliquely transverse robust lamellae 1–5 mm high, each of fairly uniform height, those near base reduced to narrow rounded ridges; each margin with pair of wings ± 6 mm wide. Seed not seen. Fig. 11.

Endemic to New Caledonia. Map 5.

NEW CALEDONIA. *Compton* 1665 & 1995 (syntypes BM); Puebo, 1861, *Deplanche* 332 (K); Wagap, 1861–67, *Vieillard* 382 (BM, P); above Puebo, 4 Dec. 1982, *McPherson* 5261 (K).

This species appears very distinct from all other Pacific species in the narrowness and relative proportions of its long straight flowers, its broadly obtusely-lobed calyx, and the general appearance of its leaves. It also seems to completely lack irritant bristles.

11. *Mucuna elegans* Merr. & Perry in Journ. Arn. Arb. 23: 406 (1942); Whitmore, Guide to For. of Brit. Sol. Is.: 192 (1966); Verdcourt, Man. N. Guinea Leg.: 442 (1979). Type: Solomon Is., San Cristobal, Magoha R., *Brass* 2734 (holotype A!; isotype BM!).

Strong woody climber into tops of tall trees; stems glabrous or with few adpressed pale hairs mostly at nodes. *Leaves* 13–23(–30) cm long; terminal leaflets 7–13 × 3.5–7.5 cm, elliptic and fairly narrow, usually more than twice as long as wide with apex abruptly acuminate, base cuneate; lateral leaflets not markedly asymmetrical, abaxial half $1\frac{1}{2}$ times as wide as adaxial; lateral veins 3–4 pairs, curving throughout length, thinly prominent both sides, reticulation raised but inconspicuous; membranous or thinly chartaceous, rarely thinly coriaceous, ± glabrous; stipels absent. *Inflorescences* arising from old stems an axils of old leaves, short, 2.5–9 cm long, solitary or several together, sometimes branched near base, final (flower-bearing) axes 4–11 per branch, completely reduced to knobs; pedicels 1.6–1.8 cm long; axis and pedicels with sparse very short and fine pale indumentum, often also longer coarser dark brown hairs at nodes; bracts and bracteoles early deciduous, not seen. *Calyx* sparsely adpressed-pale-pubescent like the axis and with sparse irritant red bristles; tube very broad, 5 × 15 mm; lowest lobe 4–6 mm, laterals ± 2 mm long, all very narrow, ± 1 mm; upper lip fairly

well-marked, often equalling lateral lobes. *Flowers* bright red; standard 3.5–4 cm long, basal auricles small, 1–2 mm; wings 4.5–6 × 1.2 cm, curved throughout length and narrowed gradually to acute tip, basal auricles large, 3–4 mm; keel usually slightly exceeding wings, 5.5–6.5 cm long, markedly curved throughout length. *Fruit* not seen; seeds said to be black and shiny, 'bean-like'. Fig. 12.

Endemic to Melanesia. Map 5.

BOUGAINVILLE. March 1936, *Voyce* 25 (A, K).

SOLOMON IS. Kolombangara: *Whitmore et al.* in BSIP 856 (K). New Georgia: *Waterhouse* 140A (K); *Woolford* s.n. (K); 1894–95, *H.M.S. 'Penguin'* s.n. (K). Santa Ysabel: *Sore et al.* in BSIP 2670 (K). San Cristobal: *Brass* 2734 (holotype A; isotype BM); *Comins* 62 (K); *Runikera et al.* in BSIP 10877 (K).

VANUATU. Pentecost Is.: Melsisi, *Cabalion* 2699 (K).

HABITAT. Seashore, littoral rainforest or lowland forest; sea level to low alt.

This species is rather distinct in being the only Pacific native with truly red flowers. Since fruit has not yet been described, its affinities are unclear, although it is very close to *M. bennettii* F. Muell. (Verdcourt 1979), a New Guinean endemic (occasionally cultivated in Tahiti and Hawaii) whose fruit is also undescribed.

INTRODUCED SPECIES

Four species have been cultivated in the region, three being natives of neighbouring areas.

A. Subgenus MUCUNA

i. *Mucuna bennettii* F. v. Muell., Descr. Notes Papuan Pl. 1: 63 (1876); St John, List Fl. Pl. Hawaii: 189 (1973); Verdcourt, Man. N. Guinea Leg.: 439 (1979).

Plant very similar to *M. elegans* with large very curved red flowers, differing only as follows: leaflets relatively larger, terminal usually over 11 cm long; calyx larger with longer lobes, lowest distinctly tail-like, at least 15 mm long. Fruit unknown. Cultivated in Tahiti: Papeari, Botanic Garden, 1982, *Guerin* 3998 (BISH) and said to be so also in Hawaii. Native to New Guinea. Fig. 13. Name persistently misapplied to *M. novoguineensis*; see note in Verdcourt (1979: 439). Fig. 13.

ii. *Mucuna miniata* Merr., Interpr. Rumph. Herb. Amboin.: 278 (1917).

