

A revision of *Mucuna* (*Leguminosae-Phaseoleae*) in China and Japan

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Summary. An account of sixteen named (and four undescribed from Yunnan) species of *Mucuna* Adans. found in China and Japan is offered, with keys and distribution maps. One new species, *M. lamellata*, is described. All specimens cited have been seen.

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

Stizolobium P. Br., Hist. Jamaica: 290 (1756).

Citta Lour., Fl. Cochinch.: 456 (1790).

Carpopogon Roxb., Hort. Beng.: 54 (1814); Fl. Ind. ed. Carey 3: 283 (1832).

Herbs, woody lianas or (rarely) erect shrubs. Leaves pinnatifid, trifoliolate, lateral leaflets \pm asymmetrical, stipules and often stipels deciduous. Inflorescences axillary on leafy shoots or on old branches, subumbellate, condensed-paniculate or falsely racemose through reduction of lateral branches (in China and Japan always extremely reduced); bracts and bracteoles deciduous. Flowers showy, purple, red, greenish, yellow or white. Calyx 4–5-lobed, 2-lipped, upper pair of lobes connate to form entire or bifid lip. Standard rounded with median claw and pair of inflexed lateral auricles at base, usually much shorter than other petals; both wing and keel narrowed into basal claw with small dorsal auricle; keel petals partially connate along lower margin, usually horny, often pale and hooked, at apex. Vexillary stamens free; 5 longer sub-basifixed anthers alternating with 5 shorter versatile or dorsifixed often barbate anthers on apically swollen filaments. Ovary few—to several—(c. 12–) ovuled; style long; filiform, sometimes pubescent but not bearded, bent; stigma small, terminal. Fruit ovoid, oblong or linear, valves thick and often ribbed or ornamented with raised lamellae and frequently with irritant bristles, septate or apparently so between seeds, mostly dehiscent but sometimes not opening, margins often winged; seeds globose or oblong with short or linear hilum and conspicuous rim-aril or larger, discoid to oblong with elongated hilum occupying over $\frac{1}{2}$ circumference and no aril.

The sixteen accepted species found in China and Japan, including one considered new, are described below. Of these, ten are endemic to the region, (the majority restricted to parts of southern China), three also found in the eastern Himalayas and/or Burma and Indochina; only two, *M. gigantea* and *M. pruriens*, are more widespread. In addition details are given of a further four probable new species, and it will be noted that these, as does *M. interrupta*, a new record for China, all come from Yunnan, an area as yet little represented in Western herbaria; it seems likely that future collections here will produce further hitherto unknown species.

KEYS TO SPECIES OF *MUCUNA* IN CHINA AND JAPAN

A. *Flower characters* (excluding *M. cyclocarpa* and 'sp.B' for which no flowers seen)

1. Mature leaves with dense pale silky hairs beneath, conspicuously sparser on lateral veins 2
 Mature leaves glabrous or variously hairy with hairs at least as dense on veins 4
2. Terminal leaflet relatively narrow, (length:width ratio over 4:2, usually 5:2), with very well-marked acumen 1–2 cm long, 2 mm wide for most of length; hairs beneath \pm 1 mm long, always closely adpressed and rather fine, very silvery, giving surface a very marked gleaming silvery silky appearance **7. calophylla**
 Terminal leaflet relatively broad, (length:width ratio 6–7:4), acumen absent or rarely up to 5 mm long, narrowing rapidly; hairs beneath often short and erect but even if long then coarser, less closely adpressed and slightly yellowish, surface therefore gold-tinged and less silky 3
3. Hairs beneath leaves \pm 1 mm long; lowest calyx lobe 8–10 mm long, wing 4×1.4 cm, almost as long as keel **20. sp. 'A'**
 Hairs beneath leaves less than 0.5 mm long; lowest calyx lobe (3–)5–6 mm long, wing $2.5\text{--}3.3 \times 0.6\text{--}0.8$ cm conspicuously shorter than keel **18. bracteata**
4. Standard and wings with margin ciliate in apical region up to $\frac{1}{4}$ or $\frac{1}{3}$ length 5
 Standard and wings with margin completely eciliate or ciliate only in basal $\frac{1}{3}$ 10
5. Flowers 5.5–6.5 cm long, standard greenish white, wings and keel reddish or purple; wing 3–5.2(–5.6) cm long, (length:width ratio 5–7:2); no persistent stipels **4. macrocarpa**
 Flowers 7–9 cm long, purple, red or whitish; wing 6–7 cm long, width various; stipels persistent or not 6
6. Persistent stipels present; standard 4.5–5 cm long, wing relatively broad, (length:width ratio 5–6:2); corolla purple **11. macrobotrys**
 Persistent stipels absent; standard usually 4 cm long or less, wing relatively narrower, (length:width ratio often 4:1 or more); corolla purple or white 7
7. Leaflets glabrous or very sparsely pale-hairy beneath, often drying markedly pale green; length:width ratio of terminal leaflet (2–)3–4:1; corolla greenish white **1. birdwoodiana**
 Leaflets with abundant to dense often coloured hairs beneath, drying brownish-green or black; length:width ratio of terminal leaflet usually 6–7.4; corolla purple or white 8
8. Indumentum of leaflets red-brown; corolla purple with whitish standard **4. macrocarpa** (large-flowered form)
 Indumentum of leaflets pale; corolla purple or white 9
9. Corolla purple, lowest calyx lobe short (up to 6 mm) and broad; terminal leaflet apex acute, subacuminate with thickened tip .. **2. terrens**
 Corolla whitish (but see note on p. 36), lowest calyx lobe (7–) 10 mm long; terminal leaflet apex very broadly rounded with abrupt apiculus **3. bodinieri**

10. Flowers crowded in upper $\frac{2}{3}$ of axis or less 11
 Flowers equally spaced throughout axis length 17
11. Lower (flowerless) part of axis with conspicuous bracts and scars; leaflets thickly chartaceous or coriaceous, markedly paler (greenish grey) beneath in dry state and with midrib and veins conspicuously stout, dark, prominent and less pubescent than surface. **18. bracteata**
 Lower (flowerless) part of axis without bracts or scars; leaves more thinly chartaceous or membranous, not markedly discoloured, venation not conspicuously stout nor less pubescent 12
12. Flowers white, crowded into upper $\frac{1}{4}$ of axis or less, forming \pm a corymb or almost so 13
 Flowers purple or white, only in upper $\frac{2}{3}$ of axis or less but forming a raceme, not a corymb 14
13. Pedicels 1.5–2 cm long, lower calyx teeth up to 3 mm long, relatively short, flowers up to 4.4 cm long; leaflets relatively wide, (length:width ratio of terminal usually less than 2:1) **16. gigantea**
 Pedicels less than 1 cm long, lower calyx teeth 5–10 mm long, often equalling tube, flowers over 5 cm long; leaflets relatively narrow, (length: width ratio of terminal over 2:1) **17. sp. 'D'**
14. Wing with abundant long adpressed hairs 1–2 mm long in upper $\frac{2}{3}$ of inner surface; terminal leaflet usually angular, rhombic. **15. lamellata**
 Wing glabrous except for short hairs in claw region; leaflets usually with curved outline, elliptic, rarely rhombic-ovate 15
15. Keel 5–5.7 cm long; pedicels 8–10 mm long **9. interrupta**
 Keel 3.5–4.3(–4.5) cm long; pedicels 2–4 mm long 16
16. Calyx with lateral teeth large, $\pm 6 \times 5$ mm, lowest tooth 8–10 \times 4–5 mm, broad, (ratio of lowest:laterals less than 2:1); keel apex very claw-like and convex, shiny on both faces in apical 1 cm; leaflets beneath with dense adpressed pale hairs ± 1 mm long .. **20. sp. 'A'**
 Calyx with lateral teeth smaller, 2–4 \times 1.5–3 mm; lowest tooth relatively longer and much narrower, 6–10 \times 2–3 mm, (ratio of lowest: laterals usually 2–3:1); keel apex less claw-like; leaflets beneath glabrous or with short pubescence **19. pruriens**
17. Length of keel 4.8–7 cm 18
 Length of keel 3.5–4.3 cm 22
18. Wing with fairly abundant long adpressed hairs on inner surface in addition to very short ones in claw region **12. sp. 'C'**
 Wing glabrous except for very short hairs in claw region 19
19. Persistent stipels absent; length:width ratio of wing 2–3:1, wing apex \pm acute and horny, usually shiny and often pale; keel (5.3–) 6–7 cm long **6. sempervirens**
 Persistent stipels present; length:width ratio of wing usually 4–5:1, apex not horny, rarely extreme tip slightly pale, usually \pm rounded; keel up to 5.7 cm long 20
20. Wing relatively wide, ± 2 cm wide; leaflets rather angular in outline, terminal rhombic-ovate or rhombic-elliptic, narrowing gradually to evenly tapering acumen and relatively broad, (length:width ratio \pm 3:2) **10. membranacea**
 Wing narrow, up to 1.3 cm wide; leaflets very rounded in outline, terminal elliptic or slightly obovate, narrowing abruptly to short wide rounded acumen and often relatively narrower, (length:width ratio (3–)4–5:2) 21

21. Flowers white or purple; bracts very broad 2.6–3.2 cm wide, calyx tube very broad \pm 2 cm, lower teeth broadly triangular, lowest (10–)12–13 \times 6 mm, upper lip apiculate; leaflet with 5–7 primary veins (Yunnan) **9. interrupta**
 Flowers purple; bracts and calyx tube less broad, up to 2 cm and 1–1.5 cm wide respectively, lower teeth narrower, lowest 5–10 \times 4 mm, upper lip slightly cleft; leaflet with 3–5 primary veins (Hong Kong, Hainan) **8. nigricans**
22. Persistent stipels absent; terminal leaflet relatively narrow, (length:width ratio (4–)5:2), apex with very marked acumen of 1–2 cm long **7. calophylla**
 Persistent stipels present; terminal leaflet usually relatively wide, length:width ratio rarely over 7:4, apex shortly, or not at all, acuminate 23
23. Flowering pedicels 8–20 mm long 24
 Flowering pedicels 2–4 mm long 25
24. Wing \pm 2 cm wide; calyx upper lip well-marked, narrowing abruptly to acute apex; leaflets rather angular in outline, terminal rhombic-ovate or rhombic-elliptic narrowing gradually to evenly tapering acumen, laterals markedly asymmetrical, width of abaxial half usually 2 \times that of adaxial **10. membranacea**
 Wing up to 1.2 cm wide; calyx upper lip with relative length variable but apex cleft to \pm 1 mm; leaflets very rounded in outline, terminal elliptic or slightly obovate narrowing abruptly to wide rounded acumen, laterals less markedly asymmetrical, width of abaxial rarely over 1½ \times that of adaxial **8. nigricans**
25. Pedicel and leaflet underside, especially on veins, with fine red-brown hairs; width of abaxial half of lateral leaflets approximately 1½ \times that of adaxial **13. championii**
 Pedicel and leaflet underside glabrous or with pale hairs (sometimes also with red-brown bristles on pedicel); lateral leaflets often very asymmetrical with width of abaxial half 2–3 \times that of adaxial ... 26
26. Calyx with lateral teeth large, \pm 6 \times 5 mm, lowest tooth 8–10 \times 4–5 mm, broad, length less than 2 \times that of laterals; keel apex very claw-like and convex, shiny on both faces in apical 1 cm; leaflets beneath with dense adpressed hairs \pm 1 mm long **20. sp. 'A'** p. 64
 Calyx with lateral teeth smaller, 2–4 \times 1.5–3 mm, lowest tooth relatively longer and much narrower, 6–10 \times 2–3 mm, length usually 2–3 \times that of laterals; keel apex less claw-like; leaflets beneath glabrous or with short pubescence **19. pruriens**

B. *Fruit characters* (excluding *M. bodinieri*, sp. 'A', sp. 'C' & sp. 'D' for which no fruit seen). (Figs. 1–3).

1. Mature leaves with dense pale silky hairs beneath conspicuously sparser on primary veins 2
 Mature leaves glabrous or variously hairy with hairs at least as dense on veins 3
2. Terminal leaflet relatively narrow, (length:width ratio (4–)5:2), with very well-marked acumen 1–2 cm long and 2 mm wide for most of length; hairs beneath adpressed \pm 1 mm long ... **7. calophylla**

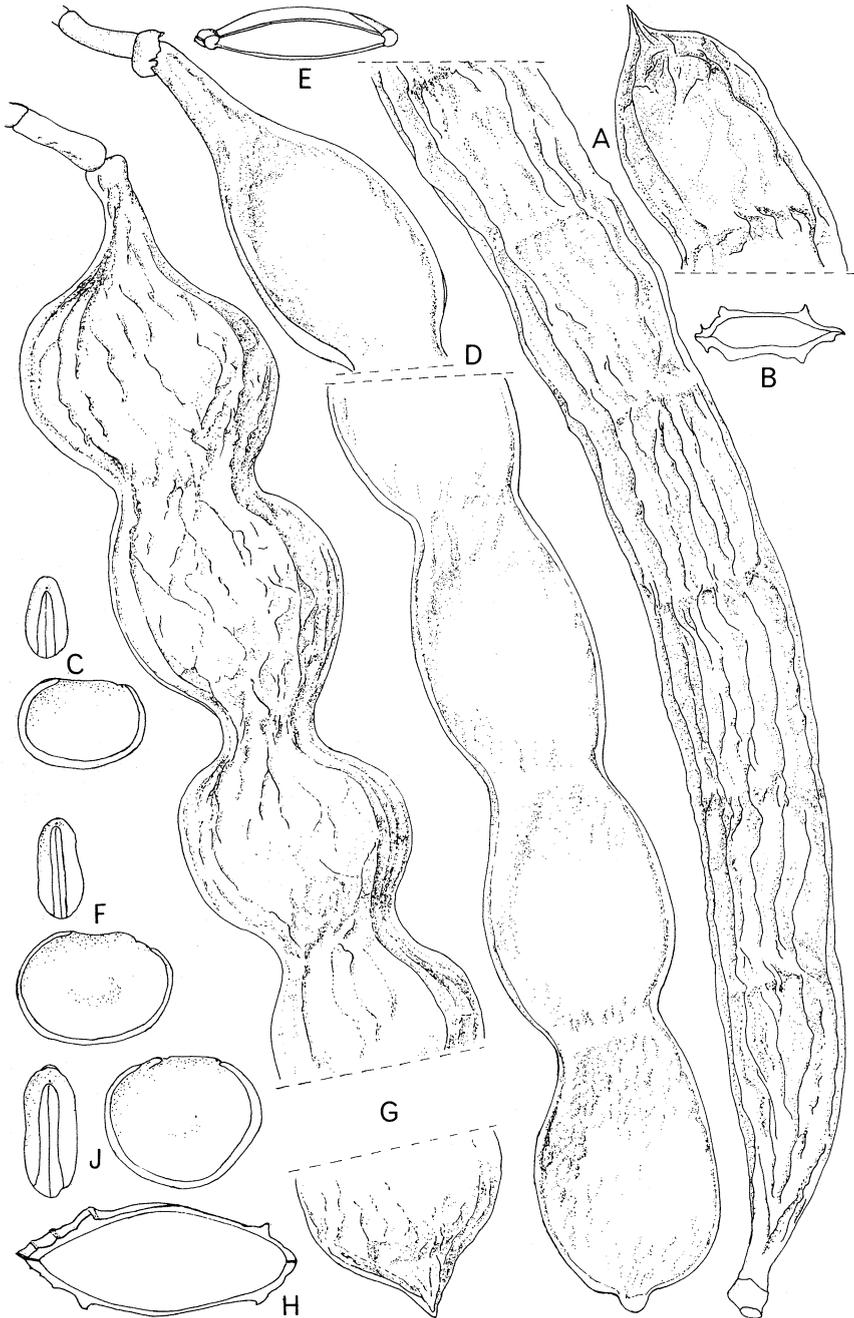


FIG. 1. *Mucuna* pods and seeds. **A-C** *M. terrens*: **A** pod (9 segments omitted), **B** transverse section, **C** seed; all from *Cavalerie* 3782. **D-F** *M. sempervirens*: **D** pod (4 segments omitted), **E** transverse section, **F** seed; all from *Wilson* 3411. **G-J** *M. macrocarpa*: **G** pod (5 segments omitted), **H** transverse section, **J** seed; all from *Henry* 13679. All $\times \frac{2}{3}$. Drawn by author.

- Terminal leaflet relatively broad, (length:width ratio 6–7:4) acumen absent or rarely up to 5 mm long, narrow; hairs beneath short, often erect **18. bracteata**
3. Pod coriaceous or fleshy, of varied shape, with or without oblique lamellae projecting from surface; usually less than 18 cm long when mature 4
 Pod woody, linear, often torulose; always without projecting lamellae; usually at least 30 cm long when mature 17
4. Pod with 8–16 conspicuous oblique lamellae 3–5 mm wide; margins winged 5
 Pod without lamellae arising from surface but with or without wrinkles or winged margin 13
5. Stem, petiole and leaves glabrous or with sparse pale hairs, pod size and shape various 6
 Stem (at least when young), petiole and leaves below with ferruginous hairs, dense on veins, abundant or dense on surface; pod over 16 cm long when mature; torulose **13. championii**
6. Pod length:width ratio 4:1, pod up to 10 cm long, wing up to 4 mm wide; sides parallel or almost so 7
 Pod length:width ratio 2–3:1 or if 4:1 then pod at least 16 cm long or sides markedly not parallel, or wing at least 1 cm wide 8
7. Pod with septa clearly visible as marked indentations, seeds not markedly flattened, almost spherical **14. cyclocarpa**
 Pod with septa just visible as indefinite indentations, seeds markedly laterally flattened to half length of longest plane **15. lamellata**
8. Pod apex obtuse, usually rounded; lamellae often thick and robust, always erect, bifurcating at apex, 'T'-shaped in section; all lamellae discontinuous giving pod a marked median gap running from apex to base crossed by no lamella **9. interrupta**
 Pod apex acute; lamellae thin, often fragile, often partly adpressed, not dividing to give 'T'-shaped section; if discontinuous, joined or branched near centre then always without a clear median gap 9
9. Pod length:width ratio 2:1, pod oblong, usually asymmetrical, often with both sides convex, sides never parallel 10
 Pod length:width ratio 3–4:1, pod linear or slightly curved, sides \pm parallel in outline, (swollen around seeds or not) 11
10. Pod with at least some lamellae joined or branched in centre, basal and sometimes apical $\frac{1}{2}$ of terminal leaflets with rather straight outline **10. membranacea**
 Pod lamellae never branched, some short or discontinuous, majority continuous; terminal leaflets with very curved outline **8. nigricans** var. **hainanensis**
11. Pod less than 2.5 cm wide; leaflets with rather straight outline, the terminal leaflet rhombic or rhombic-ovate **15. lamellata**
 Pod at least 4 cm wide; leaflets with curved outlines, the terminal leaflet elliptic or slightly obovate 12
12. Lower (abaxial) margin of pod with wings $\frac{1}{2}$ (– $\frac{4}{5}$) \times the width of the upper (adaxial); terminal leaflet 13–15 \times 7.5–8.5 cm **11. macrobotrys**

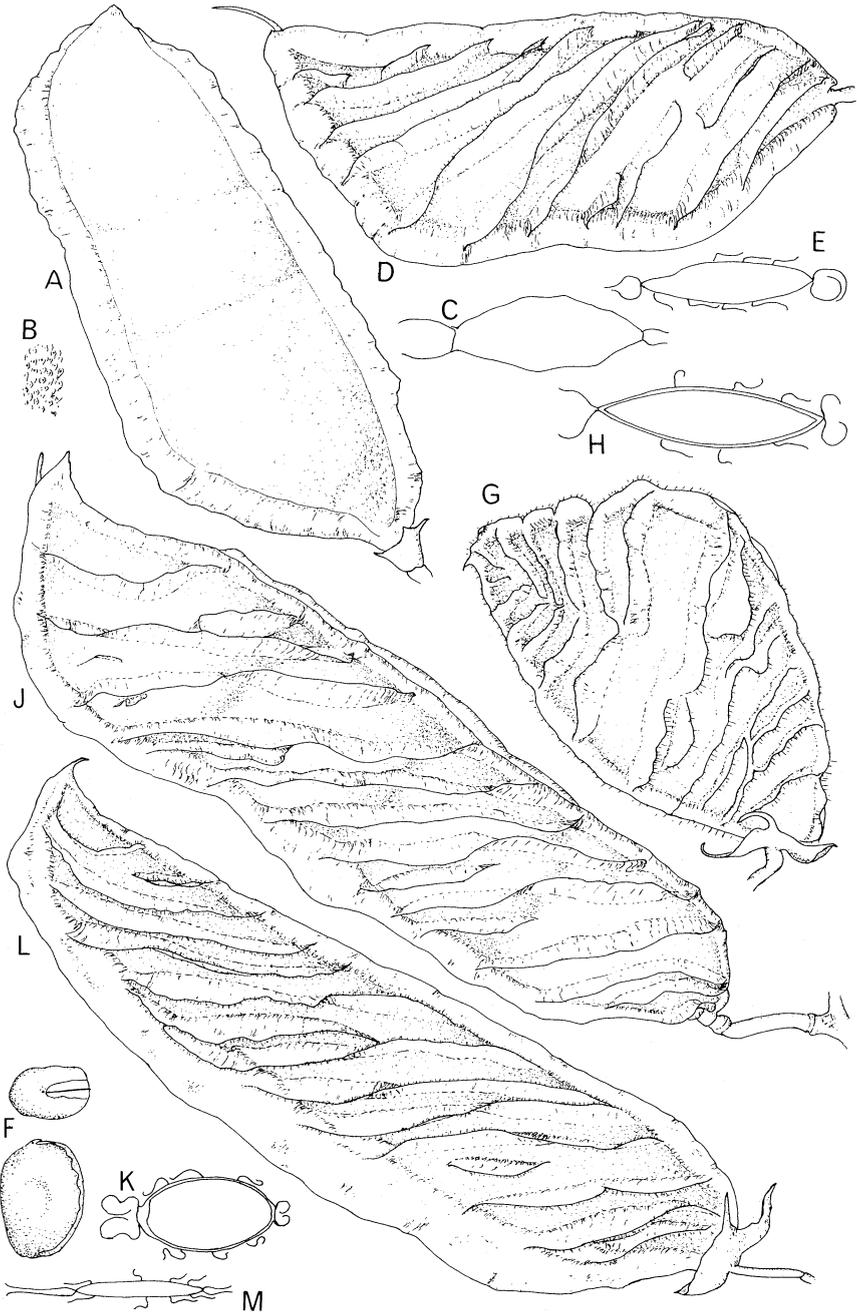


FIG. 2. *Mucuna* pods and seeds. A-C *M. gigantea*: A pod, B detail of surface, C transverse section; all from *Hidemasa Otomo* s.n. D-F *M. nigricans*: D, E var. *hainanensis*: D pod, E transverse section; from *Lei* 581, F var. *hongkongensis*, seed, from *Barretto* 199. G, H *M. membranacea*: G pod, H transverse section; from *Yamazaki* 328. J, K *M. championii*: J pod, K transverse section; from *Champion* 597. L, M *M. macrobotrys*: L pod, M transverse section; from *Wright* s.n. All $\times \frac{2}{3}$. Drawn by author.

