

**FASCICLES  
OF  
FLORA OF INDIA**

**FASCICLE 8**

**LEGUMINOSAE : GENUS—DERRIS**

**K. THOTHATHRI**



**BOTANICAL SURVEY OF INDIA  
P. O. BOTANIC GARDEN  
HOWRAH-711103**

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## LEGUMINOSAE : GENUS—DERRIS†

K. THOTHATHRI\*

### DERRIS LOUR.

Fl. Cochinch. 2: 432. 1790, *nom. cons.*; Benth. & Hook. f. Gen. Pl. 1: 549. 1865; Baker in Hook. f. Fl. Brit. Ind. 2: 240. 1876; Thoth: in Bull. Bot. Surv. Ind. 3(2): 175. 1961(1962); Hutchinson, Gen. Fl. Pl. 1: 384. 1964; Engl. Syll. Pflanzenfam. 2: 233. 1964. *Brachypterum* (Wt. & Arn.) Benth. in Ann. Wien. Mus. 2: 101. 1838.

Woody climbers, scandent shrubs, rarely erect trees. Leaves alternate, imparipinnate, stipulate; leaflets 3-many, opposite, exstipellate. Flowers in axillary or terminal racemes or panicles; bracteoles 2. Calyx campanulate, mouth truncate, rarely toothed. Corolla exserted, vexillum obovate to sub-orbicular, rarely callose at base (Sect. *Paraderris* Miq.); wings obliquely oblong; keels oblong, partially coherent at back. Stamens 10, monadelphous, vexillary stamen free at base, connate above, staminal sheath split dorsally; filaments free above. Ovary narrowly oblong, 2-more-ovuled; style filiform, incurved; stigma terminal. Pods linear to oblong, oval to obliquely orbicular, mostly indehiscent, flat, rarely turgid, distinctly winged on the dorsal or less prominently on the ventral suture, 1-many-seeded; seeds reniform to oblong-reniform, compressed, hilum submedian to sinus.

*Type* : *Derris trifoliata* Lour. (*typ. cons.*)

*Distrib.* : 120 species, chiefly in Tropical Asia, few in Africa and America. 23 species in India; 9 endemic.

*Pollen* : Prolate spheroidal to oblate spheroidal, 3-zonicolporate and ornamentation psilate to faintly reticulate.

*Chromosome* :  $n=10, 11, 12, 13$  (Darlington & Janaki Ammal, Chromosome Atlas of Cultivated Plants, 1945; Darlington & Wylie, Chromosome Atlas of Flowering Plants, 1955).

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† Editor for the Genus *Derris* : S. K. JAIN, Botanical Survey of India, Howrah-711103.

\* Botanical Survey of India, Howrah-711103.

*Notes* : *Derris* Lour. was based on two species namely *D. pinnata* and *D. trifoliata*, the former being the type species. *D. pinnata* Lour. was later on found to be a *Dalbergia* and the validity of the genus itself became doubtful. To overcome this and avoid many nomenclatural changes, the name *Derris* Lour. was conserved with *D. trifoliata* Lour. as the type species.

*Uses* : The 'Tuba root of commerce' obtained from the roots of *Derris elliptica* and *D. ferruginea* are used in the preparation of insecticides for crops.

The 4 sections of the genus are: 1. *Brachypterum* Wt. & Arn. 2. *Derris* 3. *Dipteroderris* Benth. 4. *Paraderris* Miq.

1a. Pods winged on the dorsal suture :

2a. Trees or climbers. Leaflets 2.0-8.5 × 1.5-3.7 cm. Pods thin and strap-shaped ...Sect. 1. **Brachypterum**

2b. Climbers. Leaflets 4.5-22.0 × 2.5 × 10.0 cm. Pods widely-oblong to suborbicular ...Sect. 2. **Derris**

1b. Pods winged on the dorsal and ventral sutures :

3a. Nodes of the inflorescence produced into distinct peduncles. Base of vexillum usually with 2 callosities. Pods narrowly or obscurely winged on the ventral suture ...Sect. 3. **Paraderris**

3b. Nodes of the inflorescence not produced into distinct peduncles. Base of vexillum without callosities. Pods distinctly winged on both the sutures .. Sect. 4. **Dipteroderris**

Section 1. **Brachypterum** (Wt. & Arn.) Benth. in Journ. Linn. Soc. 4 (Suppl.): 101. 1860.

1a. Erect trees. Leaflets up to 23 ...19. **D. robusta**

1b. Scandent shrubs or climbers. Leaflets up to 15 :

2a. Shrubs 5-10 m high. Pods silky, prominently winged ...18. **D. pseudo-robusta**

2b. Climbers. Pods glabrous, narrowly winged :



3a. Leaflets 7-9. Racemes shorter than leaf. Flowers 6-8 mm long ...17. **D. ovalifolia**

3b. Leaflets 9-15. Racemes longer than leaf. Flowers 8-10 mm long ...20. **D. scandens**

## Section 2. **Derris**

1a. Leaflets ovate to ovato-oblong, glabrous. Pods obliquely rounded, glabrous ...23. **D. trifoliata**

1b. Leaflets elliptic to oblong, puberulous to pubescent below, specially on the veins. Pods oblong, brown silky pubescent ...7. **D. elegans**

## Section 3. **Paraderris** Miq. Fl. Ind. Bat. 1: 145. 1855.

1a. Vexillum with 2 distinct callosities at its base:

2a. Leaflets glabrous. Flowers 1.0-1.3 cm. Calyx-cup sparsely silky. Petals glabrous:

3a. Leaflets 13-19, oblong to oblong-lanceolate, 5.0-11.0×1.3-4.0 cm ...5. **D. canarensis**

3b. Leaflets 5-11, cuneate, 6.0-14.0×3.0-9.0 cm :

4a. Racemes or panicles 10-50 cm long .. 1. **D. acuminata**

4b. Racemes 7-16 cm long:

5a. Pods ovato-orbicular to oblong, 3.0-5.0 cm long, obscurely winged on the ventral suture ...6. **D. cuneifolia**

5b. Pods oblong, 5.0-12.5 cm long, distinctly winged on both the sutures .. 14. **D. macrocarpa**

2b. Leaflets brown silky beneath. Flowers 1.5-2.0 cm. Calyx-cup and petals densely silky pubescent ...8. **D. elliptica**

1b. Vexillum without callosities at base ...13. **D. lushaiensis**

Section 4. **Dipteroderris** Benth. in Journ. Linn. Soc. 4 (Suppl.): 102. 1860.