Red-flowered species very similar to *M. bennettii* and possibly merely a form of the same species, differing only in size and relative proportions of leaflets, terminal up to 9 cm long, twice as long as wide (rather than, as in *M. bennettii*, usually over 11 cm long, 1½ times as long as wide). Fruit unknown. Cultivated in Hawaii: Oahu: Aiea, 4 Jan. 1962, *Weissich* s.n. (BISH). Native to Indonesia.

iii. *Mucuna novoguineensis* Scheff. in Ann. Jard. Buitenzorg 1: 18 (1876); Parham, Pl. Fiji Is.: 114 (rev. ed. 1972); St John, List Fl. Pl. Hawaii: 189 (1973); Verdcourt in Man. N. Guinea Leg.: 450 & fig. 104, 107A (1979); Seemann, Fl. Vit. Nov.: 211 (1985).



FIG. 13. *Mucuna bennettii*. A inflorescence & leaf; B calyx; C standard; D wing; E keel; F pistil. A from van Royen & Sleumer 5821; B-F from Millar NGF 12288. All $\times \frac{3}{2}$. Drawn by Eleanor Catherine.

M. kraetkei Warb. in Bot. Jahrb. 13: 329 (1891); St John, loc. cit. (1973).

Plant with large red flowers but distinct from above two species in rather narrower wings and keel, 4–7 mm wide (rather than 11 mm) and especially in calyx almost or completely lacking lobes, these represented at most by minute teeth 1 mm (rarely up to 4 mm) long. Fruit very long, 15–27 × 4–5.5 cm, linear-oblong, somewhat resembling that of *M. platyphylla* but lamellae hardly oblique, very low and ridge-like, marginal wings also narrow up to 1 mm. Seeds the largest known of any *Mucuna* species, ± discoid, 4 cm diam, 18 mm in thickness, black and smooth; at first soft, germinating almost as soon as pods open and apparently (*M. J. E. Coode*, pers. comm.) very short-lived—though how it was transferred from New Guinea to botanic gardens elsewhere before the days of aeroplanes is not known. Cultivated in Hawaii: Oahu: Honolulu: Gardens, 2 April 1961, *Potter* s.n. (BISH); Pacific Huts Road, 30 April 1964, *Anthony* s.n. (BISH, US); Hawaii: Hilo, 6 May 1961, *Rock* s.n. (BISH).

B. Subgenus STIZOLOBIUM

Annual or somewhat woody, pods sometimes longitudinally ribbed, seeds compressed, oblong-ovoid, with a very short hilum surrounded by a conspicuous rim-aril.

iv. *Mucuna pruriens* (L.) DC. var. *utilis* (Wall. ex Wight) Bak. ex Burck in Ann. Jard. Buitenzorg 11: 187 (1893); Wilmot-Dear in Kew Bull. 39: 63 (1984) & 42: 45 (1987) q.v. for list of synonyms. Widely referred to in Pacific Literature (under many different synonyms) as follows: Drake del Castillo, Ill. Fl. Insul. Maris Pacif. 152 (1890) & Fl. Polynésie franç.: 49 (1893); Rock, Leg. Pl. Hawaii: 197 & 199 (1920) (as *M. aterrima* & *M. pachylobia*); Guillaumin, Fl. Nouv. Cal. Phan.: 148 (1948) (as *M. utilis*); Whitmore, Guide to For. of Brit. Sol. Is.: 192 (1966); Sykes, Contrib. Fl. Niue: 157 (1970); Stone, Fl. Guam: 338 (1970); St John, List Fl. Pl. Hawaii: 189 (1973) (as *M. aterrima*, *M. cochinchinensis*, *M. deeringiana*, *M. hassjoo* & *M. pachylobia*); Parham, Pl. Fiji Is.: 114 (rev. ed. 1972) (as *M. aterrima*); Mackee, Pl. Introd. Cult. New Cal.: 82 (1985); Smith, Fl. Vit. Nov. 3: 210 (1985).

For description see Wilmot-Dear, loc. cit. (1984 & 1987). Widely cultivated: Solomon Is: Guadalcanal: *Leach* BSIP 14621 (K). New Caledonia: no material seen. Fiji: Macuata, *J. W. P., D. K. et al.* 16686 (BISH). ?Samoan Is. & ? Micronesia: no material seen, recorded as no longer present. Hawaiian Is: Oahu: 1916, *Rock* s.n. (BISH, US); 1947, *Kopf* s.n. (BISH).

UNPLACED SPECIMENS

A few collections from the Pacific exist whose identity cannot be ascertained, as follows:

VANUATU, Espiritu Santo: May 1965, *Schmid* 269 (P): stem, leaves and inflorescences resembling those of *M. gigantea* but flower-colour stated to be purple.

NEW CALEDONIA, Loyalty Is., Lifu: 1878, *Whitmee* s.n. (BM): single, falsely-racemose inflorescence, apparently arising from old wood; secondary (flower-bearing) axes 5 mm long; calyx tube 10 × 22 mm, lobes ± 10–20 ×

10 mm; flowers large, ± 6 cm long, wings and keel somewhat curved; flowers somewhat resembling *M. platyphylla* but form of inflorescence and proportions of calyx rather different; the only collection seen from this area, therefore possibly new but material insufficient for certainty.

MICRONESIA, Caroline Is., Ponape: Nov. 1947, *Riesenberg* 78 (BISH): vegetative material resembling *M. gigantea* but flowers (not collected) stated to be purple; fruit (not collected) said to be 'like bean pods'.

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