- Lower and upper margins of pod with wings of \pm equal width; terminal leaflet usually smaller, 4.5–10.5(–16) \times 2.5–5(–9) cm
13. Length:width ratio of mature pod 2–3:1, width never less than 4 cm; pod coriaceous with marginal wing 0.5–0.7 cm wide; surface glabrous or sparsely hairy with fine and regular reticulate pattern of raised lines, so fine as to give a ‘pitted’ appearance **8. nigricans** var. **hongkongensis**
- Length:width ratio of mature pod at least 4–6:1; pod fleshy or coriaceous, with or without margin thickened and sometimes raised into a small ridge but never winged; surface often invisible beneath dense hair covering, where visible wrinkled or with irregular much coarser patterning of raised lines, never ‘pitted’ 14
14. Mature pod \pm coriaceous, 13–15 cm long, surface clearly visible beneath covering of short erect hairs and longer deciduous irritant bristles; terminal leaflet relatively narrow, (length:width ratio (4–)5:2), with very distinct acumen 1–2 cm long **7. calophylla**
- Mature pod fleshy, 5–9 cm long, surface usually nearly invisible beneath dense covering of silky hairs or long deciduous irritant bristles; terminal leaflet length:width ratio usually only 3:2, acumen absent or rarely short and acute up to 0.5 cm long 15
15. Pod with silky hairs, pale, not rigid or irritant; calyx with short pale hairs, rarely also with a few longer hairs but without longer irritant bristles **19. pruriens** var. **utilis**
- Pod with dense ferruginous or brown rigid deciduous irritant bristles; calyx with short brown hairs and often irritant longer bristles . . . 16
16. Lower $\frac{1}{3}$ of infructescence always without fruit but with bract scars or with bracts still present; leaflets quite thickly chartaceous or \pm coriaceous, markedly discolourous, pale greenish grey below in dry state; midrib and veins conspicuously stout, dark, prominent and less pubescent than surface **18. bracteata**
- Lower part of infructescence fruit-bearing or if not then without bract-scars, bracts always deciduous from infructescence; leaflets much thinner, chartaceous or membranous, not or only slightly paler below, venation not stout, dark or less pubescent than surface
17. Each pod margin with a pair of thick woody wings 3–5 mm wide of \pm even width and with definite edges; pod markedly torulose, each segment \pm oval with rounded apex and base **1. birdwoodiana**
- Each pod margin unwinged, at most wrinkled into thickened irregular ridge only up to 2 mm wide and then pod not torulose, segments more or less rectangular in outline 18
18. Pod glabrous or with dense short erect red-brown pubescence, markedly torulose, width at septa between seeds usually $\frac{1}{2}$ – $\frac{2}{3}$ width at widest point; leaves chartaceous or membranous 19
- Pod glabrous, not torulose, with only slight swelling around seeds, segments \pm rectangular, apical and basal edges \pm straight; leaves quite thick, rather coriaceous **2. terrens**
19. Mature pod surface with rather fine, conspicuous (but not prominent) reticulate patterning, firm rounded raised margin and fine hairs; leaflets with reticulate venation fine and prominent, coarse reticulation often hardly distinct from fine, indumentum never dense
- **6. sempervirens**

- Mature pod surface without firm rounded raised margin; wrinkled or with coarse, prominent rugose-reticulate patterning; often without fine hairs; leaflets with fine reticulate venation not prominent, partially visible, distinct from coarse reticulation, indumentum sometimes dense 20
20. Leaves with persistent stipels **5. sp. 'B'**
 Leaves without persistent stipels **4. macrocarpa**

A. SUBGENUS MUCUNA

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

1. *Mucuna birdwoodiana* *Tutcher* in J. Linn. Soc. 37: 65 (1904); Dunn, Suppl. List Chinese Pl. in J. Linn. Soc. Bot. 39: 469 (1911); Dunn & Tutcher, Fl. Kwangtung & Hongkong (China), Kew Bull. Addit. Series 10: 83 (1912); Merrill in Lingnan Sci. Journ. 13: 30 (1934); Rehder in Journ. Arn. Arb. 18: 208 (1937); Icon. Cormophyt. Sin. 2: 497, fig. 2723 (1972); Agric. Fish. Dept. Bull. 1, Check List Hongkong Pl. ed. 5: 33 (1978); Ding Hu Shan Herb., Handb. Pl.: 236 (1978). Type: Hongkong, Mt Gough, *Tutcher* 980 (holotype K!).

Climber, often large and scrambling widely over surrounding trees and shrubs, woody or semi-woody, diameter up to 5 cm at height of 10 m; bark brownish or light grey, younger stems with many longitudinal grooves, lenticels brown, prominent; glabrous or with fine but rigid adpressed pale hairs at nodes. *Leaves* 17–30 cm long; stipules 6×1.5 mm, sparsely adpressed-hairy outside, very early deciduous; terminal leaflet elliptic, ovate or slightly obovate, usually rather long and narrow, $9-14 \times 2-7$ cm, apex with acumen of up to 1.3 cm, extreme tip abruptly or gradually narrowing to apiculus, base rounded or very slightly cuneate; lateral leaflets very asymmetrical, 9–14 cm long, abaxial half 2.4–4.5 cm wide, base rounded or slightly cordate, adaxial 1.1–2.5 cm wide. All leaflets: lateral veins 3–5, curving, becoming indistinct or arching and joining near margin, midrib, lateral veins and coarse reticulation prominent both sides, fine reticulation prominent below, sometimes visible above; \pm glossy, often drying pale green, usually coriaceous and rather thick, rarely membranous; glabrous both sides or with sparse thin light brown hairs especially or only on veins; petiole 4.5–13 cm, rhachis 1.9–4 cm, petiolules 4–8 mm with sparse short erect stiff brown hairs and sometimes longer reddish bristles, rhachis and petiole sometimes similarly hairy; no persistent stipels. *Inflorescence* borne in leaf axils or on old wood, 12–30 cm long, sidebranches 4–9, distant, usually 3-flowered; pedicels 1–1.5 cm long, pedicels and axis with sparse or dense adpressed dark brown hairs and often longer coarser paler hairs; bracts and bracteoles very early deciduous, not seen. *Calyx* with short dense adpressed light brown hairs outside and (longer and paler) inside and scattered or dense red-brown coarser deciduous bristles outside, tube fairly broadly cup-shaped, 1–1.4 cm long, 1.5–2.5 cm wide, 2 lateral teeth broadly or narrowly triangular 5–8 mm long, lowest tooth very narrowly triangular 5–15 mm long often twice as long as laterals, upper lip broadly triangular, usually well-marked and often equalling laterals, apex not emarginate. *Corolla* greenish white; standard 3.3–4(–5) cm long, $\pm \frac{1}{2}$ keel length, apex rounded, basal auricles 4 mm

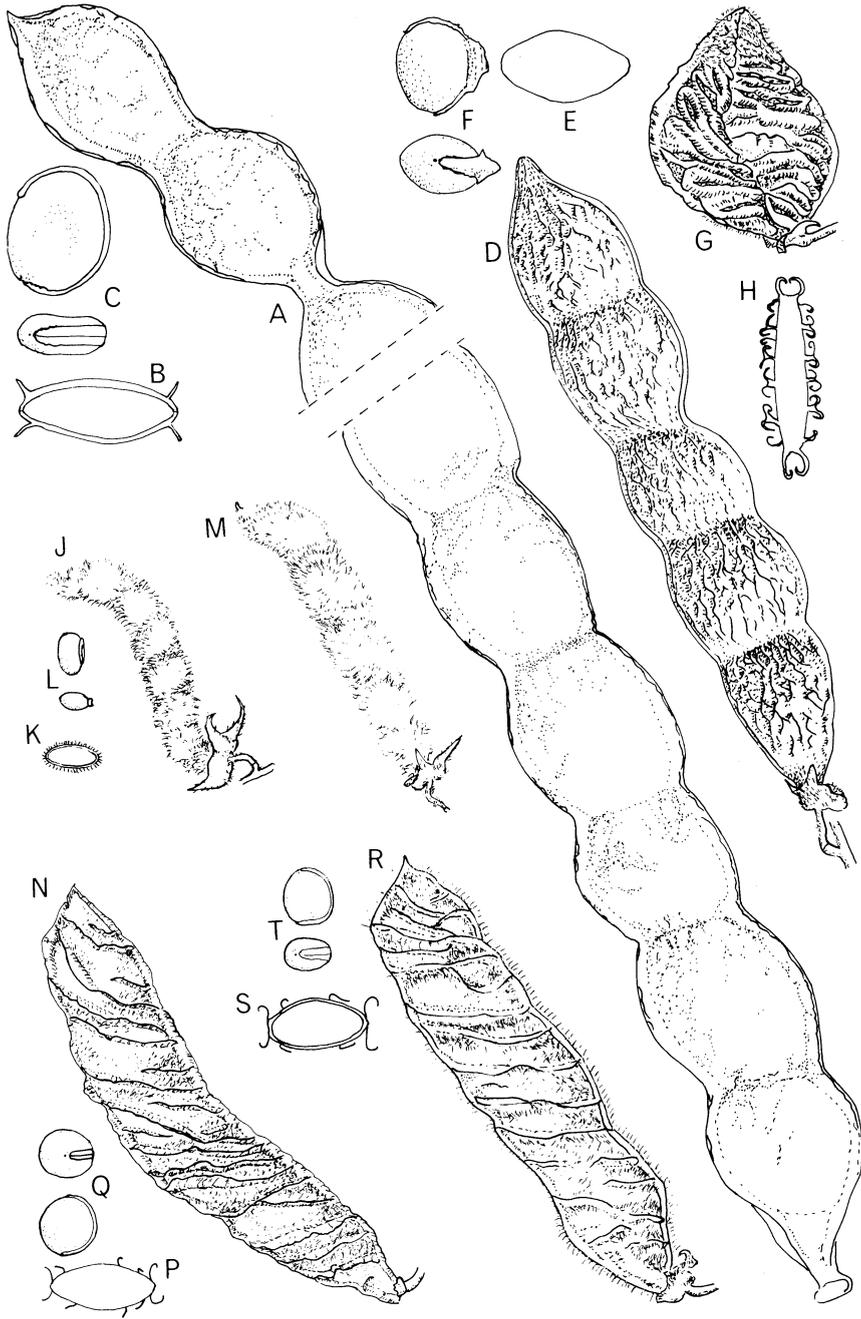
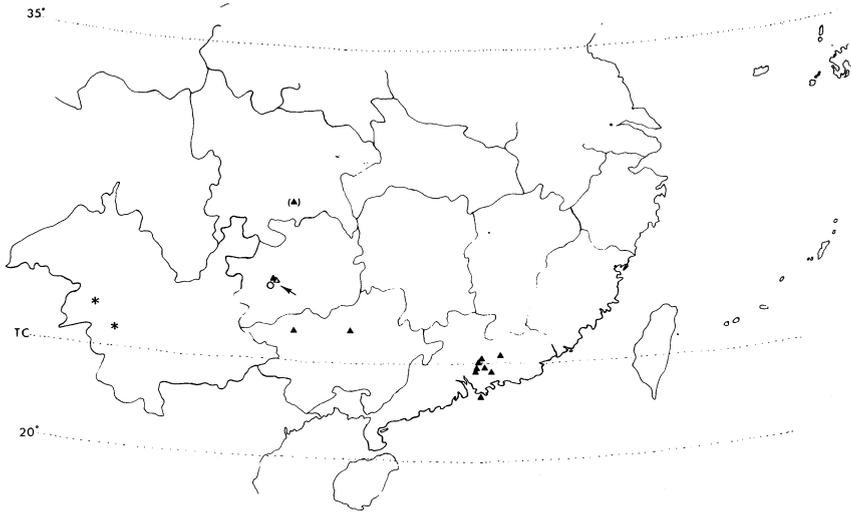


FIG. 3. *Mucuna* pods and seeds. **A–C** *M. birdwoodiana*: **A** pod (2 segments omitted), **B** transverse section; from *Hu* 6477; **C** seed, from *Tsang* 28587. **D–F** *M. calophylla*: **D** pod, **E** transverse section, **F** seed; all from *Delavay* 1977. **G, H** *M. interrupta*: **G** pod, **H** transverse section; from *Wang* 80655. **J–L** *M. pruriens* var. *pruriens*: **J** pod, **K** transverse section, **L** seed; all from *Henry* 13499. **M** *M. bracteata* pod, from *Henry* 12749A. **N–Q** *M. cyclocarpa*: **N** pod, **P** transverse section, **Q** seed; all from *Wang-Te-Hui* 334. **R–T** *M. lamellata*: **R** pod, **S** transverse section, **T** seed; all from *Chung* 83685. All $\times \frac{2}{3}$. Drawn by author.



MAP 1. Distribution of *Mucuna birdwoodiana* ▲; *M. terrens* △ (arrowed); *M. bodinieri* ○ and *M. interrupta* * in China; (absent from Ryukyus and Western Japan). Brackets () indicate exact locality uncertain; TC—Tropic of Cancer.

long, margin in apical $\frac{1}{3}$ – $\frac{1}{2}$ with short conspicuous brown cilia longest around apex; wings 6.2–7.1 \times 1.5–2 cm, $\frac{3}{4}$ – $\frac{5}{6}$ keel length, apex rounded, base with claw of 8 and auricle of 5 mm, margin in apical half ciliate as standard, claw region with short dense light brown hairs on both surfaces; keel 7.5–8.5 cm long, basal claw 7–8 mm and auricle less than 1 mm long often shortly densely brown-hairy, apex horny to 1.2–1.8 cm. *Staminal tube* 5.5–6.5 cm long. *Style* hairy in lower part, ovary with short erect dense dark brown hairs. *Fruit* woody, linear, torulose, slightly curved, laterally flattened, \pm acute at apex, 31–45 \times 3.5–4.5 \times 1–1.5 cm, with short erect dense red-brown, golden or dark hairs almost velvety especially when immature and often sparse red-brown deciduous stiff bristles, also raised reticulate pattern of lines; 5–11-seeded, internal septa woody up to 4 mm thick, visible externally as transverse grooves; margin with pair of thick woody wings 3–5 mm wide. *Seeds* dark purplish black, \pm discoid, flattened, 2.8 \times 2 cm \times 8–10 mm, often glossy, smooth; hilum encompassing over $\frac{3}{4}$ of circumference, black with brown scurfy covering. (Fig. 3A–C).

CHINA. Endemic. Map 1. Sichuan: inter Lomapu et Tu yung pu, May 1910, *Schneider* 1733 (A). Guizhou: Gan-Chouen, *Cavalerie* 3910 (E, P) & 7157 (K). Guangxi: Ling Wan district, 19 June 1937, *S. K. Lau* 28436 (A). Guangdong: Chu Feng Shan, 9 June 1928, *R. C. Ching* 5874 (A); Lo Fu Shan [Lo Fau Shan]: *N. K. Chun* 40387 & 43098 (IBSC), *Levine* 1536 (E), *Levine, McClure & Ah To* 6817 (A), *Merrill* 11062 (A, HK), *Metcalfe & Lau Fun* 18276 (A), 19 Sept. 1892, *U. On* s.n. (HK) & *T. M. Tsui* 45 (A, K) & 97 (K); Taai Leng Shan, *S. Y. Lau* 20091 (IBSC); Nam Kwan Shan, *W. T. Tsang* 20285 (A, K); Kau Lung Fung, *Tsang* 20038 (A), Sam Kok Shan, *Tsang* 20607 (A, K) & Kwai Shan, *Tsang* 28587 (A); Pak-Wan Cheung, *T. M. Tsui* 110 (A, P). Hongkong: *Chan & Chan* 47 (P); Mt Parker, *Ford* 71 (K) & s.n. (BM); Little Hongkong, *Ford* 1767 (A); Ma On Shan, *S. Y. Hu* 6475 (K); Mt Gough: *H. C.*

Tang 1710 (HK), & *Tucher* 980 (holotype K) & 7260 (HK); Mt Parker, *Tucher* 1054 (HK, K); Shek Kong, *Wu & Wu* 385 (A, P). New Territories: Tai Mo Shan: *Hu* 9947 & 12110 (K) & *H. C. Tang* 2433 (HK); Tai-Po-Kau, *Y. S. Lau* 1106, 1176 & 2852 (HK); Shing-Min Reserv., *Lau* 424 (HK). Without locality: [?Guizhou] 8 May 1895 *Bodmier* s.n. (E); *W. Y. Chun* 6698 (A, E).

HABITAT. Dense or light woodland, rocky areas, wet hillsides, ravines, streamsides; sometimes common; 800–2500 m.

2. *Mucuna terrens* *H. Lév.* in Fedde, Repert. 13: 264 (1914); Rehder in Journ. Arn. Arb. 13: 331 (1932). Type: Guizhou, *Cavalerie* 2974 (holotype E!).

M. corvina Gagnep. in Lecomte, Not. Syst. 3: 28 (1914); *H. Lév.*, Fl. Kouy Tcheou: 240 (1914–15) (with *M. terrens* as synonym though is earlier name by 9 days). Types: Guizhou, *Cavalerie* 3782 (syntype P!; isosyntypes E! K!; part of syntype A!) & 3784 (not ?3785 as in *descr.*) (syntype P!; ? isosyntype K!; part of syntype A!).