1a. Pods glabrous:

2a. Racemes or panicles fine silky:

3a. Pods narrow and long, up to 11 cm long:

4a. Flowers 1.0-1.5 cm, blue. Pods up to 10 cm long  
...16. **D. monticola**

4b. Flowers 0.7-1.0 cm, blue to red. Pods up to 5 cm long:

5a. Leaflets 7-11, oblong, glaucous beneath. Flowers red  
...21. **D. secunda**

5b. Leaflets 9-15, ovate to oblong, puberulous beneath.  
Flowers blue to whitish pink ...10. **D. hainesiana**

3b. Pods short and wide, up to 5.5 cm long:

6a. Panicles dense. Pedicels 3-4 mm. Keels silky on the back  
...22. **D. thothathrii**

6b. Panicles lax. Pedicels 8-9 mm. Keels glabrous  
...11. **D. heyneana**

2b. Racemes or panicles glabrous:

7a. Pods 6-8 cm long, wings on the sutures narrow  
...12. **D. kanjilalii**

7b. Pods 6-21 cm long, wings on the sutures wide  
...15. **D. marginata**

1b. Pods brown silky pubescent:

8a. Leaflets finely pubescent beneath ...9. **D. ferruginea**

8b. Leaflets glabrous:

9a. Leaves 20-35 cm long. Pods thin, oblong, strap-shaped, silky pubescent ...2. **D. andamanica**

9b. Leaves 5.5-20.0 cm long. Pods thicker, ovate or elliptic oblong to oblong, velvety pubescent:

10a. Flowers more than 1 cm. Pods widely oblong, tomentum of the pods blackish brown

...4. **D. brevipes**

10b. Flowers up to 0.9 cm. Pods ovate to oblong, tomentum of the pods reddish-brown

...3. **D. benthamii**

1. **Derris acuminata** Benth. in Miq. Pl. Jungh. 1: 252. 1852 *et Journ. Linn. Soc.* 4(Suppl.): 109. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 247. 1878. *D. microptera* Benth. l. c. 113. 1860 **syn. nov.**

**Figs. 1-6**

Climbers; branches lenticellate. Leaves 18-30 cm long; leaflets 8.0-14.0 × 3.5-5.0 cm, oblong to cuneate, entire, glabrous; petiolules 3-6 mm long; stipules oblong, pubescent. Inflorescence axillary and terminal, glabrous; flowers 2-4 on short peduncles from the nodes. Flowers 1.0-1.5 cm; bracts ovate, bracteoles 2, pubescent; pedicels 4-6 mm long, puberulous to pubescent. Calyx-cup 2-3 mm, faintly toothed. Corolla purple to red; vexillum 1.0-1.5 cm long. Staminal sheath 0.5-1.2 cm; filaments free on their upper third. Pistil 0.9-1.2 cm, ovary non-stipitate. Pods widely oblong, flat, 4-7 × 2.4-2.6 cm, glabrous, minutely winged on the dorsal suture, 1-3-seeded.

1a. Leaflets 5-7. Inflorescence 20-50 cm long; flowers 1 cm

...var. **acuminata**

1b. Leaflets 9-11. Inflorescence 10-22 cm long; flowers 1.2-1.5 cm

...var. **sikkimensis**

**var. acuminata**

*Type:* Nepal, 1821, Wall. Num. List no. 5901 (Lectotype K !, Isolectotype LE !).

Leaves 18-25 cm; leaflets 8-14 × 3.0-4.0 cm.

*Fls.:* May; *Frts.:* Oct.-Nov.



*Derris acuminata* Benth. var. *acuminata*

Figs. 1-6: 1. Flowering branch. 2. Fruiting branch. 3. Calyx cup. 4. Vexillum, wings and keels spread open. 5. Staminal sheath. 6. Pistil with ovary longitudinally split showing ovules.

*Distrib.* : INDIA : Sikkim; NEPAL, BHUTAN.

var. *sikkimensis* Thoth. in J. Jap. Bot. 51(5): 143. 1976. *Derris microptera*  
Benth. in Journ. Linn. Soc. 4 (suppl.): 113. 1960.

Leaves 20-30 cm long; leaflets 8-10 × 3-5 cm.

*Type*: India: Sikkim, 5000 ft, 1852, *Hooker f. s. n.* (K !).

*Distrib.* : INDIA : W. Bengal, Sikkim, Assam, Meghalaya, Arunachal Pradesh; NEPAL.

*Specimens examined*: Sikkim, 2-5000 ft, 1852, *Hooker f. s. n.* (Type of *D. microptera*, K); Mangan, Sikkim, 1300 m, May, 1980, *Ellis 5917* (CAL).

The types of *D. acuminata* var. *sikkimensis* and *D. microptera* are not the same collection though Hooker f. made them in Sikkim in 1852.

2. *D. andamanica* Prain in Journ. Asiat. Soc. Beng. 66 (2): 104. 1897; Parkinson, For. Fl. Andaman 148. 1923. *D. sinuata* Prain l. c. 60: 311. 1892, non Benth. ex Thw. 1859.