Very large woody climber; stems with prominent longitudinal ridges and sparse short weak \pm erect pale hairs. *Leaf* 21–23 cm long; stipules deciduous, not seen; terminal leaflet broadly elliptic or very slightly obovate, 11.2 \times 8 cm, apex acute subacuminate, extreme tip thickened and rounded, base slightly cuneate; lateral leaflets very asymmetrical, 10–11.5 cm long, abaxial half 5–6 cm wide with truncate base, adaxial 2.8 cm wide. All leaflets: lateral veins 5–6, slightly curved and running into margin, thin but prominent above, very prominent below, coarse reticulation scarcely visible above, prominent below, fine reticulation visible below; thickly chartaceous, glabrous above, with abundant very short weak \pm adpressed pale shiny hairs beneath; petiole 7–10.5 cm, rhachis 2 cm, petiolules 5–6 mm, all with short hairs as stem, abundant at joint and on petiolule, sparse elsewhere; no persistent stipels. *Inflorescence* arising from old wood, axis length at least 10 cm, sidebranches at least 9, distant, 3-flowered, flowering pedicel length unknown but lengthening to \pm 2.5 cm in fruit; axis and pedicel with dense short \pm adpressed dark hairs and sparser longer bristles; bracts \pm ovate, 2 \times 1.5 mm, densely hairy as pedicel outside, persistent on fruiting axis; bracteoles deciduous, not seen. *Calyx* with short dense adpressed light brown hairs outside and (slightly longer) inside, and longer deciduous red-brown bristles outside; tube broadly cup-shaped, 1.1–1.4 cm long, 2 cm wide; 2 lateral teeth 3–5 mm long, lowest tooth 6 mm, all broadly triangular, upper lip not very distinct, apex rounded or very slightly cleft. *Corolla* dark purple; standard 3.4–3.8 cm long, \pm $\frac{1}{2}$ keel length, margin in apical $\frac{1}{3}$ with short conspicuous pale cilia, apex cleft up to 2 mm; wings very narrow, 6–6.4 \times 1.5–2 cm, apex \pm rounded, base with claw of 9 mm and auricle of 5 mm long, lower margin in apical $\frac{1}{4}$ or $\frac{1}{3}$ and basal $\frac{1}{3}$ ciliate like the standard, claw region with dense short hairs on both surfaces; keel 7.5–7.7 cm long, basal claw 10 mm and auricle 8 mm long, apex horny to \pm 1 cm. *Staminal tube* 5.5 cm long. *Style* shortly hairy in lower part, ovary with short erect dense pale brown hairs, ovules \pm 16. *Fruit* woody, linear, slightly curved, laterally flattened, apex \pm acute; up to 47 \times 3.5 \times 1.5 cm, with very short dense \pm erect light brown hairs, several irregular interrupted woody ridges running

all or most of length and numerous shorter raised lines patterning whole surface; internal septa between each of ± 16 seeds thin \pm woody, up to 3 mm thick visible externally as transverse grooves giving segments \pm rectangular appearance; margin very slightly if at all indented between seeds, thickened into 2 ridges up to 1 mm high with a groove between. *Seeds* black, oblong but rounded in outline, flattened somewhat asymmetrically, $1.9\text{--}2.4 \times 1\text{--}2$ cm \times 7–8 mm, smooth, dull; hilum blackish with central paler line and brown scurfy covering, encompassing over $\frac{1}{3}$ circumference. (Fig. 1A–C).

CHINA. Endemic. Map 1. Guizhou: Gan-Chouen: May 1910 & Dec. 1910, *Cavalerie* 3782 (A, E, P), May 1910, *Cavalerie* 3782 (K), 1910, *Cavalerie* 3784 (A, P) & *Cavalerie* 3782/?3784 (K); (all syntypes P, of *M. corvina*; isosyntypes K, E, or parts of syntypes A); Sud du Kouy Tcheou, April 1908, *Cavalerie* 2974 (holotype of *M. terreus*, E).

HABITAT. \pm 1000–1500 m.

3. *Mucuna bodinieri* H. Lév. in Bull. Soc. Bot. France 55: 408 (1908); H. Lév., Fl. Kouy Tcheou: 240 (1914–15) *pro parte*; Dunn, Suppl. List Chinese Pl. in J. Linn. Soc. Bot. 39: 469 (1911); Rehder in Journ. Arn. Arb. 13: 330 (1932). Types: Guizhou: *Bodinier* 2282 (syntype E!; photo and part of syntype A!) & 6 April 1898, *Seguin* s.n. (syntype P!) but see note below on confusion of data on labels.

M. birdwoodiana sensu Merrill in Lingnan Sci Journ. 13: 30 (1934) *pro parte*;

Rehder in Journ. Arn. Arb. 18: 208 (1937) *pro parte*; non Tutcher.

M. macrocarpa sensu Van Thuan in Fl. Cambodge Laos Viêt-Nam 17: 35 (1979) *pro parte*, non Wall.

Climber, very thick and woody, 'thick as arm'; stem not seen. *Leaves* \pm 32 cm long; stipules not seen; terminal leaflet ovate-elliptic, 14×8 cm, apex rounded in outline abruptly narrowing to thin short (1 mm long) mucronate tip, base rounded; lateral leaflets very asymmetrical, 13.6 cm long, abaxial half \pm 5 cm wide with rather truncate base, adaxial \pm 2.4 cm. All leaflets: lateral veins 8, rather closely-spaced, curving and mostly running right into margin, prominent both sides, tertiary venation rather close, running \pm parallel (but not straight) between pairs of laterals, fine reticulation visible, slender but often prominent; rather thinly chartaceous with short pale brown adpressed hairs sparse on upper surface, less so on veins, and dense beneath especially on veins; petiole 14.5 cm long, rhachis 3.2 cm long, petiolules 4 mm long, all with abundant hairs as leaf surface; no persistent stipels. *Inflorescence* length and sidebranch number unknown, sidebranches ? 3-flowered; pedicels unknown, axis with dense short \pm erect light brown hairs; no bracts seen. *Calyx* with short light brown dense hairs outside and (slightly longer and darker) inside and longer sparse deciduous red-brown bristles outside; tube up to 1.2 cm long, 2 cm wide, 2 lateral teeth 5–6 mm long, lowest slightly longer (7–)10 mm, all triangular, upper lip shorter than lateral teeth with apex rounded slightly cleft. *Corolla* colour uncertain (see note below); standard \pm 4 cm long, $(\frac{1}{2}\text{--})\frac{2}{3}$ keel length, apex rounded and very slightly cleft, margin around apex with short but conspicuous light brown cilia, basal auricles 2 mm long; wings $6.5\text{--}6.8 \times 1.5$ cm, $\frac{4}{5}$ of (or almost equalling) keel, apex rounded, base with claw of 5 mm and auricle of 4 mm, margin around apex ciliate like the standard, claw region densely

shortly dark-brown hairy and ciliate on margin; keel \pm 7.2 cm long, basal claw 5 mm and auricle 2 mm (or very much less), apex horny to 1 cm. *Staminal tube* 5.5 cm long. Fruit and seed unknown but long (1.5 cm) narrow \pm cylindrical tapering 18-ovuled ovary suggests long linear fruit.

CHINA. Endemic. Map 1. Guizhou: Sous-préfet de Tchen Lin, environs de Hoang Ko Chan, 6 April 1898, *Seguin* s.n. (syntype P) & dans un bois de pagode non loin du fleuve Hoa-Kiang, 21 April 1897, *Bodinier* 2282 (syntype E; photo and part of syntype A).

HABITAT. 1000–1500 m.

There appears some confusion on labels as to collector and number: on the *Seguin* sheet *Bodinier* is typewritten, *Seguin* as well as all the data and 2282 added all in the same hand; on the *Bodinier* sheet the number and reference to the *Seguin* sheet added both in the same hand to an earlier differently hand-written label (*Bodinier* typewritten). A collection of *M. sempervirens* also exists (P) labelled (?incorrectly) *Bodinier* 2282 and with almost the same data as the *Seguin* sheet.

Identity of this species has been in doubt. Flower colour is uncertain, type description stating '?purple', label on *Seguin* (syntype) 'white dirty yellowish'. By Merrill (1934) it is included in *M. birdwoodiana*, by Van Thuan (1979) in *M. macrocarpa*, to neither of which its leaflet shape, texture, indumentum or venation conform well. Despite great similarity to both these in flowers it appears to be a good species.

4. *Mucuna macrocarpa* Wall., [Cat. no. 5618 &] Pl. As. Rar. 1: 41 t. 47 (1830); Hemsl. in Forb. & Hemsl., Ind. Fl. Sin. 3: 190 (1903); Gagnep., Fl. Gen. Indoch. 2: 317 (1916); Hand.-Mazz., Symb. Sin. 7: 580 (1933); Chuang & Huang, Legum. Taiwan: 78, fig. 116 (1966–7); Pham Hoang Ho, Ill. Fl. S. Vietnam, ed. 2, 1: 886, fig. 2228 (1970); Ohashi & Tateishi in Journ. Jap. Bot. 51 (6): 161 (1976) which see for detailed references; Huang & Ohashi in Fl. Taiwan 3: 343, pl. 621 (1977); Tateishi & Ohashi in Bot. Mag. Tokyo 94: 95, fig. 2 (1981) which see for further references. Type: Nepal, *Wallich* 5618 (holotype K!).

M. ferruginea Matsum. in Ito & Matsum., Tent., Fl. Lutch.: 422 (1899); Dunn., Suppl. List Chinese Pl. in J. Linn. Soc. Bot. 39: 469 (1911). Type: Taiwan, 17 Jan. 1898, *Owatari* s.n. (holotype & isotype TI).

M. gigantea sensu Matsum. loc. cit. (1899), in Bot. Mag. Tokyo 16: 85 (1902) & in Index Pl. Jap. 2: 272 (1912); Makino & Nemoto, Fl. Jap.: 743 (1925) & ed. 2: 588 (1931); non (Willd.) DC.

M. subferruginea Hayata, Icon. Pl. Formos. 3: 74 (1913). Type: Taiwan, 24 March 1910, *Sasaki* s.n. (holotype & isotype TI).

M. collettii Lace in Kew Bull.: 398 (1915); H. Lévl., Cat. Pl. Yunnan: 160 (1917). Types: Burma: *Collett* 458, *Lace* 5866 (syntypes K!), *Hauxwell*, s.n., *Rogers* 19, (syntypes not found); Yunnan: *Henry* 11702 (syntype K!; isosyntype A!).

M. castanea Merr. in Lingnan Sci. Journ. 11: 44 (1932); Chun & Chang, Fl. Hainan. 2: 314, fig. 454 (1965); Icon Cormophyt. Sin. 2: 428, fig. 2725 (1972). Type: Hainan, *Tsang & Fung* 504 (Lingnan Univ. no. 18038) (isotypes BM!, K!; holotype Lingnan Herb. ?ubi; & part of holotype A!);

synon. nov.



MAP 2. Distribution of *Mucuna sempervirens* ▲; *M. macrocarpa* △; *M. sp. 'B'* ⊙; *M. macrobotrys* ■; and *M. sp. 'C'* ⊙ in China; (absent from Ryukyus and Western Japan).

M. wangii Hu in Bull. Fan. Mem. Inst. Biol., Peiping, Bot. Ser., 10: 146 (1940). Types: Yunnan, C. W. Wang 72881 & 73389 (syntypes Herb Lingnan? HK; isosyntypes A!); **synon. nov.**

M. irukanda Ohwi in Journ. Jap. Bot. 12: 659 (1936); Walker, Fl. Okinawa & S. Ryukyu Is.: 587 (1976). Type: Ryukyus, *Tawada* 346 (holotype KYO).

M. irukanda var. *bungoensis* Ohwi, Fl. Jap. rev. ed.: 1439 & 807 (1965). Types: Japan: Kyushu, Kamae-machi, *Arao* s.n., *Mashiba* s.n. (syntypes TNS).

M. ferruginea var. *irukanda* (Ohwi) Ohwi, Fl. Jap. new ed.: 1453 (1975).

M. ferruginea var. *bungoensis* (Ohwi) Ohwi, loc. cit. (1975).

Climber, often very large and woody, up to 70 m long; stem to 25 cm diam. with prominent brown lenticels and longitudinal ridges, indumentum short or longer adpressed fine pale or red-brown hairs especially dense at nodes, old stems often glabrous. *Leaves* 25–33 cm; stipules deciduous, 3–4 × up to 1 mm, densely hairy as stem; terminal leaflet elliptical, ovate-elliptic, ovate or slightly obovate, 10–19 × 5–10 cm, apex with short acumen or acute or rounded, rarely emarginate, base rounded or very slightly cuneate; lateral leaflets very asymmetrical, 10.5–17 cm long, abaxial half 4–6 cm wide with rather truncate or slightly cordate base, adaxial 2–3 cm. All leaflets: lateral veins 5–6(–7), well-spaced, somewhat curved and becoming indistinct near margin, prominent sometimes grooved above, prominent beneath, coarse reticulation usually visible and sometimes thinly prominent above, prominent beneath, fine reticulation sometimes visible (rarely as grooves) above, visible beneath; thinly or thickly chartaceous or coriaceous, sometimes shiny and usually darker (in dry state) above, glabrous above or with short adpressed pale or reddish hairs often dense on veins and younger leaves, otherwise usually sparse, similar hairs beneath, usually very dense on veins, often dense elsewhere; petiole 8–13(–15) cm long, rhachis 2–4.5 cm long, petiolules 5 mm, all with hairs as stem, sparse or dense; no persistent stipels. *Inflorescence* usually borne on oldest wood, 5–23 cm long, sidebranches 5–12, distant but more crowded towards top, 2–3-flowered (reputedly malodorous); lower ¼

of axis bearing scars of bracts; pedicels 8–10 mm long with dense light or dark brown \pm adpressed short hairs and sparser often rather fine dark or red-brown bristles, similar hairs and bristles on axis; bracts and bracteoles deciduous, present on young inflorescences surrounding flower buds, all similar but bracteoles the larger, ovate, 2–5 \times 1–4 mm, with dense adpressed dark brown hairs outside, inside \pm glabrous. *Calyx* with dense short adpressed dark or light brown hairs outside and (longer) inside, and pale or red-brown deciduous bristles outside; tube broadly cup-shaped 8–12 mm long, 12–20 mm wide; 2 lateral teeth (2–)3–4 mm long, lowest tooth usually twice length of laterals, 5–6(–8) mm, triangular or broadly so, upper lip very short, usually much shorter than laterals and with apex \pm emarginate. *Corolla* dark reddish purple but standard greenish white; standard 3–3.5 cm long, $\frac{1}{2}$ – $\frac{2}{3}$ keel length, apex rounded not or very slightly cleft, basal auricles very small, 1 mm, margin with short but very conspicuous pale cilia in apical $\frac{1}{3}$; wings fairly wide, 4–5.2(–5.6) \times 1.5–1.7 cm, usually \pm $\frac{1}{5}$ keel length, basal claw 5–7 mm and auricle 3–5 mm long, apex rounded, margin ciliate as standard in apical $\frac{1}{3}$ and around claw region, claw with short adpressed hairs; keel 5–6.3 cm long, basal claw 8–10 mm and auricle 1–3 mm long, apex horny to 7–10 mm. *Staminal tube* 4.5–5.5 cm long. *Fruit* woody, linear, torulose, straight or slightly curved, apex \pm acute but thick and woody, laterally flattened, 26–45 \times 3–5 cm \times 7–10 mm, with dense very short \pm erect red-brown fine hairs but glabrescent in parts, and patterned with irregular woody ridges and wrinkles of varying thickness and length, 6–12 seeded, internal septa woody, 1–5 mm thick; margin thickened, not grooved, often with irregular woody ridge running parallel and very close throughout length of pod and up to 1 mm thick, but no definite rounded raised firm margin as seen in *sempervirens*. *Seeds* black, discoid but slightly asymmetrical in outline, faces flattened, 2.2–3 \times 1.8–2.8 cm \times 5–10 mm, surface dull; hilum encompassing $\frac{3}{4}$ circumference or more, dark brown or black sometimes with papery brownish covering (Fig. 1G–J).

CHINA. Map 2. W China, unlocalized: *Vilmorin* 1956 (P). Yunnan: *Ducloux* 6096 (P); Szemao, *Henry* 11631 (A, K) 11631A (E, K), 11702 (syntype K; isosyntype A, *M. collettii*) & 13679 (K); between Muang Pan & Muang Hai, *Rock* 2389 (A); between Keng Hung & Muang Hing, *Rock* 2688 (A, E); Keng-Ma, April 1936, *C. W. Wang* 72881 & Lan-Tsang Hsien, May 1936, *Wang* 73389 (isosyntypes *M. wangii*, A); Lan-Tsang Hsien, May 1936, *Wang* 76608 (A). Guangdong-Guangxi: Sup Man Ta Shan: *H. Y. Liang* 69866 (A) & *W. T. Tsang* 21969 (A, BM, P). Guangxi: Siu-Luk, *W. T. Tsang* 21863 (A, BM, P). Hainan: Bai Sha District, *S. K. Lau* 26413 (IBSC); Fan Yah, *N. K. Chun* & *C. L. Tso* 44187; (A, K, P); Hung Mo Shan, *Tsang* & *Fung* 504 (L.U. no. 18038) (photo and part of holotype A, isotypes BM, K, of *M. castanea*). Taiwan: *Faurie* 1823 (A); Sonaro-Arizan, 27 Feb. 1912, *Price* 71 (K); around Urai, Prov. Taihoku, 30 March 1918, *Wilson* 10268 (A, BM, K).

EXTERNAL DISTRIBUTION. Himalayas (Nepal, Sikkim); Burma; Thailand; Vietnam.

HABITAT. Evergreen or deciduous montane or riverine forest to open thickets and dry sandy areas, often common; 1000–3000 m. Fruit said to be edible.

M. ferruginea is stated to differ in having red-tomentose stems, leaves and pods and obtuse leaves, but for these characters there is a gradual and

continuous variation between two extremes and therefore the distinction is insufficient for specific recognition.

M. castanea similarly seems to represent one extreme, stems, leaves (below) and pods all with very dense short red pubescence hardly decreasing with age; leaves were also noted to be particularly thick, coriaceous and drying a rather pale greenish brown and the few specimens conforming in all these characters came from Hainan from which other forms of *M. macrocarpa* were not seen. These may therefore represent a geographical variant but without seeing more material (or any flowering specimens) I do not feel justified in giving it varietal status.

M. wangii type material lacks the 'birdwoodiana-like' wings stated to be its chief distinction. It seems in all respects a rather tomentose form of *M. macrocarpa*.

One specimen (Tsang 21969, the only collection seen from Guangxi) has much longer pedicels (1.5–2 cm) and corolla (standard 4 cm, wings 6–6.3 cm, keel 7.5–8 cm) but apart from these long flowers is identical with the above description and seems therefore only a rather extreme form of this species. *M. macrocarpa* may indeed show (as does *M. sempervirens*) a rather greater range of variation than is illustrated by the small number of specimens seen.

M. coriocarpa Hand-Mazz. has been included in *M. macrocarpa* by Hand-Mazz., Symb. Sin. 7: 580 (1933) but see note under *M. sempervirens*.

5. *Mucuna* sp. 'B' aff. *macrocarpa* differing only in persistent stipels and completely glabrous leaves.

One fruiting specimen only seen; differences from *macrocarpa* as follows: terminal leaflet 21 × 12 cm, laterals 18 cm long, less markedly asymmetrical, abaxial half 6 cm wide, adaxial 4.5 cm; petiole 12 cm, lamina, petiole, rhachis and petiolules glabrous; stipels persistent, 2 mm long, terete, rather thick.

CHINA. Map 2. SW Yunnan, Jah-Kuang, Che Li Hsien, mixed forest, 1550 m, Sept. 1936, C. W. Wang 79134 (A).

6. *Mucuna sempervirens* Hemsl. in Forbes & Hemsl. in J. Linn. Soc. Bot. 23: 190 (1887) & in Curtis's Bot. Mag. t. 7978 (1904); Bretschneider, Hist. Eur. Bot. Disc. China 1: 697 & 781 (1898); H. Lév. in Bull. Soc. Bot. France 55: 408 (1908) & Fl. Kouy Tcheou: 240 (1914–15); Rehder in Journ. Arn. Arb. 13: 331 (1932); Icon. Cormophyt. Sin. 2: 497 fig. 2724 (1972); Fl. Hupeh. 2: 266 pl. 1109 (1979); Tateishi & Ohashi in Bot. Mag. Tokyo 94: 102 fig. 7 (1981) which see for further references. Type: China: Hubei: Ichang, A. Henry 1065 (holotype K!; isotype P!).

M. mairei H. Lév. in Fedde, Repert. 13: 337 (1914) & Cat. Pl. Yunnan: 160 (1917). Type: China: Yunnan, Forêt de San-Tao-Keou, May 1913, Maire s.n. (holotype E!; isotype A).