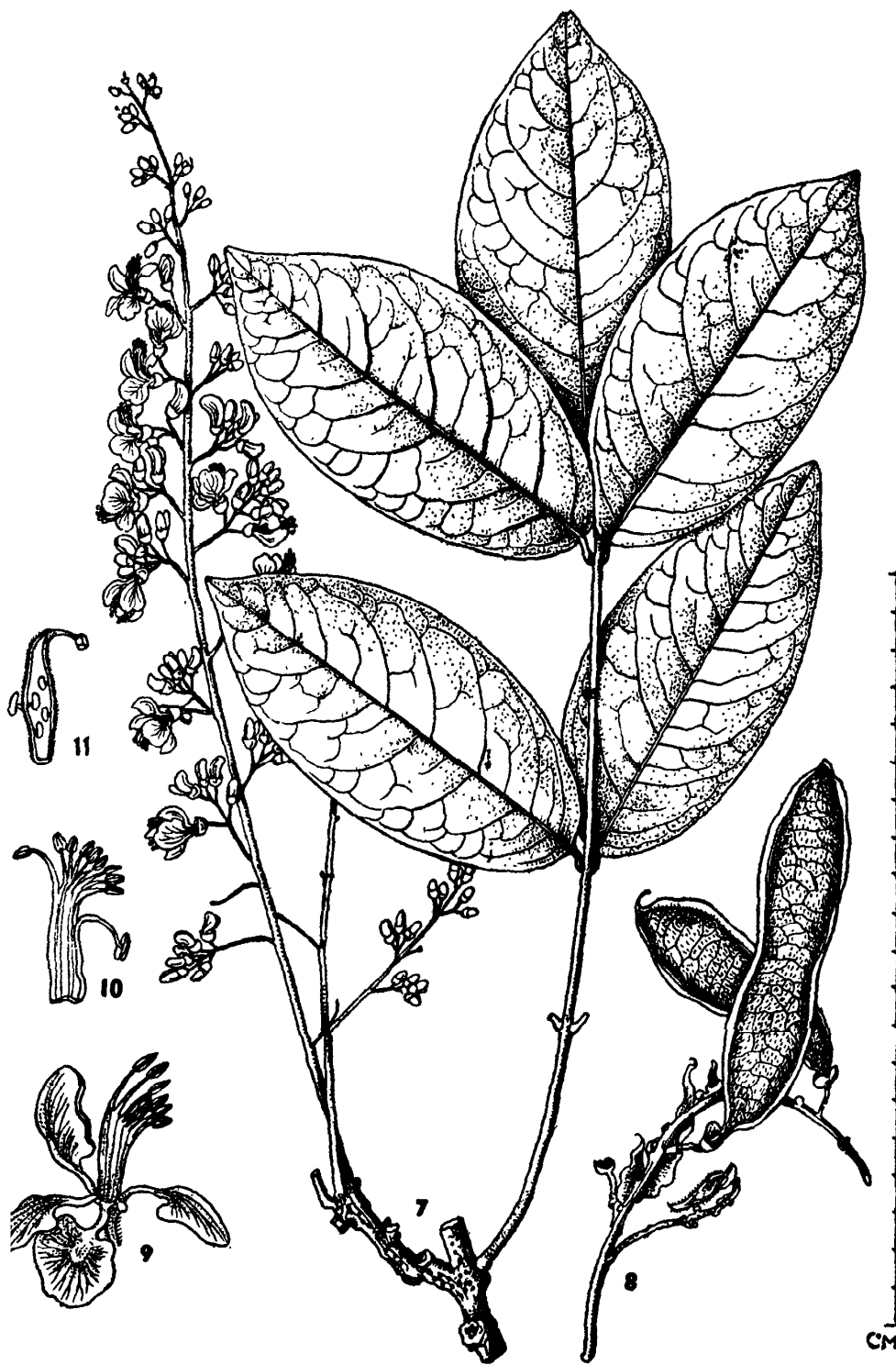
**Figs. 7-11**

Woody robust climbers of the littoral forest; younger parts brown-pubescent. Leaflets 7-9, rarely 5, 8.0-12.5 × 5.0-7.0 cm, elliptic to oblong, obtuse to retuse at apex; petiolules 5-7 mm long. Panicles 15-60 cm long, axillary and terminal, rachis and branchlets puberulous to pubescent. Flowers 1.0-1.5 cm; pedicels 5-7 mm long. Calyx-cup 3-5 mm, densely silky outside, entire to faintly toothed. Corolla yellowish white; vexillum ovato-orbicular, 1.0-1.3 cm long, with caducous brown, silky hairs on its back; wings and keels silky pubescent on their back. Staminal sheath 1.0-1.3 cm long. Pistil 1.3 cm long, ovary 3-4-ovuled. Pods 3.5-11.0 × 1.8-2.5 cm, reticulately veined, unequally winged on both the sutures, 2-3-seeded.

*Type*: India: North Corbyn'scove hill jungle, South Andaman, January 1895, *King's Collector s. n.* (Lectotype CAL !).

*Fls.*: Dec.-March; *Frts.* : Feb.

*Distrib.*: INDIA: Andaman and Nicobar Islands; endemic.



*Derris andamanica* Prain

7-11: 7. Flowering branch. 8. Fruiting branch. 9. Flower spread open. 10. Staminal sheath. 11. Pistil with ovary longitudinally split showing ovules.

*Specimens examined* : Sea-shore hill jungle, Car Nicobar, Feb. 1894, *King's Collector s. n.* (Syntype CAL); Nicobars, Jan. 1893, *King's Collector n.* (Syntype CAL, K, BM); Cinque Island, South Andaman, Apr. 1964, *Thothathri 10730* (CAL).

*Ecol.*: The species is a huge climber and prefers sandy rocks in littoral forest. It climbs over other trees to great heights, the stem attaining 6-8 m in diameter.

3. **D. benthamii** (Thw.) Thw. Enum. Pl. Zeyl. 413. 1864; Gamble, Fl. Pres. Madr. 2: 387. 1918 (Repr. ed. 1: 273. 1957). *Brachypterum benthamii* Thw. l. c. 93. 1859. *Derris paniculata* Benth. in Journ. Linn. Soc. 4(Suppl.): 105. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 242. 1878.

Climbers; younger branches lenticellate. Leaves 9.5-14.3 cm long; leaflets 5-7(-9), 2.5-8.0 × 1.5-4.0 cm, ovato-elliptic to oblong, obtuse to retuse at apex, subcoriaceous; petiolules 2-3 mm long. Panicles up to 21 cm long, copiously branched, rachis and branches rusty pubescent. Flowers 7-9 mm; pedicels 2-4 mm long, pubescent. Calyx-cup 2.0-2.8 mm, pubescent outside, faintly 5-toothed. Corolla rose pink, vexillum, wings and keels glabrous. Staminal sheath 7-9 mm long. Pistil 6-9 mm long, ovary non-stipitate, pubescent, 3-4-ovuled. Pods 2.5-7.7 × 1.0-2.5 cm, at times falcately oblong, narrowly winged on the dorsal and ventral sutures; seeds 1-2, 1.8 × 0.8 cm, oblong.

1a. Leaflets 4.4-8.0 × 2.3-4.0 cm, oblong. Pods ovate to oblong, 3.0-5.0 × 1.0-2.5 cm, sometimes turgid against the seeds ...var. **benthamii**

1b. Leaflets 2.5-4.0 (-7.5) × 1.5-2.5 cm, elliptic to elliptic-oblong. Pods elliptic-oblong, 2.5-7.7 × 1.5-2.5 cm, flat ...var. **wightii**

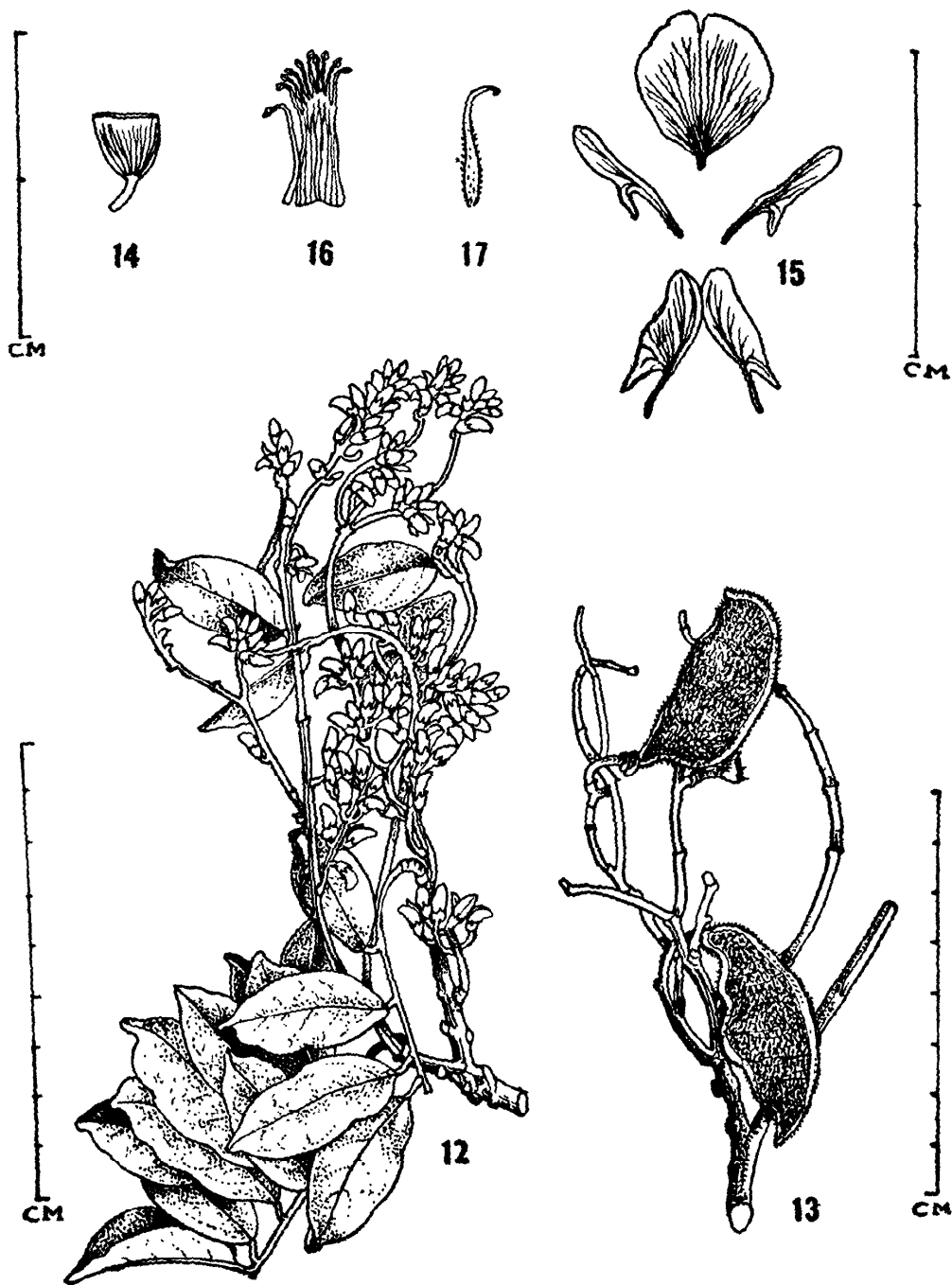
var. **benthamii**

*Type*: Ceylon (Sri Lanka): Central Province, *Thwaites 2925* (Holotype K !, Isotypes CAL !, BM !, LE !).

*Fls.*: June-Aug.; *Frts.* : Sept.-Nov.

*Distrib.*: INDIA: Karnataka, Kerala, Tamil Nadu, SRI LANKA. Rare in the Western Ghats.

*Specimens examined*: Kemmangundi, Chikmagalur, Karnataka, June, 1978, *Saldanha & Ramesh 1743* (CAL); Ceylon (Sri Lanka), *Walther s. n.* (Type of *D. paniculata* Benth., K).



*Derris benthamii* (Thw.) Thw. var. *wightii* (Baker) Thoth.