?*M. coriocarpa* Hand.-Mazz. in Anz. Akad. Wiss. Wien, Math.-Nat. 62: 244 (1925). Type: China: Yunnan, Northwest, Supra Tschamutong, 13 July 1916, Handel-Mazzetti 9562 (holotype W; isotypes E!, K!); identity in doubt: see note under this name below (p. 41).

M. japonica Nakai in Bot. Mag. Tokyo 46: 57 & 631 (1932). Type: Japan:

Kyushu, prov. Higo, Aiva, May 1932, *Kodzuma* (lectotype Tatieshi & Ohashi loc. cit (1981) TI!).

Climber, up to 25 m, usually woody; old stems up to 30 cm diam., bark fairly wrinkled, young stems prominently longitudinally ridged and with prominent brown lenticels, glabrous, rarely younger stems with very sparse short stiff pale hairs. *Leaves* 21–39 cm long, stipules very deciduous, up to 3 × less than 1 mm, densely hairy as stem, terminal leaflet narrowly or broadly elliptic or ovate-elliptic, 8–15(–19) × 3.5–9 cm, apex with acumen of up to 1.5 cm, extreme tip acute often thickened, base very slightly cuneate, lateral leaflets very asymmetrical, 9–14 cm long, abaxial half 2.5–5 cm wide with base somewhat truncate or very slightly cordate, adaxial 2–3 cm. All leaflets: lateral veins 4–7, curving and becoming indistinct or arching and joining before reaching margin, thin but fairly prominent on both sides, coarser reticulation hardly distinguishable from finer reticulation which usually fairly prominent; membranous or chartaceous, often thin, rarely coriaceous, glabrous or with sparse to moderately abundant (never dense) thin, pale, fairly stiff hairs, often only on veins and more abundant beneath; petiole 7–16.5 cm, rhachis 2.5–4.5 cm, petiolules 3–5 mm, all or only petiolule with sparse hairs as stem, or all glabrous; no persistent stipels. *Inflorescences* often arising in groups and from very old wood, 10–36 cm long, sidebranches 5–7, distant, each bearing 3 scentless or malodorous flowers; pedicels 1–2.5 cm long with stiff dark ± adpressed short hairs, similar hairs often on axis especially when young; bracts and bracteoles soon deciduous, bracts narrowly obovate, 15 × 15 mm, bracteoles ovate or slightly obovate, 5 × 4 mm, both with acute apex and short dense dark brown adpressed hairs outside and (near margin only) inside. Flower parts very variable in size and somewhat in proportions. *Calyx* with dense short dark brown adpressed hairs both sides and longer scattered deciduous golden or red-brown bristles outside; tube broadly cup-shaped, 8–12 mm long (12–)18–25 mm wide; 2 lateral teeth 5–8 mm long, lowest tooth 5–9 mm, all broadly triangular; upper lip often equalling lateral teeth, broadly triangular, apex cleft slightly or not at all. *Corolla* dark purple or reddish; standard 3.2–4 cm, $\frac{1}{2}$ – $\frac{2}{3}$ keel length, rounded, cleft up to 4 mm at tip, basal auricles 1–2 mm long, margin ciliate; wings rather wide, (4.5–)4.8–6 × 1.8–2 cm, $\frac{2}{3}$ – $\frac{4}{5}$ (rarely almost equalling) keel length, apex angular with edge somewhat horny and often pale especially inside to width of 1–2 mm, base with claw of 7 mm and auricle of 4 mm long, margin ciliate except in claw region, claw with short dense fine ± adpressed brown hairs on both surfaces; keel (5.3–)6–7 cm long, basal claw 7 mm and auricle 1 mm long, apex horny to ± 1 cm, claw often with indumentum as wing. *Staminal tube* ± 4 cm long. *Style* (in lower part) and ovary hairy. *Fruit* woody, linear, torulose, not noticeably curved, laterally flattened, apically ± acute, 30–53 × 3–3.5 × 1–1.3 cm, with short adpressed red-brown hairs and (usually) long deciduous red-brown bristles, and many small ± longitudinal irregular wrinkles not making a distinct reticulate pattern, 4–12-seeded, internal septa woody, visible externally as transverse grooves often shallow and ill-defined; margin much thickened, raised into a well-defined smooth rounded ridge without a central groove. *Seeds* reddish, brownish or black, oblong in outline or discoid, faces flattened; 2.8–3 × 2–2.2 × 1 cm, shiny, surface often slightly patterned; hilum black, encompassing $\frac{3}{4}$ circumference. (Fig. 1D–F).

JAPAN (probably introduced). Kyushu, Kumamoto Pref.: Kamoto-gun, *Nakahara* s.n. (TI) & Aiva, May 1932, *Kodzuma* s.n. (TI lectotype of *M. japonica*).

CHINA. Map 2. Sichuan: Mt Omei: *C. Y. Chiao* & *C. S. Fan* 116 (A), *S. C. Sun* & *K. Chang* 1166 (A), *Y. S. Shiao* 49272 (IBSC), *F. T. Wang* 23555 (A, IBSC) & *Wilson* 3411 (A, BM, K); Kiating: *H. C. Chow* 9609 (A) & *L. Y. Tai* 624 & 819 (A). Hubei: Yangtze-Kiang, *Faber* 756 (K); Ichang: *Henry* 1065 (holotype K; isotype P), 3517A (A, stated to be flowers of type, K), & 3517 (BM, K, P); *Wilson* 3271 (A, BM, E, K). Zhejiang: Ningpo, *Everard* s.n. (K, cited in original description). Guizhou: Tchen Lin à Hoang Ko Chan, *Bodinier* 2282 (P, not the *M. bodinieri* sheet: see note under that species); Pin-yue to Kouy-yang, *Bodinier* 2604 (E); Tsing chen, *S. W. Teng* 90287 (A). Yunnan: Ping-pien Hsien, *W. Y. Chun* 60959 (IBSC); N of Teng yueh, *Forrest* 7712 (A, E, K; mixed coll.: leaves are *Millettia dielsiana* Harms); ascent to Yangtze from E boundary of Li Chiang Valley, *Forrest* 10931 (BM, E, K); Salwin-Kiu Chiang divide, *Forrest* 21667 (E); Schweli Valley, *Forrest* 24148 (E); Yao Chau, *McLaren's collectors*, A.A. 212 (E); Suen Oui, May, *Maire* 283 (A, E); San-Tao-Keou, May 1913, *Maire* s.n. (holotype E; isotype A, *M. mairei*); Ping-Pien Hsien, *H. T. Tsai* 61796 (A); *Tsai* 60959 (A, IBSC). Hong-kong: East Point, April 1875, *de Poli* s.n. (P). Without locality: W China, [? Yunnan] *Maire* 785/1914 (BM).

CULTIVATED. KEW, from Chinese material (? Ichang) 1886, *Henry* 163–86 (K, see *Bot. Mag.* t. 7978 (1904)); Hongkong, 16 Oct. 1906, *Herb.* no. 4606 (HK).

EXTERNAL DISTRIBUTION. ? Eastern Himalayas: Burma.

HABITAT. Subtropical forests, thickets, valleys and river edges, on calcareous soils; 300–3000 m. Vernacular name: 'Cow and Horse Creeper', Niu Ma Teng Hua (Mandarin).

M. mairei is not here considered to be distinct. Its small leaflets (terminal 8–9 cm) are at the lowest extreme of the range and it could be separated on its narrow calyx, short wings and keel (1.2 cm, 4.5 cm and 5.3 cm respectively as opposed to 1.8–2.5 cm, 4.8–6 cm and 6–7 cm). However, it is otherwise identical and *M. sempervirens* is already so variable a species that it seems most likely that *M. mairei* represents an extreme form, intermediates having yet to be collected. Varietal status seems unwarranted, there being little geographical separation between the 2 collections of this form (NE Yunnan: type & *Maire* 283) and larger forms in Western Yunnan.

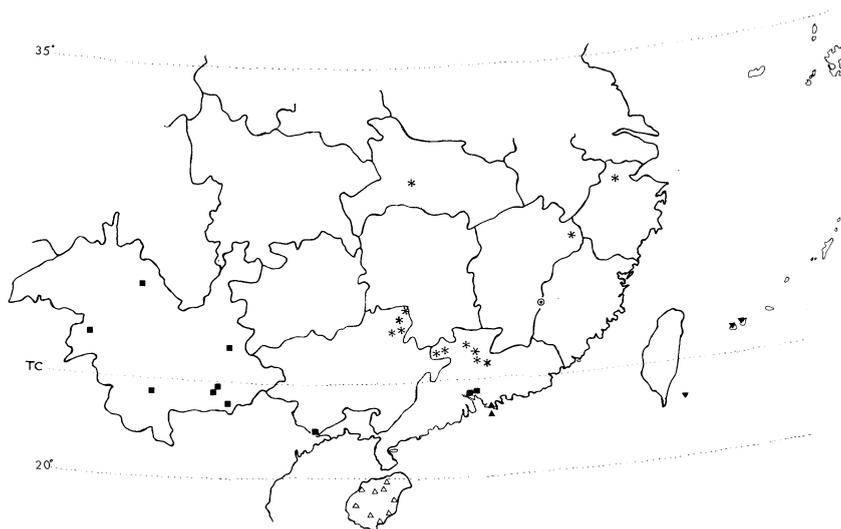
M. coriocarpa type material lacks flowers, without which the less pubescent forms of *M. macrocarpa* are very difficult to distinguish from *M. sempervirens*. All that can be said is that from the appearance of the pod it probably belongs to *M. sempervirens*, although *Handel-Mazzetti* himself, *Symb. Sin.* 7: 580 (1933), sank it into *M. macrocarpa*.

7. *Mucuna calophylla* *W. W. Smith* in *Not. Roy. Bot. Gard. Edinb.* 12: 216 (1920); *Hand.-Mazz.*, *Symb. Sin.* 7(3): 581 (1933). Type: Yunnan: Western flank of the Tali Range, on dry grassy slopes, July 1917, *Forrest* 15619 (holotype E!; isotype K!).

Climber up to 3 m; stems up to 2 cm diam., surface red-brown, bark often longitudinally grooved and cracked and flaking; young stems with abundant adpressed long fine hairs, later glabrescent. *Leaves* 15–22 cm long; stipules

very deciduous, narrowly ovate or lanceolate, 2.5–3.5 × 1–1.5 mm, hairy as stem; terminal leaflet ovate, elliptic or rhombic, relatively narrow, 7–11 × 3–5 cm, length over 2, usually 2½, × width, apex gradually or abruptly narrowing into long and relatively wide acumen up to 2 cm long and 2 mm wide for most of its length, extreme tip often abruptly narrowed into short apiculus, base ± rounded, lateral leaflets very asymmetrical, 7–10.5 cm long, abaxial half 1.8–2.6 cm wide with base slightly cordate or rather truncate giving triangular outline to leaf-half, adaxial 1.2–1.6 cm wide. All leaflets: lateral veins 5–6, curving gradually until parallel to and close to margin then arching and joining or becoming indistinct, thin but somewhat prominent above, visible, often prominent, below, coarse reticulation visible below, finer reticulation very slender and close but slightly raised; often rather thick and drying a rather pale green, upper surface with sparse adpressed usually quite long (up to 1 mm) silvery hairs, lower surface of even old leaves with dense silky covering of similar hairs, midrib and primary veins conspicuous, secondary veins partly covered but visible as darker slightly less pubescent lines amongst pale pubescence; rarely both surfaces sparsely pubescent or glabrous; petiole 5.5–8 cm long, rhachis 1.3–2 cm, petiolules 2–4 mm; no persistent stipels. *Inflorescences* arising from old or young stems, axillary, 3–12 cm long, sidebranches up to 11, 3-flowered, spaced throughout most of length but more crowded near apex and sometimes with leaves arising from lower nodes of axis; pedicels 4–5 mm long, with usually dense silvery hairs similar to those on leaves but shorter, finer and weaker, similar sometimes sparser hairs on axis, bracts very deciduous, bracteoles less so but deciduous before inflorescence mature, bracts narrowly ovate, up to 3 mm long, bracteoles elliptical, ovate or slightly obovate, up to 6 mm long, 3 mm wide, both with acute apex, short dense adpressed light brown hairs outside and, more sparsely and towards apex, inside. *Calyx* with very dense short adpressed light brown hairs outside and inside and sparse deciduous irritant darker bristles outside; tube not very broadly cup-shaped, 6–7 mm long, 8–11 mm wide; 2 lateral teeth 2–4 mm long, lowest tooth (3.5–)5–6 mm, fairly broadly triangular, apex ± rounded; upper lip less than or equalling laterals, tip acute or rounded, sometimes slightly cleft. *Corolla* reddish purple; standard 2–2.4 cm long, ½–⅔ keel length, rounded, cleft at apex slightly or up to 4 mm, margin eciliate, basal auricles very small, 1–2 mm long; wings rather broad, 2.8–3.2 × ± 1 cm, ± ¾ keel length, apex broadly rounded, basal claws 5–6 mm and 3 mm long, margin ciliate in claw region, claws with short hairs inside and out; keel 3.8–4 cm long, basal claws 5–7 mm and 1–2 mm long, apex fairly shiny and horny to ± 1 cm, extreme tip pale, hooked. *Staminal tube* 3 cm long. *Ovules* ± 7. *Fruit* woody, linear-oblong, not curved, very swollen around seeds, flattened, ± acute at apex, 15 × 2.5–3 × 1.5 cm, with dense ± erect fairly rigid long reddish or pale bristles, very short ± erect fine reddish or pale hairs, and patterning of raised reticulation of lines of varying prominence, up to 7-seeded, internal septa fairly thick (up to 2 mm), woody, visible externally as deep transverse grooves; margin ± thickened. *Seeds* orange-brown, oval in outline, faces flattened, 2 × 1.5 cm, thickness 1 cm, surface slightly rough, not shiny; hilum encompassing ½–¾ circumference, with brown covering, papery in dry state. (Fig. 3 D–F, 5 G–M).

CHINA. Endemic. Map 4. W Yunnan: E Likang, 21 Sept. 1939, *R. C. Ching* 21690 (A); Ta Mi Lang près de Ta Pintze, 6 April 1885, *Delavay* 1977 (K, P);



MAP 3. Distribution of *Mucuna bracteata* ■; *M. lamellata* *; *M. cyclocarpa* ⊙; *M. membranacea* ▼ and *M. nigricans* var. *hainanensis* △ and var. *hongkongensis* ▲ in China & Ryukyus (absent from Western Japan).

Hokin, 23 April 1939, *K. M. Feng* 789 (A); Western flank of the Tali Range, July 1917, *Forrest* 15619 (holotype E; isotype K); Pien Oua, Yunpe, 23 April 1920, *S. Ten* 389 (E); Yung-jen Hsien, 10 May 1933, *H. T. Tsai* 52797 (A).

HABITAT. Forest or open thickets; ± 1000–3000 m. USES. Flowers said to be used as a vegetable.

8. *Mucuna nigricans* (Lour.) Steud., *Nom. Bot.* ed. 2, 2: 163 (1841); Tateishi & Ohashi in *Bot. Mag. Tokyo* 94: 99–102, fig. 4 & 5a (1981), which see for other refs. and syns. Type: [Vietnam] Cochinchina, *Loureiro* s.n. (holotype BM!).

Citta nigricans Lour., *Fl. Cochinch.*: 456 (1770) excl. references to Rumphius and Clusius.

Since only var. *hainanensis* and var. *hongkongensis* appear in China a detailed description of the species as a whole is not given (but see notes at end, p. 45).

var. ***hainanensis*** (Hayata) Wilmot-Dear stat. nov.

M. hainanensis Hayata, *Icon. Pl. Formos.* 3: 72 (1913); *Icon. Cormophyt. Sin.* 2: 496, fig. 2722 (1972); see Tateishi & Ohashi loc. cit. for other refs. Type: Hainan: 1910, *Katsumada* s.n. (holotype TI,? isotype HK!).

M. suberosa Gagnep. in *Lecomte, Not. Syst.* 3: 27 (1914) & in *Fl. Indo-Chine* 2: 319 (1916). Types: Tonkin: *D'Alleizette* 345, *Balansa* 4402, *Bon* 2925, 2938 & 332 (syntypes P!).

Climber 2–7 m long, woody or semi-woody; stems finely longitudinally grooved, glabrous or with sparse pale weak ± adpressed hairs. *Leaf* 8.6–23 cm long; stipules deciduous, 2 × less than 1 mm, densely hairy as stem; terminal leaflet elliptic or slightly obovate, rarely ovate-elliptic, 4.5–10.5 ×

2.5–5 cm, shortly widely acuminate with apex rounded but extreme tip thickened or apiculate, base rounded or slightly cuneate; lateral leaflets not markedly asymmetrical, 5–11 cm long, abaxial half 1.7–3.2(–4.2) cm wide, base rounded or cordate, adaxial 1.2–2.2 cm. All leaflets: lateral veins 3–5(–7), curving and becoming indistinct near margin, thin but prominent above and beneath, coarser reticulation not very distinct from finer reticulation which is visible, sometimes prominent, both sides; chartaceous or coriaceous, usually thin, glabrescent or with pale, sparse short adpressed fine hairs on veins and sometimes on surface both sides; petiole 3–11.5 cm long, rhachis 2–3.3 cm, petiolules 3–5 mm, all with sparse hairs as stem or glabrescent; stipels 2–6 mm long, terete, rather thin. *Inflorescence* 8–27 cm long, side-branches 5–11, distant, 3-flowered, pedicels 8–20 mm long with very dense short adpressed pale hairs, similar hairs on axis; bracts and bracteoles deciduous only shortly before individual flowers mature, 9–15 × 2–20 mm, bracts broadly elliptical or obovate, bracteoles often more narrowly ovate or elliptical, both with rounded apices and abundant short hairs as axis. *Calyx* with fairly abundant or dense short pale hairs inside and out and longer deciduous yellowish brown bristles outside; tube usually broadly cup-shaped, 7–10 mm long, (1–)1.2–1.4(–1.5) cm wide; 3 lower teeth triangular, not broad, lowest tooth (5–)7–10 × 4 mm, laterals 3–6 × 2–5 mm; upper lip much shorter or sometimes equalling lowest tooth, apex cleft up to 1 mm. *Corolla* deep purplish or reddish; standard (2.7–)3.2 cm long, over ½ (usually ⅔) keel length, rounded, apex cleft up to 1 mm, margin eciliate, basal auricles very small, 1 mm long; wings (4.2–)4.5–5.5 cm × 8–12 mm ± equalling keel, apex rounded, basal claw 9 mm and auricle 4 mm long, margin ciliate only in claw region where surface also with short abundant hairs outside; keel (4.2–)4.8–5.7 cm long, basal claw 10 mm and auricle 1 mm long, apex horny to 1 cm. *Staminal tube* 3.7–4 cm long. *Style* hairy in lower part. *Fruit* leathery, asymmetrically oblong with upper edge convex in outline, much-flattened laterally, acute at apex and base, downcurved at apex, 8–13 × 4–5 × 1 cm, length 2–2½ × width, greenish grey when young, becoming gradually golden-orange with reddish lamellae as it matures, with sparse (dense on young pods) adpressed long deciduous irritant red-brown bristles and often short weak pale hairs, and 8–12 thin somewhat adpressed lamellae 4–5 mm wide, some interrupted but otherwise running very obliquely across whole pod width and patterned with raised transverse and reticulate lines, 3–4-seeded, internal septa leathery, visible externally as slightly oblique very narrow grooves; each margin with pair of slightly inrolled wings 1–1.3 cm wide, patterned like the lamellae. *Seeds* fairly similar to those of *M. championii*, black, oblong or ± reniform, flattened, 1.7–2(–2.5) × 1.5(–2) × 5–7(–10) mm, ± smooth but not shiny; hilum black, encompassing ½ to nearly ¾ circumference. (Fig. 2 D, E).

CHINA. Map 3. Hainan: Vicinity of Manning, *F. C. How* 71364 (A); Yaichow, *How & Chun* 70030 (A, HK, K, P); May 1910, *Katsumata* [Katsumada] s.n. herb. no. 7812 (?isotype, HK); SW Po-Ting, *Ko* 52232 (A, IBSC); Chiu Sam Tsuen, *S. K. Lau* 385 (A, BM, E, K); Bak Sa, *Lau* 26145 (A); Ka Chik Shan, *Lau* 1418 (BM) & 3003 (A, P); *Lau* 3182 (P); Chim Fung Mt, *Lau* 5535 (A); Nam Shan Leng, *Lau* 5884 (A); Pak Shik Ling, *Lei* 581 (A, K); *H. Y. Liang* 65430 (A, E); Paak Shek Shan, *W. T. Tsang* 615 (L.U. No. 17364) (A, BM, E, K); *Tutcher* 2140 (K); Trop. Forest Res. Stn., *C. L. Wu* 171 (IBSC); Loo Tu Tsun, 'Chinese collector' 2140 (HK).