Figs. 12-17: 12. Flowering branch. 13. Fruiting Branch. 14. Calyx cup. 15. Vexillum, wings and keels. 16. Staminal sheath. 17. Pistil.



var. **wightii** (Baker) Thoth. in Journ. Jap. Bot. 51 (5): 145. 1976. *D. wightii*  
Baker in Hook. f. Fl. Brit. Ind. 2: 247. 1878.

**Figs. 12-17**

Leaflets rarely up to 7.5 cm long. Panicles ferruginous; flowers 7-9 mm.

*Type:* India: Shevagherry hills, Aug. 1936, *Wight* 834 (Holotype  
K !, Isotypes CAL !, LE !).

*Distrib.:* INDIA: Tamil Nadu; rare and endemic.

*Specimen examined:* Kalakkadu reserve forest, 1300 m, Tinnevely  
district, Tamil Nadu, 1976, *Oates* 136—Sheet 2/2 (K).

4. ***D. brevipes*** (Benth.) Baker in Hook. f. Fl. Brit. Ind. 2: 244. 1878;  
Cooke, Fl. Pres. Bomb. 1(2): 406. 1902 (Repr. ed. 1: 432. 1958); Gamble,  
Fl. Pres. Madr. 2: 388. 1918 (Repr. ed. 1: 273. 1957). *D. heyneana*  
Benth. var. *brevipes* Benth. in Jour. Linn. Soc. 4 (Suppl.): 110. 1860.

Large climbing shrubs. Leaflets 7, 4.2-13.0 × 2.5-5.8 cm, ovate to elli-  
ptic-oblong, shortly cuspidate; lateral veins 6-10 pairs; petiolules 4-10 mm  
long. Panicles 12-28 cm long, axillary and terminal, rachis and branchlets  
densely ferruginous. Flowers 1.0-1.3 cm; pedicels 2-4 mm long. Calyx  
narrowly campanulate, 3-4 mm, 4-toothed. Corolla red; vexillum 8-12 mm  
long, ovato-orbicular to obovate, vexillum and wings with deciduous  
silky pubescence on the back above; keels densely silky on the back. Staminal  
sheath 8-10 mm long. Pistil 9-11 mm, ovary densely pubescent, 3-4-ovuled.  
Pods 2.5-14.0 × 2.0-3.3 cm, reticulately veined, narrowly winged on the  
dorsal suture with an obscure one on the ventral suture; seeds 1-3, reddish  
brown, oblong.

1a. Pods 2.5-5.5 cm long:

2a. Leaflets 6-7 × 2.5-3.2 cm, subcoriaceous; lateral veins 6-8 pairs.  
Pods flat ...var. **brevipes**

2b. Leaflets 8-13 × 4.5-5.8 cm, coriaceous; lateral veins 8-10 pairs.  
Pods turgid ...var. **coriacea**

1b. Pods 10-14 cm long

...var. **travancorensis**

var. **brevipes**

*Type:* India: Concan, *Stocks s. n.* (Lectotype K !).

*Fls.:* May-Aug.; *Frts.:* Sept.

*Distrib.:* INDIA: Maharashtra, Kerala, Tamil Nadu ; endemic.

*Specimens examined:* Fl. Ind. Or. (Mount Nilgiri). *Hohenacker 1597* (CAL, K, Syntypes); Akkamalai, 900 m, Coimbatore, Tamil Nadu, Mar. 1978, *Ansari 1163* (CAL).

var. **coriacea** Baker in Hook. f. Fl. Brit. Ind. 2: 244. 1878.

*Type:* India: Fl. Ind. Or. (Mount Nilgiri), *Hohenacker 1598* (Holotype K !, Isotype LE !).

*Distrib.:* INDIA: Kerala, Tamil Nadu.

var. **travancorensis** Thoth. in Bull. Bot. Surv. Ind. 6(1): 67. 1964 (1965).

*Type:* India: Vellevamallay, 2333 m, Travancore, Nov. 1890, *Bourdillon s. n.* (MH !).

*Distrib.:* INDIA: Kerala.

5. **D. canarensis** (Dalz.) Baker in Hook. f. Fl. Brit. Ind. 2: 246. 1878; Cooke, Fl. Pres. Bomb. 1(2): 406. 1902 (Repr. ed. 1: 433. 1958); Gamble, Fl. Pres. Madr. 2: 387. 1918 (Repr. ed. 1: 273. 1957); Thoth. in Journ. Jap. Bot. 51(5): 148. 1976. *Pongamia canarensis* Dalz. in Hook. Kew Journ. Bot. 2: 37. 1850. *Derris oblonga* Benth. in Journ. Linn. Soc. 4 (Suppl.): 112. 1860; Baker *l. c.* 242. 1878; Cooke *l. c.* 405. 1902 (Repr. ed. 1: 431. 1958). *Brachypterum canarensis* (Dalz.) Dalz. in Dalz. & Gibs. Bomb. Fl. 76. 1861.

Climbing shrubs. Leaves up to 35.5 cm long; leaflets obtuse at apex, rounded at base, glaucous beneath, lateral veins 6-8 pairs; stipules ovate. Racemes 15-18 cm long, axillary, nodes produced into peduncles, each bearing 3-(6) pedicellate flowers. Flowers 1.0-1.3 cm; pedicels 3-4 mm long. Calyx-cup 3-4 mm, truncate. Corolla pinkish-white; vexillum 1.0-1.1 cm long. Staminal sheath 1.0 cm long. Pistil 0.9 cm long, ovary pubescent, 2-ovuled. Pods 3.6-8.3 × 2.0-2.6 cm, oblong, flat, mucronate at apex,

glabrescent, reticulately veined, winged on both the sutures, the one on the ventral suture less developed; seeds 1-2, bluish-black, 1.0×0.8 cm.

*Type:* India: Kassarleh, Kanara, Mysore, May 1853, *Dr. Ritchie* 1720 (Neotype CAL !).

*Fls.:* Feb.-April; *Frts.:* Sept.

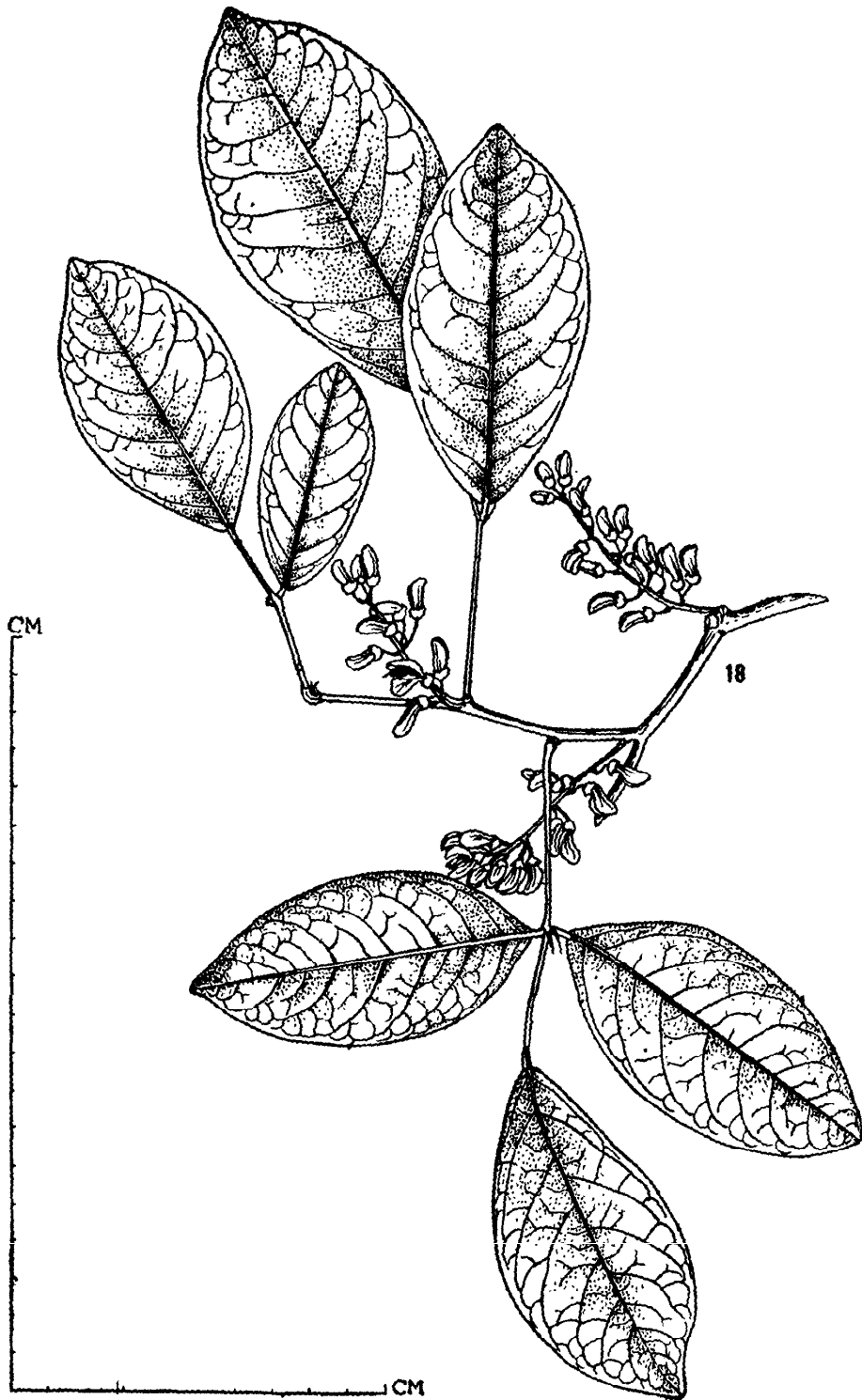
*Distrib.:* INDIA: Maharashtra, Goa, Karnataka; SRI LANKA.

*Specimens examined:* Yesle forest, North Canara, May 1956, *Mahajan* 1675 (BSI); Concan, *Stocks s. n.* (Syntype of *D. oblonga* Benth., K, CAL, BM); Ceylon (Sri Lanka), 1847, *Gardner* 476, *Walker s. n.*, *Thwaites* 1493 (Syntypes of *D. oblonga* Benth., K).

6. *D. cuneifolia* Benth. in *Miq. Pl. Jungh.* 1: 253. 1852 et *Journ. Linn. Soc.* 4(Suppl.): 112. 1860; Baker in *Hook. f. Fl. Brit. Ind.* 2: 243. 1878; Prain, *Beng. Pl.* 1: 409. 1903 (Repr. ed. 1: 292. 1963); Haines, *Bot. Bih. Or.* 3: 298. 1922 (Repr. ed. 2: 312. 1961); Kanjilal *et al.* *Fl. Assam* 2: 113. 1938. *Galedupa marginata* Roxb. *Fl. Ind.* 3: 241. 1832. *Derris discolor* Benth. *l. c.* 111. 1860; Baker *l. c.* 247. 1878.

Climbers. Leaves 20-30 cm long; leaflets 5-9 (-11), 8-14×3-9 cm, obovate obovato-oblong, obtuse at apex, cuneate at base, glabrous, thin to subcoriaceous; petiolules 4-6 mm long, puberulous. Racemes 7-16 cm long, axillary, nodes produced into short peduncles, each bearing 2-3 flowers, rachis and stalks glabrate. Flowers 1.0-1.3 cm; pedicles 0.3-1.2 cm long, puberulous. Calyx campanulate, 3-4 mm, mouth toothed, ciliate. Corolla rosy-red, vexillum ovate to ovato-orbicular, 1.1-1.2 cm long. Staminal sheath 1.0-1.2 cm long. Pistil 1.0-1.2 cm long, ovary non-stipitate, silky pubescent, 1-2-ovuled; stigma bushy. Pods 3.0-5.5×2.0-2.8 cm, flat, at times turgid against the seeds, glabrescent, winged on both the sutures, the one on the ventral suture obscurely developed; seeds 1-2, oblong, 2.0-2.4×0.8-1.0 cm.