EXTERNAL DISTRIBUTION. Vietnam.

HABITAT. Dense forest, light woodland, thickets, scattered shrubs; climbing on trees, shrubs or bamboos; often common; dry to swampy land, soil sandy or silty; sea level to low altitude.

Tateishi & Ohashi (loc. cit. 1981) regard *M. hainanensis* Hayata as merely a synonym of the widespread and polymorphic species *M. nigricans*, but though it falls within the range of variation of this species it does possess several distinct features. Taking these together with its geographical distribution, a restriction to Hainan (from which other forms of *M. nigricans* are absent) and also North Vietnam (fide Van Thuan loc. cit. (1979) although such specimens as I have seen are rather less distinctive), it seems appropriate to recognise the taxon as a variety. Distinctions are as follows, characters for var. *nigricans* in square brackets: terminal leaflet 4.5–10.5 cm [rarely less than 13.5 cm] long; lateral veins usually 3–5 [7]; wing apex \pm rounded, narrowing and acute only at extreme tip [rather triangular, tapering gradually to narrow acute tip]; fruit asymmetrically oblong with surface lamellae thin, very oblique, 8–12 [\pm linear-oblong with lamellae often thick and robust, slightly oblique, \pm 25]; range Hainan, North Vietnam [E Himalayas; Burma; Laos; Vietnam; Thailand; ?Moluccas; Philippines].

var. **hongkongensis** Wilmot-Dear var. nov. var. *hainanensi* persimilis sed leguminibus linearibus torulosus 4–5-plo longioribus quam latioribus lamellis saepissime magis numerosis 10–17, foliolis quoque saepe maioribus 7–15 cm longis differt. Typus: Hongkong: New Territories, Fung Yuen near Tai Po, *Y. S. Lau* 3234 (holotypus K!; isotypus HK!).

Planta scandens caulium foliorumque forma sicut in var. *hainanensi* sed foliolis saepe maioribus, foliolo terminali 7–15 \times 4–9 cm, lateralibus 7.5–15 cm longis parte abaxiali 3–6 cm lata adaxiali 1.5–3.5 cm lata. *Inflorescentia* floresque omnino sicut in var. *hainanensi* sed alae apice saepe ut in var. *nigricanti* angustiori acutiorique. Legumen coriaceum, \pm lineari-oblongum, rectum vel leviter deorsum curvatum, \pm torulosum, marginibus \pm parallelis, basin apicemque versus angustatum, quam in var. *hainanensi* saepissime longius semper pro rata parte angustius 12–15 \times 3.5–4 \times 1 cm, longitudine 4–5-plo longius quam latius, pagina reticulis cum setis et pubescentia et lamellis sicut in var. *hainanensi* ornata sed lamellis saepe magis numerosis 12–17; margine sicut in var. *hainanensi* alato. *Semina* omnino sicut in var. *hainanensi*. (Fig. 2F).

CHINA. Map 3. Hongkong: 1903, *Birdwood* s.n. (HK); *Hance* 10176 (BM); 1 May 1899, *Faber* s.n., herb. no. 8306 (HK); near Buddhist Temple, Causeway Bay, 7 March 1904, *Tutcher* s.n. (HK); Buddhist Temple, March 1874, herb. no. 1442 (HK); Causeway Bay, March 1879, herb. no. 1443 (HK). New Territories: Lam Tsun, *Y. S. Lau* 1177 (HK); Tai Po, *Y. S. Lau* 458 & 695 (HK); Fung Yuen, near Tai Po, *Y. S. Lau*, 2826 (HK) & 3234 (HK, K); Lam Tsuen Valley, *Williams* 199 for *Barretto* (HK, K).

This variety is not always distinguishable from var. *hainanensis* without fruit but the geographical range does not overlap. Apart from some overlap in leaflet size, wing apex shape and fruit shape, it has the same distinctions from var. *nigricans* as does var. *hainanensis*.

9. *Mucuna interrupta* Gagnep. in Lecomte, Not. Syst. 3: 26 (1914); Craib, Fl. Siam. Enum. 1 (3): 444 (1928); Pham Hoang Ho, Ill. Fl. S. Viet-Nam, ed. 2, 1: 885, fig. 2227 (1970); Van Thuan in Fl. Cambodge Laos Vietnam 17: 38 (1979). Type: Cambodia: Angkor, *Thorel* 2098 (lectotype, Van Thuan loc. cit., P!)

Climber, ± woody, stem longitudinally grooved, glabrous or with sparse longish brown fine adpressed hairs. Leaf up to 22 cm long, stipules deciduous, not seen; terminal leaflet elliptic, 9–14 × 4–6 cm, base rounded or ± cordate, apex abruptly shortly acuminate, extreme tip mucronate; laterals 9–10 cm long, abaxial half 3–3.7 cm wide, base rounded or very slightly cordate, adaxial 1.5–2.2 cm. All leaflets: lateral veins 5–7, curving and becoming indistinct near margin, prominent below, thinly so above, coarse and fine reticulation visible, not prominent; chartaceous, glabrous or with very sparse hairs as stem both sides; petiole 6–9 cm long, rhachis 1.5–2 cm, both ± glabrous, petiolule ± 4 mm with sparse hairs as stem, stipels terete, thin, 2–4 mm long. *Inflorescence* 6–22 cm long, side-branches up to 11, often very stout, distant but often absent from lower part of axis, usually 3-flowered, pedicels 8–10 mm with dense hairs as stem, similar sparser hairs on axis; bracts often persistent, broadly ovate, apex acute, 2.5–3.2 × 2–2.5 cm, with abundant short fine adpressed hairs both sides; bracteoles deciduous, not seen. *Calyx* with hairs as stem but denser and longer; tube very broadly cup-shaped, ± 1 cm long, 2 cm wide; 2 lateral lower teeth very broadly triangular, 5–6 × 4–6 mm; lowest tooth long, broadly triangular, (10–)12–14 × ± 6 mm; upper lip slightly shorter than laterals, rather indistinct, apex ± apiculate, not cleft. *Corolla* white but see note below; standard 3–3.5 cm long, ½ keel length or slightly longer, apex broadly shallowly cleft, glabrous; wings 5–5.7 cm long, equalling keel, very narrow 1–1.3 cm wide, apex narrow ± acute, claw 7 mm and auricle 2 mm long, shortly brown-hairy and ciliate in claw region; keel 5–5.7 cm long, apex horny to ± 6 mm, claw 10 mm and auricle up to 1 mm, glabrous. *Staminal tube* 4.5–5 cm long. *Fruit* leathery, asymmetrically oblong-elliptic, very flattened laterally, apex and base rounded, 5–12 × 3.5–6 × 1.5–2 cm, length usually twice width, with reticulate surface patterning of raised lines, abundant short fine pale hairs, rigid irritant deciduous red-brown bristles and 10–20 oblique rather thick and robust erect lamellae all interrupted in centre giving narrow longitudinal gap crossed by none, each lamella bifurcating at apex to give 'T'-shape in cross section; internal septa between each of the 2–3 seeds thin but rigid, sometimes apparent externally as slight transverse indentations; each margin with pair of wings 4–5 mm wide. *Seed* red-brown with black streaks and blotches, reniform or almost discoid, flattened, faces convex ± 2.5 × 2 cm, 1.2 cm thick, surface smooth; hilum black, encompassing just over ½ circumference. (Fig. 3 G–H, 4).

CHINA. Map 1. W Yunnan: Ming-La, Jenn-Yeh Hsien, Nov. 1936, *C. W. Wang* 80655 (A); Chen Kang, Maliling, 21 Aug. 1938, *T. T. Yu* 17443 (A, E).

EXTERNAL DISTRIBUTION. Thailand, Cambodia, Laos, Vietnam; Malaysia; ?India.

HABITAT. Border of woodland; 900–1100 m.

Not previously recorded from China. I am somewhat doubtful about its supposed occurrence in India; specimens seen present a markedly different

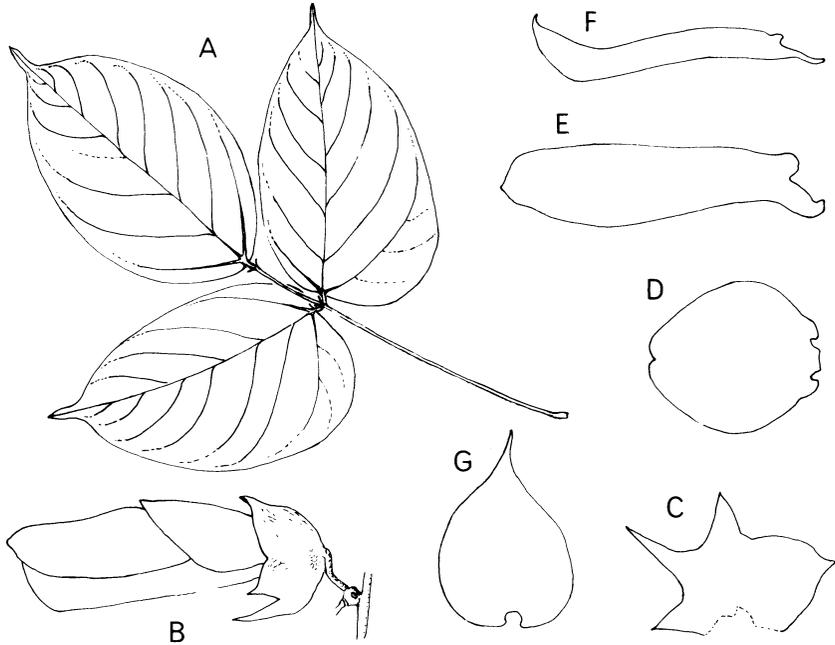


FIG. 4. *Mucuna interrupta*. **A** leaf; **B** flower; **C** calyx opened out; **D** standard; **E** wing; **F** keel; **G** flora bract. All from Yu 17443. **A** $\times \frac{1}{2}$, **B—G** $\times \frac{2}{3}$. Drawn by author.

appearance (leaves broad; pod lamellae and wings both markedly wider not thick and robust, undulating).

In other areas flower colour said to be red; the only flowering specimen seen is possibly a white-flowered variant.

10. *Mucuna membranacea* Hayata, *Icon. Pl. Formos.* 3: 73 (1913) & *Gen. Ind. Fl. Formos.*: 21 (1917); Tateishi & Ohashi in *Bot. Mag. Tokyo* 94: 97 fig. 3 & 5b (1981) which see for detailed references. Type: Taiwan: Lan-Yu, Dec. 1909, *Kusano* s.n. (lectotype, Tateishi & Ohashi loc. cit., TI).

M. iriomotensis Ohwi in *Act. Phytotax. Geobot.* 5: 181 (1936). Type: Ryukyus: Iriomote-jima: Takana, 11 May 1936, *Sonohara* s.n. (holotype KYO).

M. nigricans (Lour.) Steud. *sensu* auctt. *Jap. et Formos.*; Hatusima & Nacke-jima, *Fl. Ryukyus*: 234 (1979); see Tateishi & Ohashi loc. cit. for further references.

Woody climber. Stems with fine longitudinal grooves, older bark wrinkled; \pm glabrous but with sparse short adpressed fairly rigid hairs near nodes. Leaves up to 22 cm long; stipules deciduous, 7–8 \times 1 mm, apex acuminate, with long adpressed hairs outside; terminal leaflet \pm rhombic-elliptic or rhombic-ovate, 8–13 \times 6–8 cm, apex gradually narrowing into evenly-tapering acumen \pm 1 cm long with acute apiculate tip, widening from base (and sometimes apex) with rather straight outline giving basal half a tapering appearance, extreme base rounded or \pm cuneate; lateral leaflets very asymmetrical, up to 12 cm long, abaxial half up to 5 cm wide with rather truncate base, adaxial up to 2.5 cm. All leaflets: lateral veins 4–6, at least

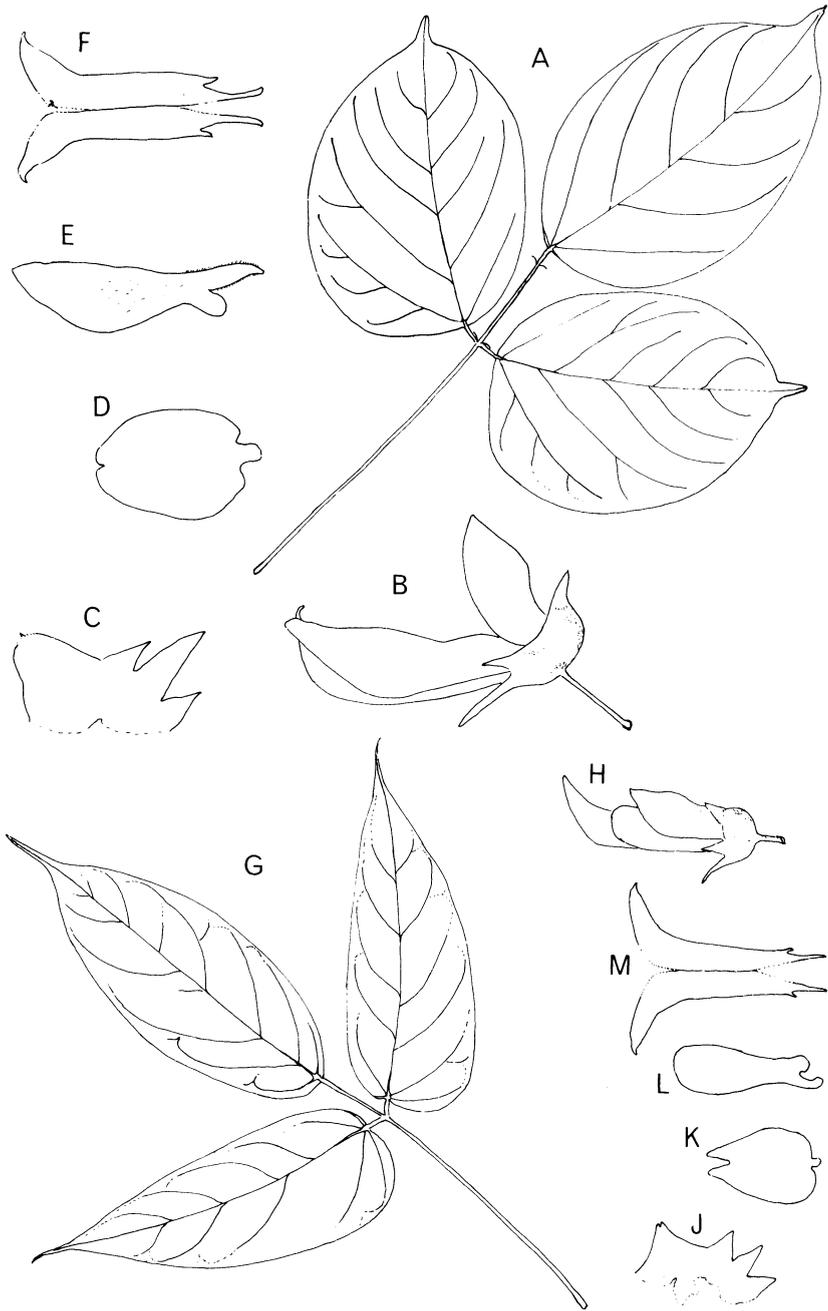


FIG. 5. **A-F** *Mucuna* sp. 'C': **A** leaf; **B** flower; **C** calyx opened out; **D** standard; **E** wing; **F** keel; all from Wang 78923. **G-M** *M. calophylla*: **G** leaf from Tsai 52797; **H** flower; **J** calyx opened out; **K** standard; **L** wing; **M** keel; all from Feng 789. **A** $\times \frac{1}{3}$; **B-M** $\times \frac{2}{3}$. Drawn by author.

lower ones rather straight, curving abruptly close to margin and becoming indistinct or arching and joining, thin but prominent each side, all reticulation very fine, \pm prominulous each side, with short pale \pm erect weak hairs abundant beneath, sparse above, drying rather green with pale yellow or brownish veins, chartaceous; petiole up to 9 cm long, rhachis 1.5–2 cm, petiolules 4–6 mm, all with short erect sparse pale weak hairs, these coarser and less sparse on petiolules; stipels 2–3 mm long, filiform. *Inflorescence* up to 12 cm long, sidebranches at least 6, usually 3-flowered, pedicels 6–10 mm long with sparse or dense short adpressed light brown hairs, similar hairs on axis; bracts and bracteoles deciduous before anthesis, bracts ovate, often broad, \pm 13 \times 8 cm, bracteoles lanceolate; both with acute apex, dense short adpressed pale hairs on both surfaces and brown irritant bristles outside. *Calyx* with dense short adpressed brown fine hairs on both surfaces and abundant irritant reddish bristles outside; tube medium to broadly cup-shaped, \pm 8 mm long, 13 mm wide; 3 lower teeth triangular to narrowly so, 2 laterals \pm 7 mm, lowest markedly longer, \pm 10 mm; upper lip well-marked, \pm equalling laterals, broadly triangular, narrowing abruptly to acute tip. *Corolla* dark purplish; standard 3–3.5 cm long \pm $\frac{2}{3}$ keel length, broadly rounded, apex cleft up to 2 mm, basal auricles \pm 3 mm long, eciliate; wings \pm 5 \times \pm 2 cm, equalling or slightly exceeding keel, apex narrowly rounded or acute, claw 7 mm and auricle 4 mm long, margin and outer surface short-hairy in claw region; keel \pm 5 cm long, basal claw of \pm 10 mm and auricle of 1 mm, upper margin of claw ciliate. *Staminal tube* \pm 4 cm long. *Style* hairy, ovary with dense adpressed long hairs, ovules 2. *Pod* leathery, asymmetrically elliptic-oblong, tapering to \pm rounded base and acute down-curved apex, laterally flattened, 8–9 \times 4–5 cm \times 5–10 mm, with abundant very short pale hairs, longer deciduous irritant red bristles and 9–12 raised wing-like lamellae, some interrupted or branched near middle giving appearance of almost a line running longitudinally along pod, otherwise lamellae running obliquely across whole width of pod and sometimes continuing onto marginal wings, wings, lamellae and pod surface all with reticulate pattern of raised lines; number of seeds (1–) 2; margin with pair of wings 6–10 mm wide, those from upper margin slightly the wider. *Seed* brownish black, \pm discoid, faces flattened or indented, \pm 2.5 \times 2.2 cm, \times 7 mm, surface smooth; hilum encompassing almost $\frac{3}{4}$ circumference. (Fig. 2G, H; 7H).

JAPAN. Endemic. Map 3. Ryukyu Is.: Iriomote: between Shira-hama and Sonai, 19 Aug. 1951, *Walker & Tawada* 6619 (A); Ishigaki: Hirakibo, 19 June 1971, *Yamazaki* 328 (BM).

HABITAT. Evergreen forest, near river or beside sea; sea level –30 m.

11. *Mucuna macrobotrys* *Hance* in Walp. Ann. 2: 422 (1851); Benth., Fl. Hongkong: 87 (1861) (as ‘*macrobotrya*’); Forbes & Hemsl. in J. Linn. Soc. 23: 190 (1887) & Ind. Fl. Sin. 3: 190 (1903); Bretschneider, Hist. Eur. Bot. Disc. China 1: 367 (1898) (as ‘*macrobotrya*’); H. Lév. in Bull. Soc. Bot. France 55: 409 (1908); Dunn & Tutcher, Fl. Kwangtung & Hongkong (China), Kew Bull. Addit. Series X: 83 (1912); Agric. Fish. Dept. Bull. I, Checklist Hongkong Pl. ed. 5: 33 (1978); *non sensu* Hand. Mazz., Symb. Sin. 7: 580 (1933). Type: Hongkong, *Harland* 762 (holotype K!) (not *Hance* as stated by some authors).