- 1a. Pedicels 0.3-0.4 cm long ...var. *cuneifolia*
- 2a. Leaflets thin. Pods flat ...f. *cuneifolia*
- 2b. Leaflets subcoriaceous. Pods turgid against seeds ...f. *assamica*
- 1b. Pedicels 1.0-1.2 cm long ...var. *longipedicellata*



*Derris elegans* Benth.  
Fig. 18. Flowering branch.

**var. cuneifolia f. cuneifolia**

*Type:* Nepal: Noakote, 1820, Wall. Num. List no. 5887 (Lectotype CAL !, Isolectotypes BM !, LE !).

*Fls.:* April-May; *Frts.:* June-July.

*Distrib.:* INDIA: N. Bihar, West Bengal, Sikkim, Assam; NEPAL, BANGLADESH, BURMA.

*Specimens examined:* Lakhimpur, Assam, May 1938, *De* 16631 (ASSAM); Sylhet, *Graham* in Wall. Num. List no. 5896, 5896B (Type of *Galedupa marginata* Roxb., CAL, K); Soormah, Sylhet, 1850, *J. D. Hooker & T. Thomson s. n.* (Syntype of *Derris discolor* Benth., K); Sikkim Terai, 4000 ft., 1852, *J. D. Hooker s. n.* (Syntype of *D. discolor* Benth., CAL, K).

**var. cuneifolia f. assamica** Thoth. in Bull. Bot. Surv. Ind. 3(2): 192. 1961 (1962).

Pods ovato-orbicular to oblong, 4.3-5.5 × 2.4-2.8 cm, 1-seeded; seeds large, 2.4 × 1.0 cm.

*Type:* India: Bishnupur, Cachar district, Assam, Dec. 1914, *U. Kanjilal* 4835 (Holotype CAL !).

*Distrib.:* INDIA: Assam; endemic.

**var. longipedicellata** Thoth. in Bull. Bot. Surv. Ind. 3(2): 191. 1961 (1962).

Leaflets 7-9, obovate, cuneate. Racemes 7-10 cm long, much shorter than leaves.

*Type:* India: Sivoke, Sikkim, April, 1908, *Ribu* 760 (Holotype CAL!).

*Distrib.:* INDIA: West Bengal, Sikkim; NEPAL.

7. **D. elegans** Benth. in Miq. Pl. Jungh. 1: 252. 1852 *et* Journ. Linn. Soc. 4(Suppl.): 109. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 242. 1878; Parkinson, For. Fl. Andaman 148. 1923.

**Fig. 18**

Climbers; younger parts pubescent. Leaves 15-37 cm long; leaflets 3-7, 13-22 × 4.5-10.0 cm, subcoriaceous, glabrous above; stipules lanceolate, stipels 3-4 mm long; petiolules 3-5 mm long. Racemes axillary, 6-20 cm long. Flowers 1.0-1.4 cm long, pedicellate; pedicels 4-6 mm long. Calyx

campanulate, 3-4 mm, pubescent without, mouth shallowly toothed. Corolla white; vexillum ovato-orbicular, 1.0-1.2 cm long; wings auricled. Staminal sheath 1.0 cm long. Pistil 0.9-1.1 cm long, ovary pubescent; ovules 4. Pods 4.5-6.0 × 2.0-3.0 cm, reticulately veined, distinctly winged on the dorsal suture; seeds 1-2, much compressed.

1a. Racemes 6-13 cm long, shorter than leaves .. f. *elegans*

1b. Racemes 16-20 cm long, longer than leaves ...f. *andamanensis*

**f. *elegans***

*Type:* Burma: Pionac Hill, 1827, Wall. Num. List no. 5883 (Holotype K!).

*Fls.:* Feb.-March; *Frts.:* March-April.

*Distrib.* INDIA: Andaman & Nicobar Islands; BURMA, MALAYSIA, SUMATRA, PHILIPPINES.

*Specimens examined:* Alimasjid jungle, Mar. 1915, Parkinson 443 (K); Campbell Bay, Great Nicobar, Mar. 1966, Thothathri & Banerjee 11348 (CAL).

f. *andamanensis* Thoth. in Bull. Bot. Surv. Ind. 3(2): 184. 1961 (1962).

*Type:* India: Manpur Hill Jungle, South Andaman, Feb. 1894, King's Collector s. n. (Holotype CAL !, Isotype K !).

*Distrib.:* INDIA: Andaman Islands; endemic.

8. ***D. elliptica*** (Wall.) Benth. in Journ. Linn. Soc. 4(Suppl.): 111. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 243. 1878; Prain, Beng. Pl. 1: 409. 1903 (Repr. ed. 1: 292. 1963); Kanjilal *et al.* Fl. Assam 2: 114. 1938; Thoth. in Journ. Jap. Bot. 51(5): 148. 1976. *Pongamia elliptica* Wall. Pl. Asiat. Rar. 3: 20. t. 237. 1832. *Galedupa elliptica* Roxb. Fl. Ind. 3: 242. 1832.

Large climbing shrubs; younger parts rusty tomentose. Leaves 23.0-40.0 cm long; leaflets 9-13 (-15), obovate to obovato-oblong, 8.0-16.0 × 5.0-6.0 cm, lower ones smaller, cuneate at base, shortly acuminate at apex; petiolules 3-8 mm long. Racemes 19-26 cm long, axillary and terminal; peduncles 0.3-1.4 cm long, each bearing 3 pedicellate flowers, rachis and

peduncles rusty tomentose. Pedicels 0.8-1.2 cm long. Calyx campanulate, 4-7 mm. Corolla whitish pink to red; vexillum 1.2-2.0 cm long. Staminal sheath 1.5-1.7 cm long. Pistil 1.5-1.6 cm long; ovules 2. Pods mostly oblong, rarely elliptic, 4.5-13.0 × 2.0-3.3 cm, minutely puberulous, faintly reticulated, winged on both the sutures; seeds 1-2.