Tall *climber*; stems finely longitudinally grooved and with short red-brown fine hairs at nodes or \pm glabrous. *Leaves* 29–33 cm long; stipules deciduous, not seen; terminal leaflet elliptic or slightly obovate, 13–15.5 \times 7.5–8.5 cm, apex rarely rounded, more often with fairly wide acumen up to 1.5 cm long and extreme tip very abruptly apiculate, base \pm rounded; lateral leaflets usually very asymmetrical, 12–15 cm long, abaxial half 4–5.5 cm wide, base rounded or very slightly cordate, adaxial 2.7–3.2 cm wide. All leaflets: lateral veins 4–5, much curved and becoming indistinct near margin, raised and often grooved above, quite thick and prominent beneath, coarser reticulation thin, prominulous above and just visible beneath, finer reticulation visible above; usually rather thinly chartaceous, \pm glossy above, glabrous or with short sparse fine reddish hairs beneath; petiole 11–13 cm long, rhachis 3.8 cm, petiolules 7–10 mm, all glabrous or with sparse hairs as stem; stipels 4–6 mm long, terete, rather thin. *Inflorescence* 15 cm long, side branches 4–5, distant, 3-flowered; pedicels 1 cm long with short dark brown adpressed hairs, axis with very short fine erect reddish hairs and longer coarser red bristles; bracts deciduous, not seen. *Calyx* with short adpressed dark brown hairs (denser inside) and coarser longer deciduous red-brown bristles outside; tube broadly cup-shaped, 1 cm long, 1.5 cm wide; 3 lower teeth narrowly triangular, lowest \pm 10 mm long, laterals \pm 7 mm; upper lip sometimes equalling laterals, apex slightly cleft up to 1 mm. *Corolla* dark purplish, standard 4.5–5 cm long, $\frac{1}{2}$ – $\frac{2}{3}$ keel length, apex broadly rounded, margin in apical $\frac{1}{3}$ with prominent short brown hairs; wings 6–7 \times 2–2.5 cm, \pm $\frac{2}{3}$ keel length, apex broadly rounded, margin hairy as standard around apex and apical $\frac{1}{4}$ of lower edge and in claw region; keel (7.5–) 8–9 cm long, apex horny to 1 cm. *Staminal tube* 6.5–7 cm long. *Style* hairy in lower part; ovules 3. *Fruit* leathery, asymmetrically oblong, upper edge convex, much-flattened laterally, apex acute and downcurved to remains of style, base \pm rounded, 16–17 \times 4.5 cm, with short adpressed fine pale hairs and very sparse red-brown rather fine bristles, 12–16 oblique wing-like thin \pm adpressed lamellae up to 6 mm wide occasionally branching or discontinuous but mostly running across whole pod width, and patterning of raised transverse and finer branching lines; internal septa between the 3 seeds not or hardly apparent externally; each margin with pair of wings 6–15 mm wide, on upper margin often twice as wide as on lower, thin and inrolled, patterned as lamellae. *Seed* not seen. (Fig. 2L, M).

CHINA. Endemic. Map 2. Guangxi: Tai Ching Shan, 29 May 1935, *Ko* s.n. (A). Hongkong: 15 April 1903, *Ford* 1054 (BM); 'spont!', April 1857, *Hance* 1162 (BM, not a type as sometimes stated); *Harland* 762 (holotype K); U.S. North Pacific Exploring Expedition under Commanders Ringgold & Rodgers 1853–56, *Wright* s.n. (A).

HABITAT. Climbing on trees in woodland at low altitude.

12. *Mucuna* sp. 'C' aff. *M. macrobotrys* in general leaf form but flowers unlike anything else seen.

Climber, stems prominently grooved, sparsely hairy as *macrobotrys*. *Leaves* rather long, 34 cm, terminal leaflet \pm 14.5 \times 8.5 cm, acumen abrupt, long (up to 1 cm) and wide, laterals \pm 13 cm long, less asymmetrical than *macrobotrys*, abaxial half \pm 5.5 cm wide, base rounded or slightly truncate, adaxial \pm 3.5 cm. All leaflets: lateral veins 5–6, form as *macrobotrys* or arching and

joining near margin, all veins slightly more prominent; drying rather pale yellowish green, glabrous except for occasional fine hairs on veins beneath; petiole 15 cm long, rhachis 4 cm, petiolules 5–7 mm with short sparse stiff \pm erect brown hairs; stipels fairly thick. *Inflorescence* \pm 10 cm long, sidebranches and pedicels as *macrobotrys*, indumentum short \pm erect pale golden; bracts not seen. *Calyx* tube and teeth as *macrobotrys* but tube 1.6–1.8 cm wide, lowest tooth 11–12 mm long, indumentum \pm erect and bristles rather fine, more dense inside, upper lip sometimes exceeding lateral teeth, apex acute \pm apiculate. *Corolla* drying rather brownish, all parts smaller than *macrobotrys* and apices eciliate; standard \pm 3.2 cm long, $\frac{3}{5}$ keel length, apex shallowly cleft, margin slightly pale in apical region; wings 5–5.4 cm long \pm equalling keel, fairly narrow to 2 cm wide, basal claw 10 mm and auricle 4 mm long, apex narrowly rounded, besides short hairs in claw region on margin and outer surface, basal half of inner surface with abundant long fine \pm adpressed pale hairs; keel 5–5.5 cm long, apex horny to 7 mm. *Staminal tube* \pm 4 cm long. *Ovules* ? 3. *Fruit* and *seed* unknown but wide very short flattened ovary narrowed into style suggests wide non-linear fruit. (Fig. 5A–F).

CHINA. Map 2. W Yunnan, Meng-Ping, Jenn-Yeh Hsien, dense woods near river, 800 m, Oct. 1936. C. W. Wang 78923 (A).

Since only one, non-fruiting, specimen has been seen, material is inadequate for description as a new species.

13. *Mucuna championii* Benth. in Hook. Kew Journ.: 4: 49 (1852) & Fl. Hongkong: 87 (1861); Forbes & Hemsl. Ind. Fl. Sin. 1: 189 (1887); Bretschneider, Hist. Eur. Bot. Disc. China 1: 376 (1898); H. Lév. in Bull. Soc. Bot. France 55: 408 (1908); Dunn & Tutcher, Fl. Kwangtung & Hongkong (China), Kew Bull. Addit. Series 10: 83 (1912); Agric. Fish. Dept. Bull. 1, Checklist Hongkong Pl. ed. 5: 33 (1978); ? *non sensu* Tutcher in J. Linn. Soc. Bot. 37: 65 (1904). Type: Hongkong, East Point, *Champion* 597 (holotype K! isotype BM!).

Climber to 10 m; stems deeply longitudinally grooved and with abundant fairly long crisped orange pubescence, very old stems glabrescent. *Leaves* up to 15.5 cm long; stipules early deciduous, not seen; terminal leaflet broadly ovate, 7 \times 5.3 cm, apex acute, acuminate or apiculate, base very slightly cuneate; lateral leaflets asymmetrical, 16.8 cm long, abaxial half 3 cm wide with base rounded and slightly cordate, adaxial 2 cm; lateral veins 6, curving and becoming indistinct near margin, thin but prominent above, thicker and prominent beneath, coarse reticulation visible above, prominent beneath, fine reticulation just visible above, chartaceous, old leaflets glabrous above, younger with sparse fairly long weak golden or pale hairs, all leaflets beneath with dense red-brown hairs on veins and golden silky hairs (sparse on older leaves) on surface; petiole 6.5 cm long, rhachis 1.5–2 cm, petiolules 5 mm all with sparse or (especially young leaves) dense red-brown hairs as stem; stipels 1–2 mm long filiform. *Inflorescences* arising singly or in small groups from old wood, \pm 8 cm long, side branches distant, up to 7, usually 3-flowered; pedicels 3–4 mm long with dense adpressed crisped or straight red-brown hairs, similar hairs on axis; bracts and bracteoles very deciduous (see note). *Calyx* with dense short light brown hairs both sides and longer red-brown deciduous bristles outside; 2 lateral teeth 2 mm, lowest 4 mm,



MAP 4. Distribution of *Mucuna gigantea* ▲; *M. championii* ○; *M. pruriens* var. *pruriens* □ and var. *utilis* ■; *M. calophylla* ▽; *M. sp. 'A'* ○ and *M. sp. 'D'* * in China, Ryukyus and Western Japan.

long, all fairly broadly triangular, upper lip equalling lateral teeth, apex cleft to 1–2 mm; tube 7–8 mm long, 10 mm wide, fairly broadly cup-shaped. *Corolla* purple; standard 2.5 cm long, $\frac{2}{3}$ keel length, rounded, apex cleft to 1 mm, margin eciliate, basal auricles very small 1 mm long; wings 4 × 6–8 mm, length nearly equalling keel, apex rounded but narrow and somewhat upcurved, basal claw 7 mm and auricle 1 mm long, conspicuous light brown cilia in claw region and basal $\frac{1}{3}$ of lower margin, claw region sparsely pubescent outside; keel 4–4.2 cm long, basal claw 6 mm and auricle 1.5 mm long, apex horny to 7 mm. *Staminal tube* 3–3.2 cm long. *Style* hairy in lower part, ovary with dense often crisped golden pubescence, ovules 4. *Fruit* leathery, asymmetrically oblong, upper edge convex but indented between seeds, much-flattened laterally, with acute downcurved apex and \pm rounded base, $\pm 16 \times 1.5$ cm, when young with dense erect coarse pale brown deciduous bristles, when mature glabrescent with 12–15 wing-like thin, scarcely adpressed lamellae 3–4 mm wide all running obliquely across whole width of pod and patterned with thin raised transverse and reticulate lines; internal septa between the 3–4 seeds thick, apparent externally as slightly oblique narrow indentations; each margin with pair of slightly inrolled wings 1 cm wide. *Seeds* reddish brown, oblong, slightly asymmetrical in outline, flattened, $\pm 2.5 \times 2$ cm $\times \pm 7$ mm, shiny, smooth; hilum black, encompassing $\frac{1}{2}$ circumference. (Fig. 2J, K).

CHINA. Endemic. Map 4. Hongkong: *Champion* 597 (holotype K; isotype BM).

HABITAT. Climbing on trees in evergreen forest at low altitude.

Tutcher (1904) states that bracts are broadly ovate up to 3 cm long, bracteoles narrowly ovate or lanceolate 2 cm long, both pubescent each side; he also described flowers as borne on previous year's growth and not on very old wood in this species. Since the type shows inflorescences on old wood and of proportions such that so large bracts seem unlikely I am doubtful whether

he refers to a specimen of this species. Many Hongkong collections of *M. nigricans* var. *hongkongensis* (including one of his own ? named by himself), as also *de Poli* s.n. (*M. sempervirens*) have until now been determined as *M. championii*.

14. *Mucuna cyclocarpa* Metcalf in Lingnan Sci. Journ. 19: 561 (1940). Type: China: Fujian-Jiangxi border, *Wang Te-Hui* 334 (holotype A!; isotype E!).

M. macrobotrya sensu Hand.-Mazz., Symb. Sin. 7: 580 (1933) *non* Hance.

Climber; stems longitudinally ridged, \pm glabrous or with very sparse short pale fine but fairly rigid hairs denser at nodes and on young stems. *Leaves* 26–31 cm; stipules not seen; terminal leaflet triangular-cordate, very broad, up to 15.3 \times 11.5 cm, apex with very short acumen, extreme tip mucronate, lateral leaflets very asymmetrical, up to 15.5 cm long, abaxial half up to 6.8 cm wide with cordate base, adaxial 4 cm wide. All leaflets: lateral veins 5–7, curving and becoming indistinct very close to margin, midrib prominent \pm grooved above, lateral veins fairly prominent, coarse and fine reticulation thinly prominent above and below; fairly thin chartaceous with sparse shiny pale hairs above and (less sparse) below; petiole up to 13 cm long, rhachis up to 3.3 cm, petiolules 4–5 mm, all with sparse hairs similar to those on stem, less sparse on basal joint and petiolules; stipels 5 mm long, terete, filiform. *Inflorescences* borne on fairly old stems; bracts, bracteoles and inflorescence not seen. *Calyx* with short dense erect pale brown rigid hairs outside. *Flowers* unknown. *Fruit* leathery, oblong-linear but tapering to tip, torulose, slightly curved, laterally flattened, acute at apex, 9.3 \times 2 \times \pm 1 cm, abundantly shortly pubescent like calyx to glabrescent in places, with longer deciduous irritant reddish bristles and \pm 16 wing-like thin \pm erect lamellae of irregular height but up to 3 mm, some interrupted, otherwise running obliquely across whole width of pod, \pm 5-seeded, internal septa thin but very rigid, visible externally as slightly oblique well-marked grooves; margin with pair of wings, slightly crisped and of slightly irregular width but up to 3–4 mm. *Seeds* black and brown patterned in irregular streaks and blotches, almost spherical, 1.2 \times 1.1 cm \times 9 mm, shiny; hilum encompassing $\frac{1}{2}$ circumference, black with slight scurfy covering. (Fig. 3N–Q).

CHINA. Endemic. Map 3. Fujian-Jiangxi border: in Monte Dughwa-Schan inter Schitscheng et Ninghwa, Tungtien-Schan, 7 May 1921, Wang Te-Hui 334 (holotype A; isotype E).

HABITAT. Scandent on shrubs in stony places; 1200 m.

15. *Mucuna lamellata* Wilmot-Dear sp. nov. affinis *M. cyclocarpae* seminibus tamen multo magis compressis latitudine quam longitudine dimidio minoribus dissimilis; a *M. pruriens* et *M. bracteata* parte inferiore axium floribus bracteisque cicatricibusque nudo, alis facie interiore pilis aureis satis longis ornatis, fructibusque lamellatis diversa; cum *M. championii* adhuc confusa sed fructibus seminibusque multo minoribus, inflorescentiae axi ex axilla folii orienti et in parte inferiore floribus bracteisque carenti, foliis quoque magis angulatis subtus pallido- non ferruginoso-pubescentibus multo differt. Typus: China: Guangdong, *T.M. Tsui* 579 (holotypus A!; isotypus K!).

Planta usque 5 m scandens, \pm lignosa; caules striati, glabri vel pilis pallidis adpressis erectisve sparse obtecti. *Folia* 17–27 cm longa; stipulae mox caducae, 2–2.5 mm longae, haud 1 mm latae, extra eodem modo ac caulis pilosae; foliola 3, terminalia rhombeo-ovata basin versus ambitu \pm recta, apicem versus ambitu curvata decrescentia, raro rhombea vel late ovata, 6–13 \times (3.5–)5–9.5 cm, apice gradatim saltem usque 4 mm acuminata mucronata, base rotundata vel leviter cuneata; lateralia conspicue obliqua, 8–14 mm longa, parte abaxiali 4–6 cm lata \pm triangularia base oblique truncata saepe \pm cordata adaxiali 2–3 cm lata; omnium foliorum nervi laterales 5–6, leviter curvati marginem attingentes, utrinque elevati, et venis et rete venarum infra interdum supra elevatis, chartacea in siccitate plerumque claroviridia, supra glabra vel pilis satis longis adpressis sparsissime obtecta, infra nonnihil magis pilosa. Petiolus 7–11 cm longus; rhachis 2–2.5 cm longus; petioluli 4–5 mm longi; omnes partes caulis similes sed densius pilosae; stipellae 2–3 mm longae, lineares. *Inflorescentiae* ex axillis foliorum orientes, 7–27 cm longae, ramis 6–15 redactissimis omnibus distalibus confertis, usque $\frac{1}{5}$ – $\frac{3}{8}$ longitudinis axis plerumque trifloris, parte inferiore axis bracteis cicatricibusque carenti; flores inodori; pedicelli 7–8 mm longi, pubescentia erecta ferruginosa atque pilis longioribus pallidis adpressis obtecti; axis similiter sed longius basinque versus sparsius pubescens pilosusque. *Bractee* bracteolaeque lanceolatae, linearilanceolatae vel anguste ovatae, usque 7 \times 2 mm, intus \pm glabrae, extra \pm dense pallido-tomentosae; bractee valde deciduae; bracteolae saepe non multo ante anthesin caducae. *Calyx* extra intusque dense pallido-sericeo-pubescentis extraque setis ferruginosis sparsis densisve obtectus; tubus cupuliformis, 5–6 mm longus, 8–10 mm latus, lobis lateralibus anguste triangularibus \pm 2 mm longis, lobo inferiore anguste triangulari 3–4 mm longo, lobis 2 superioribus in labium saepe indistincte triangulare lateralibus brevius vel eos aequans apice rotundato acutove non bifido connatis. *Corolla* saturate purpurea vel fusco-rubra. *Vexillum* 2–2.5 cm longum, \pm dimidio carina brevius, late ellipticum, apice late rotundatum breviter (1–2 mm) bifido, auriculis basalibus minutis 1 mm longis, ungue \pm 2 \times 2 mm; alae oblongae, 3.2–4 \times 0.9–1.2 cm, carinam aequantes vel haud ea breviores, apice \pm rotundatae basi in unguem 6 mm longum et in auriculam 2 mm longam productae, margine prope basin ciliatae, in ungue auriculaeque utrinque fusco-pubescentes, in parte apicali usque $\frac{2}{3}$ longitudinis intus \pm copiose pilis aureis adpressis longis obtectae; carina gracilis (3.6–) 4(–4.5) cm longa, apicem versus abrupte et \pm angulariter curvata, parte flexa \pm 1 cm longa apice valde incrassata \pm uncinata, ungue basali 6–7 mm longo auriculo 1–2 mm. *Androecium* carinam \pm aequans, prope apicem abrupte curvatum, parte flexa \pm 8 mm longa et filamentis ibi liberis, tubo \pm 3 cm longo; filamentum vexillare omnino liberum. *Ovarium* lineare, \pm 7 mm longum, \pm 5 ovulatum; stylus \pm 3.4 cm longus, fusco-hirsutus, apicem versus glaber, stigmatum minus 0.5 mm lato terminatus. *Legumen* coriaceum, oblongum, \pm deorsum curvatum, basin apicemque versus angustatum, ambitu asymmetrico latere superno convexo, valde lateraliter compressum, 6.5–10 \times 2–2.3 \times 5–8 mm, juventute pagina setis densis erectis omnino tectum, demum (in vivo \pm viride) pubescentia pallida erecta setisque ferruginosis irritantibus deciduisque obtectum atque 12–16 lamellis \pm erectis oblique transversis 1–3 mm altis interdum interruptis ornatum, 3–5-seminatum, inter semina profunde transverse sulcatum, margine utrinque bialatum alis 2–3 mm latis. *Semina* saturate roseo-fusca vel atra, discoidea,

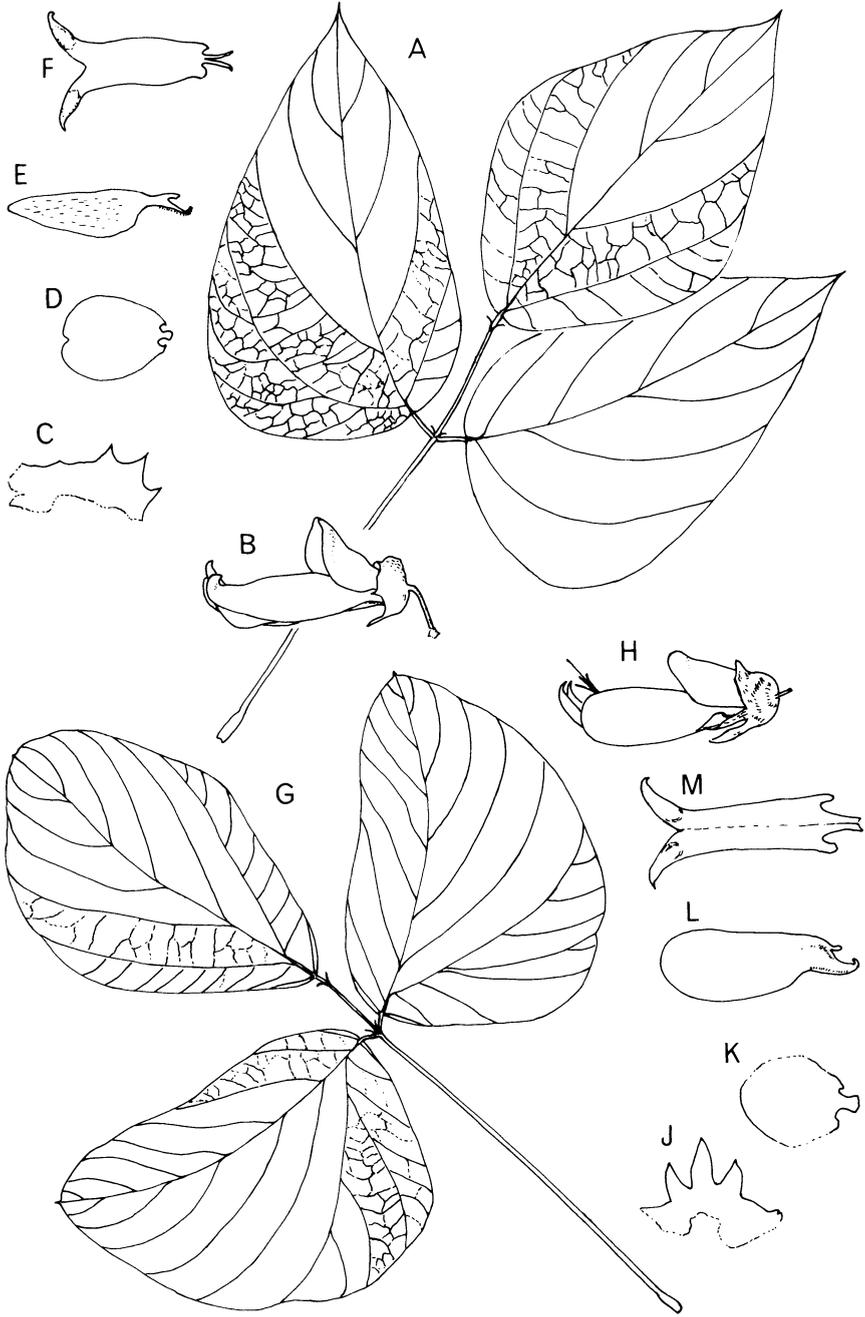


FIG. 6. **A-F** *Mucuna lamellata*: **A** leaf; **B** flower; **C** calyx opened out; **D** standard; **E** wing; **F** keel; all from *Tsang* 28001. **G-M** *M. sp.* 'A': **G** leaf; **H** flower; **J** calyx opened out; **K** standard; **L** wing; **M** keel; all from *Wang* 79571. **G** $\times \frac{1}{2}$, rest $\times \frac{2}{3}$. Drawn by author.

compressa, faciebus convexis $\pm 11 \times 9 \times 7$ mm, laevia, \pm nitentia; hilum nigrum, $\pm \frac{5}{8}$ circumferentis cingens, arillo nullo. (Fig. 3 R-T, 6 A-F).

CHINA. Endemic. Map 3. Hubei: Ichang, *Wilson* 1610 (K). Zhejiang: near Yuhang, *Meyer* 1503 (K). Jiangxi: Chien Shan, *H. H. Hu* 1269 (C.C.C. No. 51979) (A). Guangxi: Hing on District, *Z. S. Chung (T. S. Tsoong)* 83685 (A, IBSC); Chuan Hsien, *H. Fung* 21058 (A); Ling-chai-miao, *W. T. Tsang* 27834 (A); San-min village, *Tsang* 28001 (A). Guangdong: Lien Chan River, *Ford* 64 (K) (mixed coll.; other sheet is *M. pruriens*); Ru-yue, *Y. G. Liu* 701 (IBSC); Lo Fau Shan, *Mell* s.n. (HK. herb. no. 7821) (HK); Hau Tung Shan, *To & Tsang* CCC no. 12916, (A, BM, E); Yang Shan, *T. M. Tsui* 579 (holotype A; isotype K).

HABITAT. Climbing on shrubs in thickets, streams, roadsides, open valleys; sometimes abundant; ± 700 –1,500 m.

16. *Mucuna gigantea* (Willd.) DC. Prodr. 2: 405 (1825); Burck in Ann. Jard. Buitenzorg 11: 187 (1893); Gagnep. in Fl. Indo-Chine 2: 318, fig. 33, 7–14 (1916); Ohashi & Tateishi in J. Jap. Bot. 51(6): 164 fig. 2, 3, (1976); Tateishi & Ohashi in Bot. Mag. Tokyo 94: 92, fig. 1 (1981) which see for detailed list of refs. and syns. Type: Rheede, Hort. Malab. 8: 63 t. 36 (1688).

Climber, often large, 3–6 m high; stems smooth or finely longitudinally grooved, old stems wrinkled; glabrous or with sparse short \pm adpressed fine pale hairs. *Leaves* 13–27 cm long; stipules very deciduous, 3–5 \times up to 1 mm, sparsely hairy as stem outside; terminal leaflet usually elliptic-ovate, sometimes elliptic, rhombic or ovate, rarely broadly ovate, 7–13 \times 4–8.5 cm, apex \pm shortly acuminate, apiculate, sometimes mucronate, base \pm rounded; lateral leaflets very asymmetrical, 7–11 cm long, abaxial half 3–5 cm wide, base slightly cordate, adaxial 1.5–3 cm wide. All leaflets: lateral veins 4–6, curving and becoming indistinct near margin, prominent, coarse and fine reticulation finer but often prominent above and beneath, thinly chartaceous, often glossy above, glabrous or with sparse short pale adpressed hairs on veins or whole surface above and beneath; petiole 3.5–11 cm long with only indistinct pulvinus, rhachis 1.8–3 cm, petiolules 5 mm, all with hairs as stem but shorter and less sparse; stipels 3–5 mm long, filiform. *Inflorescence* often borne on older stems, 8–25 cm long, sidebranches 4–5, 3-flowered and all crowded into upper $\frac{1}{4}$ or less, lower (flowerless) part of axis without either bracts or scars; pedicels 5–20 mm long, of rather varying lengths such that the inflorescence forms a corymb with dense short pale fine hairs, similar more sparse hairs on axis; bracts deciduous, outer lanceolate up to 5 mm long, inner elliptic, 3 mm; bracteoles later deciduous from young buds, ovate-lanceolate, 16–18 \times 5–7 mm, apex rounded; inner bracts and bracteoles boat-shaped, margins incurved to clasp bud, all bracts and bracteoles with sparse short pale adpressed hairs outside and (bracteoles) sometimes inside. *Calyx* with dense dark brown fairly coarse adpressed hairs inside and out with sparse or abundant longer deciduous red-brown bristles outside; tube rather narrowly cup-shaped, 8–10 mm long, 11–16 mm wide; 2 lateral teeth ± 1 mm long, lowest tooth ± 3 mm, all broadly triangular; upper lip \pm equalling lateral teeth, apex widely or narrowly cleft to depth of 1–2 mm. *Corolla* pinkish or greenish white; standard 2.5–2.8[–3.8] cm long, $\frac{2}{3}$ – $\frac{3}{4}$ keel length, apex cleft 1–2 mm, eciliate, basal auricles 1–2 mm long; wings 2.8–4.4 cm \times 8–10 mm usually \pm equalling keel, apex rounded, basal claw 7

[–11] mm and auricle 4 mm long, conspicuous pale brown cilia in claw region and basal $\frac{1}{2}$ of lower margin; 3–4.2 cm long, basal claw 6 mm and auricle 2 mm long, apex horny to 5 mm, extreme tip usually not hooked. *Staminal tube* up to 2.2 cm long. *Style* hairy in lower part; ovules 3. *Fruit* leathery, asymmetrically elliptic-oblong, much-flattened laterally, apex \pm acute, slightly downcurved, base \pm rounded, 7–14 \times 4–5.5 cm \times 5 mm, with short dense adpressed yellowish brown hairs but glabrescent with age, and rather regular reticulate pattern of close thin raised lines giving surface a pitted appearance, 1–3-seeded, internal septa marked externally by indistinct shallow grooves; margin thickened and with pair of leathery wings, (those on upper margin slightly the wider), 5–10 mm wide, with reticulate pattern of raised lines. *Seed* dark brown or blackish, reniform or discoid, faces convex, 2.3–3 \times 2–2.5 cm \times 8–10 mm, smooth; hilum black, encompassing $\frac{2}{3}$ – $\frac{3}{4}$ circumference. (Fig. 2A–C).

HABITAT. Thickets, hillsides, often coastal; low altitude.

Only material of subsp. *gigantea* seen: square brackets above indicate measurements for subsp. *tashiroi* taken from Ohashi & Tateishi tom. cit.: 166 fig. 3 (1976) where these differ.

subsp. **gigantea**; Ohashi & Tateishi tom. cit.: 164, f.2 (1976).

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

Carpogon giganteus (Willd.) Roxb., Hort. Beng. 54 (1814).

Stizolobium giganteum (Willd.) Spreng., Syst. Cur. Post. 281 (1827).

Mucuna toyoshimai Nakai in Bot. Mag. Tokyo 35: 144 (1921). Type: Bonin Is., Nakai s.n. (holotype TI).

Standard $\frac{3}{4}$ wing length, wing claw less than $\frac{1}{4}$ total wing length, upper calyx teeth closely connate giving upper lip a narrow cleft. Bonin & Ryukyu Is; Hainan. Map 4.

JAPAN. Bonin Is: Hahajima, 28 Dec. 1973, *Furuse* 7631 (K) & 26 April 1917, *Wilson* 8326 (A, K); Chichijima, 4 May 1917, *Otomo* s.n. (A); U.S. North Pacific Exploring Expedition under Commanders Ringgold & Rodgers, 1853–56, *Wright* 66 (A, K).

EXTERNAL DISTRIBUTION. India; Malesia; Australia; Polynesia.

subsp. **tashiroi** (*Hayata*) *Ohashi & Tateishi loc. cit.*: 166, fig. 3 (1976). Type: Taiwan: Pingtung, Heng Chun, Kuraro, April 1909, *Y. Tashiro* s.n. (holotype & isotype TI).

Mucuna tashiroi Hayata, Icon. Pl. Formos. 3: 75 (1913); Makino & Nemoto, Fl. Jap.: 743 (1925) & ed. 2, 589 (1931).

M. gigantea (Willd.) DC. *sensu* Hosokawa in Journ. Soc. Trop. Agr. 4: 490 (1932), *pro parte*; Li, Woody Fl. Taiwan: 355 (1963) Huang & Ohashi in Fl. Taiwan 3: 342 (1977).

Standard more than $\frac{4}{5}$ wing length, wing claw $\frac{1}{3}$ total wing length, upper calyx teeth loosely connate giving lip wide cleft. Endemic to Taiwan. Map 4.

17. *Mucuna* sp. 'D' aff. *M. gigantea* in leaf and inflorescence form.

Climber, stem glabrous. *Leaves* \pm 24 cm long, stipules not seen; terminal

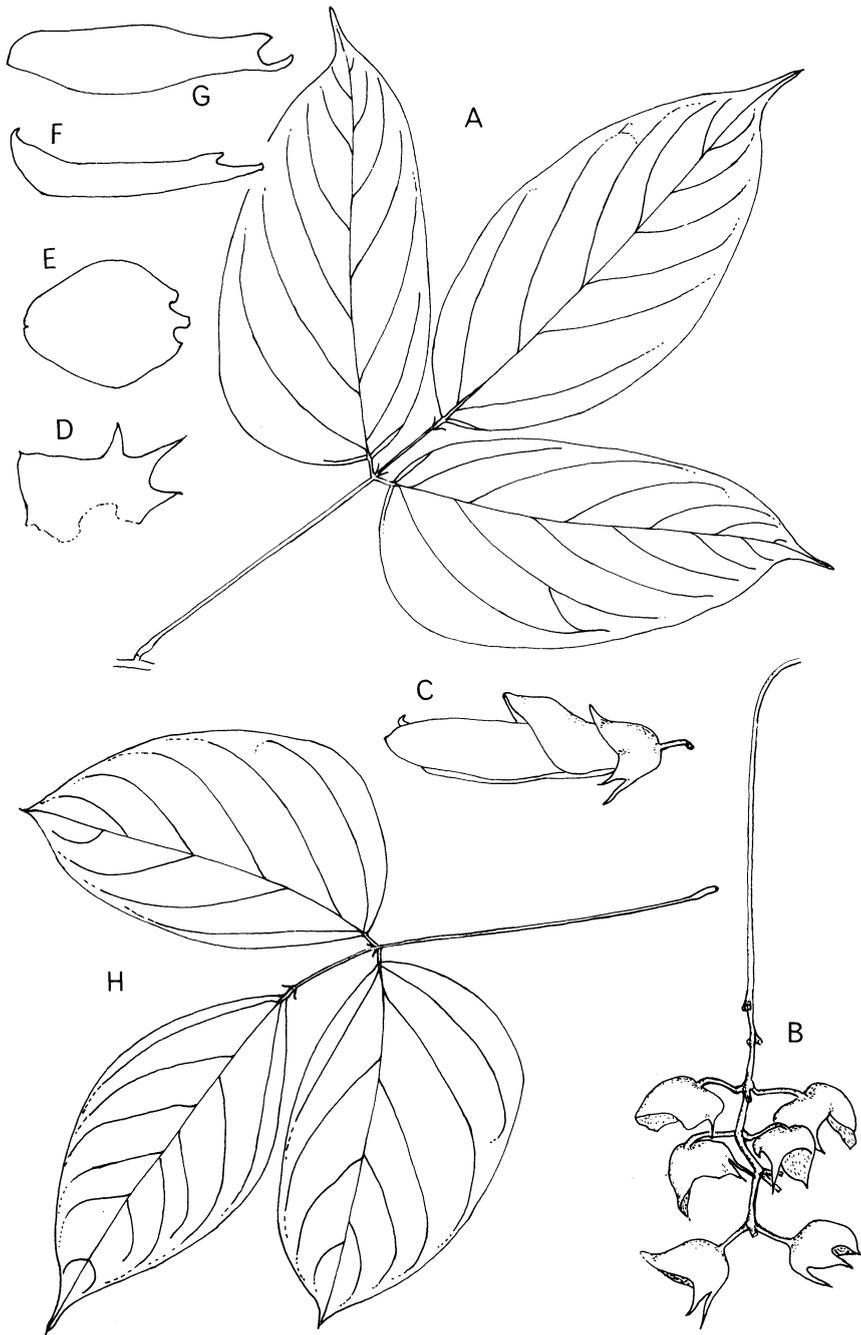


FIG. 7. **A-G** *Mucuna* sp. 'D': **A** leaf; **B** inflorescence; **C** flower; **D** calyx opened out; **E** standard; **F** wing; **G** keel; all from Wang 80022. **H** *M. membranacea* leaf from Yamazaki 328. **A**, **H** $\times \frac{1}{2}$; **B-G** $\times \frac{2}{3}$. Drawn by author.

leaflet elliptical, rather narrower, $\pm 13 \times 6$ cm, apex with acumen up to 1.5 cm long abruptly narrowing to apiculus or mucro 1–2 mm long, laterals rather long and narrow, ± 12 cm long, abaxial half 3.6 cm wide, adaxial 2 cm; leaf surface and venation as *gigantea*; rather thinly chartaceous; petiole ± 8 cm long, pulvinus conspicuous, rhachis 2 cm, petiolules as *gigantea*, indumentum short, rigid, brown; stipels 2–3 mm. *Inflorescence* ± 20 cm long, sidebranches crowded as in *gigantea* and each with 2–3 flowers; pedicels mostly slightly shorter, 8 mm, and all of similar length so that inflorescence not quite a corymb; pubescence as *gigantea*; bracts not seen, no scars on flowerless part of peduncle. *Calyx* tube as *gigantea* but lateral and lowest teeth much longer, 5–6 mm and 9–10 mm, respectively half, and equalling, tube length, pubescence short, pale, with darker rather fine bristles outside. *Corolla* light greenish, all parts longer, standard 3–3.5 cm, apex hardly cleft; wings 5.2–5.4 cm long 1.3–1.4 cm wide, slightly exceeding keel, apex rather narrowly rounded, claw and indumentum as *gigantea*; keel 5.1–5.3 cm long, apex horny to ± 1 cm. *Staminal tube* 4 cm long. *Ovules* 2. *Fruit* and *seed* unknown but wide flattened ovary suggests wide flattened fruit. (Fig. 7A–G.)

CHINA. Map 4. W Yunnan: Meng-Him, Jenn-Yeh Hsien, wooded mountain slope, 850 m, Oct. 1936, C. W. Wang 8002 (A).

Since only one, non-fruiting, specimen has been seen, material is inadequate for description as a new species but, having the unusual inflorescence-form seen only in *M. gigantea*, from which however its flowers are distinct, it seems worthy of a description giving detailed differences from the latter.

B. SUBGENUS STIZOLOBIUM (P.Br.) Prain

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

18. *Mucuna bracteata* DC. ex Kurz, J. Asiat. Soc. Beng. 42: 231 (1873); Bak. in Hook.f., Fl. Brit. Ind. 2: 186 (1876); Gagnep., Fl. Gen. Indoch. 2: 323 (1916). Types: Burma: Pegu, Martaban, Ava, ? Kurz (syntypes CAL); Roxb. drawing 138 (syntype ?CAL, ?copy K!).

Carpogon bracteatum Roxb., Hort. Beng: 54 (1814) *nom nud.*

Stizolobium venulosum Piper in Proc. Biol. Soc. Washington 30: 60 (1917).

Type: Burma, MacGregor 1144 (holotype CAL).

Mucuna venulosa (Piper) Merrill & Metcalf in Lingnan. Sci. Journ. 16: 196 (1937); How (ed.), Fl. Kwangchow: 369 (1956); Chun & Chang, Fl. Hainan. 2: 315 (1965).

Herbaceous or semi-woody climber up to 4 m; stem longitudinally ridged, old branches smooth or slightly wrinkled, glabrous or with sparse or dense short adpressed pale weak hairs on both young and relatively old stems. *Leaves* 14–31(–39) cm long; stipules early deciduous, not seen; terminal leaflet rhombic or sometimes broadly elliptic, broadly ovate or obovate, relatively wide, 7–14 \times 5.6–11(–13) cm, apex acute, rarely very shortly acuminate up to 5 mm, mucronate, base rounded; lateral leaflets very asymmetrical, 7–14 cm long, abaxial half 3–8.5 cm wide with base \pm truncate, widening from base and apex to widest point with rather straight

outline giving \pm triangular shape, adaxial 2–3 cm wide. All leaflets: lateral veins 5–7, slightly curved and running right into margin, raised and often grooved above, rather stoutly prominent beneath, tertiary veins not or hardly branched, all \pm parallel, running transversely often \pm at right angles to lateral veins, slightly raised above, thin but often prominent beneath, fine reticulation sometimes visible beneath; often fairly thick, markedly paler below at least in dry state, upper surface very dark, with sparse or abundant usually fairly short \pm erect pale fine hairs especially on midrib and lateral veins, lower surface very pale, indumentum usually similar but denser and midrib, lateral veins and sometimes reticulation rather less pubescent, usually conspicuously darker than surface and pubescence; rarely both surfaces glabrous; petiole 6–27 cm long, rhachis 1–4 cm, petiolules 5 mm, all, or only petiolules, with short erect dark brown hairs; stipels 2–5 mm long, terete, quite robust. *Inflorescences* 18–41 cm long, axillary, arising sometimes in pairs and often from very young stems; sidebranches 12–many, crowded in upper $\frac{2}{3}$ of inflorescence, 2-flowered; axis of inflorescence with numerous bracts or scars throughout length; pedicels 5–7 mm long with short dense pale brown hairs and sparse or dense longer coarse red-brown deciduous irritant bristles, axis hairs similar; bracts and bracteoles usually persistent at anthesis and especially lower bracts often present on nearly mature infructescence, very variable, (those on lower $\frac{1}{3}$ usually longer, \pm triangular), obovate, lanceolate, ovate or linear-lanceolate, 2–22 \times 8–10 mm, apically rounded, acute or acuminate, with short dense pale brown hairs outside and (sparser) inside and sometimes longer coarser deciduous irritant red-brown bristles outside. *Calyx* pubescent as pedicels both sides and with bristles like the stem outside; tube fairly broadly cup-shaped, 4–7 mm long, 7–10 mm wide; 2 lateral teeth 2–4 mm long, lowest tooth (3–)5–6 mm long fairly broadly triangular, upper lip equalling or exceeding laterals, apex rounded or slightly cleft. *Corolla* dark purple-maroon, fragrant; standard 1.6–2.3 cm long, up to $\frac{1}{2}$ (rarely $\frac{2}{3}$) keel length, rounded, apex slightly cleft to 1 mm, margin eciliate, basal auricles 1–2 mm long; wings 2.5–3.3 cm \times 6–8 mm, $\frac{3}{4}$ keel length or slightly less, apex rounded, basal claw 4 mm and auricle 1–2 mm long, conspicuously ciliate in claw region and in basal $\frac{1}{3}$ of lower margin, claw shortly pubescent outside; keel 3.5–4.3 cm long, basal claw 5–8 mm and auricle 1–2 mm long, apex horny to 5–7 mm. *Staminal tube* 2.5–3 cm long. *Style* hairy in lower part; ovary with short dense dark brown hairs, ovules \pm 6. *Fruit* fleshy, curved, linear but tapering towards tip and somewhat swollen around seeds, somewhat flattened laterally, acute and downcurved or hooked at apex, 6–9 \times 1.2–1.6 cm \times 3 mm, dark brown or grey with dense dark brown or golden deciduous irritant bristles, 3–6-seeded, internal septa 2–4 mm thick, visible externally as slightly oblique grooves; margins thickened and with slight groove along suture. *Seeds* very similar to those of *M. pruriens*, ellipsoid, slightly flattened, \pm 9 \times 6 \times 4 mm, brownish black, usually with pinkish-brown mottling, shiny or dull, smooth, hilum 5 mm long, ($\frac{1}{8}$ circumference), grey with black central line and narrow raised black marginal aril. (Fig. 3M).

CHINA. Map 3. Yunnan: Manhao, *Beauvais* 823 (P); *Bons d'Anty* s.n. (P); Ta Ping Valley, Upper Burma, 24°20'N, *Forrest* 952 (A, K); Mengzi, *Henry* 10417 (A, K); Szemao, *Henry* 12749 (A, E) & 12749A (A, E, K; cited in original *S. venulosum* description); Ho-Kou, *H. T. Tsai* 52654 (A); Lu-Se, *Tsai*

56410 (A, IBSC); Li-Kiang Hsien, *C. W. Wang* 70656 (A); Menghim, Jenn-yeh Hsien, *Wang* 79947 (A). Guang-dong: Sun Yat-Sen Univ. Bot. Gard. (? cult.), *S. H. Chun* 2134 (IBSC). Hainan: Chim Fung Mt, *S. K. Lau* 5247 (A); Bak Sa, *Lau* 25566 (A, IBSC) & 26024 (A); Tai Wong Lin, *C. I. Lei* 349 (HK, K); *H. Y. Liang* 64342 (A); Nga Wan, *Mc Clure* 1842 (CCC No. 8350) (A); Ang Mao, *Smith* 73 (K); *C. Wang* 36472 (A).

EXTERNAL DISTRIBUTION. Eastern Himalayas; Thailand; Laos; Vietnam.

HABITAT. Climbing on shrubs and trees, forest, thickets or open grassland, on mountain slopes, by paths or streams; 600–2000 m.

19. *Mucuna pruriens* (L.) DC., Prodr. 2: 405 (1825); Bak. in Fl. Brit. Ind. 2: 187 (1876); Dunn, Suppl. List Chinese Plants, in J. Linn. Soc. Bot. 39: 469 (1911); Chun & Chang, Fl. Hainan. 2: 315 (1965); Verdcourt in Man. New Guinea Legum.: 451 (1979). Type: Indonesia, Amboina, Rumphius, Herb. Amb. 5 t. 142 (1750).

Dolichos pruriens L. in Stickman, Diss. Herb. Amb.: 23 (1754) & Syst. Nat., ed. 10: 1162 (1759).

Stizolobium pruriens (L.) Medic. in Vorles., Churpf. Phys. Ges. 2: 399 (1787).

Mucuna prurita Hook., Bot. Misc. 2: 348 (1831) & Bot. Mag 82: t. 4945 (1856); Wight & Arn., Prodr. 1(2): 255 (1834); Dalz. & Gibs., Bomb. Fl.: 70 (1861), *nom. illegit. superfl.* Type as for *M. pruriens*.

M. esquirolii H. Lév. In Fedde, Repert. Nov. Sp. 7: 231 (1909); Dunn, loc. cit. (1911); H. Lév., Fl. Kouy Tcheou: 240 (1914–15); Rehder in Journ. Arn. Arb. 13: 331 (1932). Type: China, Kouy Tcheou [Guizhou], *Esquirol* 885 (holotype E!).

Climber, semi-woody often large up to 4 m long; stem with many fine longitudinal grooves, glabrous or with sparse pale weak fine hairs and often longer coarser hairs. *Leaves* of very varying sizes up to 46 cm long; stipules 3–4 × 1 mm, hairy as stem, very deciduous; terminal leaflet elliptic or rarely rhombic-ovate, rather wide, (8.5–)14–16 × (4.5–)8–10 cm, length 1½–1¾ × width, apex rounded, ± acute, or narrowing into very short (up to 5 mm) acumen, extreme tip often mucronate, base rounded; lateral leaflets very asymmetrical, 7–19 cm long, abaxial half 3.5–12 cm wide, 2–3 × adaxial width, base somewhat truncate or rarely cordate, adaxial half 1.5–4 cm wide. All leaflets: lateral veins 5–8, curving slightly and running into margin, prominent above and below, coarse reticulation thinly prominent, fine reticulation visible but often inconspicuous above, slender but prominent beneath; fairly thin, drying paler beneath than above, upper surface glabrescent or with fairly abundant fine pale weak hairs often more numerous on veins, similar but denser (not silky) indumentum below; petiole 26 cm long, rhachis 1.2–2 cm, petiolules 4–6 mm, all with sparse hairs as stem; stipels 4–5 mm long, terete, fairly thick. *Inflorescence* arising from axils, 3–4 cm long, side-branches 2–13, 2–3-flowered and spaced throughout length or in top ⅔ of axis and then no bracts or scars on lower flowerless part; pedicels 2–4 mm long, with dense ± silky adpressed pale hairs and often also deciduous reddish bristles, similar hairs and bristles on axis more sparse towards base; bracts and bracteoles deciduous as flowers develop, linear-lanceolate, lanceolate or narrowly ovate, 6–9 × 1–3 mm, with short weak pale hairs dense outside sparser inside. *Calyx* with dense short pale or light brown adpressed hairs outside and inside, often also longer whitish or light brown deciduous

bristles; tube broadly cup-shaped, 5 mm long, 10 mm wide; 2 lateral teeth broadly triangular, $2\text{--}4 \times 1\cdot5\text{--}3\text{--}(3\cdot5)$ mm, lowest tooth narrowly triangular, $6\text{--}10 \times 2\text{--}3$ mm, usually 2–3 times as long as laterals and usually longer than tube; upper lip slightly longer than laterals and with rounded or acute tip. *Corolla* purple or white; standard $1\cdot6\text{--}2\cdot5$ cm long, $\frac{1}{2}\text{--}\frac{2}{3}$ keel length, rounded, apex very slightly cleft, basal auricles hardly visible, margin ciliate; wings $2\text{--}4 \times \pm 1\cdot2$ cm, shorter than or \pm equalling keel, basal claw 4 mm and auricle 1 mm long, apex rounded, claw region with margin ciliate and often shortly pale pubescent surface; keel $2\cdot8\text{--}4\cdot2\text{--}(4\cdot5)$ cm long, basal claw 5 mm and auricle 1–2 mm long, apex horny to 0·5–1 cm. *Staminal tube* 2–2·7 cm long; ovules ± 6 . *Fruit* fleshy, oblong-linear but torulose, slightly curved and narrowing towards tip or \pm sigmoid, rather misshapen and often greatly swollen around seeds, laterally flattened, apex acute and downcurved often hooked, $5\text{--}9 \times 0\cdot8\text{--}2$ cm $\times 5$ mm; with very dense covering of long rigid irritant deciduous dark brownish, orange or golden bristles or sparse to dense short or long pale fine hairs, 3–6 seeded, septa papery and very thin, on linear pods visible externally as slightly oblique grooves often indistinct due to dense bristle-covering; margin \pm thickened, centrally grooved, sometimes ridged; surface with or without irregular longitudinal wrinkles. Seeds of various colours, ellipsoid, $1\cdot3\text{--}1\cdot7\text{--}(2) \times 0\cdot9\text{--}1\cdot3$ cm $\times (3\text{--})4\text{--}10$ mm, shiny; hilum only occupying $\frac{1}{8}$ circumference, 6 mm long, with aril forming a raised orange border.

var. **pruriens**

Corolla dark purple; standard 1·7–2·5 cm long, wings 3·5–4 cm, keel 3·8–4·2 cm. *Pods* linear, up to 1 mm broad, with very dense covering of long irritant deciduous dark, orange or golden bristles; septa visible as oblique indistinct grooves, other surface detail invisible beneath indumentum, surface not wrinkled. *Seeds* fawnish brown. (Fig. 3J–L).

CHINA. Map 4. Yunnan: Mengze, *Henry* 10963 (A, K); Yuanchang, *Henry* 13499 (A, BM, E, K); Near Nacholi, Puerh, *Y. Tsiang* 12896 (IBSC); Meng-La, *C. W. Wang* 80460 (A). Hainan: Ai Xian, *China–Germany coll.* 2074 (IBSC); Yaichow, *N. K. Chun & C. L. Tso* 44507 (A, K); Chim Fung Mt, *S. K. Lau* 5122 & 5165 (A); *H. Y. Liang* 66157 (A).

EXTERNAL DISTRIBUTION. Widely distributed: Tropical Africa; Madagascar; Asia; Tropical America.

HABITAT. Montane forest, mixed woodland to light shade, tall scrub, open thickets and riversides; 0–1700 m. Vernacular names: ‘spiny hair bean’ Zhe maoli dou; ‘dragon’s teeth bean’, Long ya dou (Mandarin).

var. **utilis** (*Wall. ex Wight*) *Bak. ex Burck* in *Ann. Jard. Buitenzorg* 11: 187 (1893). Type not indicated.

Marcanthus cochinchinensis Lour., *Fl. Cochinch.*: 461 (1790) & ed. Willd.: 563 (1793). Type: Cochinchina, *Loureiro* s.n. (holotype BM!).

Carpogon niveus Roxb., *Hort. Beng.*: 54 (1814) & *Fl. Ind.* 3: 285 (1831). Type: Roxb. drawing no. 1601 (lectotype K! chosen here).

Mucuna capitata Sweet, *Hort. Brit. ed.* 1: 482 (1827) *nom. nud.*

Carpogon capitatus Roxb. *Fl. Ind.* 3: 284 (1832). Type: Roxb. drawing no. 285 (lectotype K! chosen here).

Mucuna capitata Wight & Arn. *Prodr.* 1(2): 255 (1834); Benth. in *Pl. Jungh.*:

- 273 (1852); Miquel, Fl. Ind. Bat. 1: 212 (1855); Bak. in Fl. Brit. Ind. 2: 187 (1876); Ito & Matsum. in J. Coll. Sci. Tokyo 12: 420 (1900); Matsum. & Hayata in J. Coll. Sci. Univ. Tokyo 22: 110 (1906); Dunn, Suppl. List Chinese Pl. in J. Linn. Soc. Bot. 39: 469 (1911); Icon. Cormophyt. Sin. 2: 498 fig. 2726 (1972). Type: Roxb. drawing no. 285 (lectotype K! chosen here).
- M. nivea* (Roxb.) Wight & Arn., Prodr.: 255 (1834); Bak. in Fl. Brit. Ind. 2: 188 (1876); F.-Vill., Nov. App.: 63 (1880); Piper & Tracy in U.S. Dept. Agric. Bur. Pl. Industry, Bull. 179: 15 pl. 4 fig. A (1910).
- M. utilis* Wall. ex Wight, Ic. Pl. Ind. Or. 1: 280 (1840); Gagnep., Fl. Gen. Indoch. 2: 321 (1916); Pham. Hoang Ho, Ill. Fl. S. Viet-Nam, ed. 2, 1: 885, fig. 2226 (1970).
- M. velutina* Hassk., Hort. Bog.: (1844). Type: syntypes: ? specimens cult. at Bogor.
- M. pruriens* (L.) DC. var. *capitata* Burck in Ann. Jard. Buitenzorg 11: 87 (1893).
- M. martinii* H. Lév. & Vaniot in Bull. Soc. Bot. France 55: 409 (1908); Dunn, loc. cit. (1911); H. Lév., Fl. Kouy Tcheou: 240 (1914–15). Type: Guizhou, Martin & Bodinier 1984 (holotype E!, photo. and part of holotype A!).
- Stizolobium deeringianum* Bort in U.S. Dept. Agric. Bur. Pl. Industry, Bull. 141: 31 pl. 2, 3 (1909). Types: Argo, Florida, 1890, *S. C. Carleton* (syntypes ?US or ?NA).
- Mucuna deeringiana* (Bort) Merr. in Philipp. J. Sci. 5: 118 (1910).
- Stizolobium utile* (Wall. ex Wight) Piper & Tracy in U.S. Dept. Agric. Bur. Pl. Industry, Bull. 179: 14 (1910).
- S. hassjoo* Piper & Tracy in tom. cit.: 17, Pl. 5 fig. B (1910). Type: Cult.: Yokohama Nursery Co., *S.P.I.* no. 25254 (holotype: ?US or ?NA).
- S. aterrimum* Piper & Tracey in tom. cit.: 18 (1910). Types: Cult.: *S.P.I.* no. 21300 (syntype NA!), *S.P.I.* nos. 19180, 22031, 22032, 25262, 24922, 25870, 25755, 21951, 21953, 24935 (syntypes ?US or ?NA).
- S. velutinum* (Hassk.) Piper & Tracy tom. cit.: 20 (1910).
- Mucuna cochinchinensis* (Lour.) A. Chev. in Bull. Agr. Inst. Sci. Saigon 1: 91 (1919); Rehder in Journ. Arn. Arb. 13: 331 (1932); Merr. in Trans. Amer. Phil. Soc. 24(2): 209 (1935); How (ed.), Fl. Kwangchow: 369 (1956); Chun & Chang, Fl. Hainan. 2: 316 (1965); Van Thuan in Fl. Cambodge Laos Viet-Nam. 17: 32 (1979).
- M. atrocarpa* Metcalf in Lingnan Sci. Journ. 19: 559 (1940). Types: Hainan: Liang 66443 (syntype A!), How 73745 (syntype A!; isosyntype IBSC!).
- M. hassjoo* (Piper & Tracy) Mansf. in Kulturpfl.; Beih. 7: 204 (1959).

Stem always without longer coarser hairs. *Terminal* leaflet often markedly small compared with laterals, 6.5–15 × 4.5–10 cm, length rarely over 1½ × width. Deciduous red-brown bristles absent from pedicels and inflorescence although long finer hairs often on calyx; lowest calyx tooth up to twice (never 3 ×) as long as lateral lobes. *Corolla* purple or whitish, often rather short; standard 1.6–1.8 cm long, wings 2–3.5 cm, keel 2.8–3.5(–4.5) cm. *Fruits* linear but often rather misshapen due to irregular width of swellings around seeds, sometimes up to 2 cm broad in places; surface with dense or sparse pale or light brown short adpressed or erect fine soft hairs and irregular wrinkles of varying thickness and length, usually longitudinal and often near margin, usually clearly visible beneath indumentum. *Seeds* whitish, fawnish, light

orange or black, sometimes marbled in these colours or with slightly transverse dark markings.

JAPAN. Map 4. Ryukyus: 1914, *Yokohama Nursery Co.* s.n. (A); Nagasaki, Cult., 1863, *Maximowicz* s.n. (BM, K, P).

CHINA. Map 4. Sichuan: Kiating, cult., *Y. L. Tai* 1465 (A); Changyang Hsin, *Wilson* 3758 (A, K); Tung-chuan fu, cult., *Wilson* 3767 (A). Hubei: Chiensih Hsien, *Ho-chang Chow* 1717 (A, E). Guizhou: Yunnan-sen, *Cavalerie* 4050 (E, K); Ou-La-Gay Tchen-Lin, *Martin & Bodinier* 1984 (photo. and part of holotype A; holotype E, *M. martinii*). Guangdong: Sun Yat-Sen Univ., Cult., *S. H. Chun* 8477 (IBSC); cult. *Ford* 238 (K); Lienchow; 23 Aug. 1887, *Ford* s.n. (HK) & 1912, *Mell* s.n. (HK); Lin District: Ngor Koon Taam, *C. L. Ng* 3283 for *Levine* (A, HK), & Kau Wai, *W. T. Tsang & K. C. Wong* 2635 (CCC no. 14496) (A). Macao: 1836–7, *Gaudichaud* s.n. (P). Hainan: Po-Ting, cult., *F. C. How* 73745 (syntype A; isosyntype IBSC, *M. atrocarpa*); *H. Y. Liang* 66443 (syntype A, *M. atrocarpa*); Chim Fung Mt, *S. K. Lau* 5165 (A); Bo-ting (wild) *Lau* 28023 (A). Taiwan: Bankinsing Mts (escape), *Henry* 1719 (K).

EXTERNAL DISTRIBUTION. Cultivated widely in tropics.

HABITAT. Cultivated in gorges, valleys and plains, rarely naturalised; 80–500 m.

The variety is not absolutely distinguishable without fruit. It is a cultivated form grown widely in the tropics as a fodder crop and for green manure, cultivated and ?naturalised in parts of China.

M. pruriens sens. lat. (flowering specimens of uncertain identification)

CHINA. Guizhou: *Esquirol* 885 (holotype E, *M. esquirolii*). Guangdong: Lien Chow River, *Ford* s.n. (HK); Lien Chan, *Ford* 64 (K, P; mixed coll., other sheet is *M. lamellata*); Honan Isl., *Levine* 2158 (A); Paak Fa Haang, *McClure* 1789 (CCC. no. 131613) (A); She-Haang, *McClure* 242 (CCC. No. 7116) (A).

20. *Mucuna* sp. 'A' aff. *pruriens* in leaf and flower form.

Climber; stems robust, semi-woody, older bark rough \pm wrinkled, younger stems with prominent longitudinal ridges and abundant erect or adpressed long fine golden hairs. *Leaves* \pm 29 cm long; stipules deciduous, not seen; terminal leaflet shape as *pruriens* or slightly obovate, widening from base with rather straight outline, from apex with curved outline to widest point, rather broad, 10.5–11 \times \pm 6.8 cm; laterals with shape as *pruriens*, 9.5–11.5 cm long, abaxial half 5–6 cm wide, adaxial 2–2.5 cm. All leaflets: lateral veins 5–6, form as *pruriens*, tertiary veins little-branched therefore often \pm parallel and running at right angles between laterals, tertiary veins and fine reticulation less conspicuous than in *pruriens*; rather thinly chartaceous to membranous with abundant short pale adpressed hairs above giving a shiny appearance, similar much denser hairs below with veins showing as dark lines amongst pubescence; petiole 13–15 cm long, rhachis 2.5 cm, petiolules 5–7 mm, all with short \pm adpressed fine pale hairs; stipels 2–4 mm long, terete, fairly robust. *Inflorescence* arising from leaf axils, axis length and sidebranch number unknown, flowers 3 per branch, pedicels 3–4 mm long, indumentum on pedicels and (sparser) axis as *pruriens*; bracts unknown. *Calyx* tube \pm 6 mm long, 10 mm wide, hairs as *pruriens* but bristles finer; 2 lateral teeth larger

than in *pruriens*, $6 \times 4-5$ mm, lowest markedly broader than in *pruriens* but less markedly longer than laterals, $8-10 \times 4-5$ mm, upper lip as in *pruriens*. *Corolla* purplish black, standard 2.2 cm, shape as *pruriens*; wings 4 cm long, 1.4 cm wide, slightly shorter than keel, basal claw 6 mm and auricle 1-2 mm long, ciliate and hairy as in *pruriens*; keel 4-4.5 cm long, basal claw 7 mm and auricle 2 mm long, apex extremely claw-like in appearance, horny to length of ± 1 cm and very incurved, markedly shiny and usually pale both sides. *Staminal tube* 3 cm long. *Ovules* ? 4. *Fruit* and *seed* unknown but narrow cylindrical apically tapering ovary suggests linear fruit. (Fig. 6 G-M).

CHINA. Map 4. SW Yunnan: Che Li district, Ban-chiou chian, mixed forest, 840 m, Oct. 1936, C. W. Wang 79571 & Kuen-ger, 900 m, Oct 1936, Wang 79233 (A).

Since only one flowering and one sterile collection have been seen, material is inadequate for description as a new species; however, the extremely claw-like keel unlike anything else seen makes an account of its differences from *M. pruriens* worth giving.

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CORRECTIONS

Vol. 38(3): 369(1983). Key 3; lead 1 second half, line 2: "inverted boat-shaped to rigid" is better translated as "undulate to flat".

lead 2 second half; "boat-shaped to rigid" is better translated as "undulate to flat".

Vol. 39(1): 57 line 21 "*Carpogon*" should be "*Carpopogon*".

: 59 line 15 from below "*Carpogon*" should be "*Carpopogon*".

: 62 lines 3 & 6 from below "*Carpogon*" should be "*Carpopogon*".