1a. Peduncles 1.2-1.4 cm long, longer than the pedicels ...var. **elliptica**

1b. Peduncles 0.3-0.6 cm long, shorter than the pedicels  
...var. **chittagongensis**

**var. elliptica**

*Type:* Amboina: Cultivated in Botanic Garden, Calcutta, Wall. Num. List No. 5881A (Holotype K !, Isotypes CAL !, BM !).

*Fls.:* April; *Frts.:* April-May.

*Distrib.:* A plant of rare occurrence in wild in India but largely cultivated in Punjab, Assam, Karnataka, Kerala, Tamil Nadu, for the 'tuba root of commerce'. INDIA: Assam, Great Nicobar Island; BANGLADESH, BURMA, MALAYSIA, JAVA, SUMATRA, PHILIPPINES, THAILAND, CAMBODIA.

*Specimens examined:* Great Nicobar Island, Apr. 1805, *Mushi Ahamadali* 23 (CAL); Rattenpore, Cachar district, Assam, Oct. 1873, *Maneek* (for R. L. Keenan) s. n. (K).

*Chr. No.:* n=10, 11, 12 (Heyn in Chron. Bot. 4: 107. 1938; Aitchison in Amer. Journ. Bot. 36: 364-368. 1949; Toxopeus in Euphytica 1(3): 175-182. 1952.

*Ecol.:* Grows in evergreen forests up to an elevation of 1000 m, and flourishes well in areas with an annual rainfall of 200-300 cm.

*Uses:* The roots commonly known as 'Derris or Tuba Root of Commerce' is the source of rotenone whose content varies from 1.6-10.0% in plants grown in India. Rotenone is used in the preparation of a valuable insecticide.

var. **chittagongensis** Thoth. in Bull. Bot. Surv. Ind. 3(2): 195. 1961 (1962).

Leaflets 11-15. Racemes 10-18 cm long; pedicels 0.8-1.0 cm long. Calyx widely campanulate, mouth entire.

*Type:* Bangladesh: Kodla Hills, Chittagong district, May 1887, *Badul Khan* 450 A-E (Holo and Isotypes CAL !).

*Frts.:* May.

*Distrib.:* INDIA: Meghalaya; BANGLADESH.

*Specimens examined:* Shila forest, Khasi and Jaintia Hills, Meghalaya, May 1937, *Deka* 14064 (ASSAM).

9. **D. ferruginea** (Roxb.) Benth. in Miq. Pl. Jungh. 1: 252. 1852 *et* Journ. Linn. Soc. 4 (Suppl.): 109. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 245. 1878; Kanjilal *et al.* Fl. Assam 2: 114. 1938. *Robinia ferruginea* Roxb. Fl. Ind. 3: 329. 1832.

*Ruphang-doukha, Aru* (Asm.).

Woody climbers; branchlets and younger parts ferruginous. Leaves 18-35 cm long; leaflets 7-9, obovato-oblong, 6.0-15.5 × 2.5-7.5 cm, shortly cuspidate, cuneate at base. Panicles 16-38 × 25 cm, axillary and terminal, ferruginous. Flowers 1.0-1.3 cm; pedicels 5-7 mm long. Calyx campanulate, 3-4 mm, 5-toothed at the mouth. Corolla purple; vexillum ovate to ovato-orbicular, 0.9-1.2 cm long, puberulous on back; wings and keels glabrescent. Staminal sheath 1.0-1.1 cm long. Pistil 1 cm long, ovary pubescent; ovules 3-4. Pods oblong, 4.5-9.0 × 2.0-3.6 cm, reticulately veined, winged on both the sutures, the one on the ventral suture less developed; seeds 1-2(-3), wrinkled.

*Type:* Bangladesh: Silhet, Wall. Num. List no. 5885a (Lectotype K !, Isolectotypes CAL !, LE !, BM !).

*Fls.:* March-May; *Frts.:* June-Aug.

*Distrib.:* INDIA: W. Bengal, Assam; BANGLADESH, BURMA.

*Specimens examined:* HBC, Wall. Num. List no. 5885b (Syntypes CAL, K, LE ); North Lakhimpur, Assam, Nov. 1957, *G. Panigrahi* 11561 (CAL, ASSAM).

*Chr. No.:* n=11 (Srinath & Sarwar in Curr. Sci. 33: 590. 1964).



*Uses:* Roots of *D. ferruginea* known as the 'Indian Tuba Root' yield rotenone used in the preparation of insecticides, but compared with *D. elliptica*, the rotenone content is less (0.1-4.3%).

10. *D. hainesiana* Thoth. in Bull. Bot. Surv. Ind. 3(2): 198. 1961 (1962) et Journ. Jap. Bot. 51(5): 147. 1976. *D. laxiflora* Haines, Bot. Bih. Or. 3: 299. 1922 (Repr. ed. 2: 312. 1961) non Benth. 1860.

Woody climbers. Leaves 8.0-19.5 cm long, rachis pubescent at times; leaflets 2.0-7.0 × 1.5-3.3 cm, sub-coriaceous, lowest pair much smaller than others; petiolules 2-4 mm long. Panicles axillary and terminal, 11-18 cm long. Flowers 8-10 mm; bracteoles 2, pubescent; pedicels 2.0-2.5 mm long, pubescent. Calyx campanulate, 2.5-4.0 mm, pubescent without. Corolla blue to whitish pink; vexillum ovate to ovato-orbicular, 9-10 mm long; wings and keels auricled. Staminal sheath 8-9 mm long, vexillary filament free at base and above. Pistil 9-10 mm long, ovary brown silky; ovules 4-6. Pods oblong, 5.0 × 1.8 cm, narrowly winged on both the sutures; seed 1.

*Type:* India: Ramnagar Hills, North Bihar, Nov. 1916, *Haines* 3946 (Holotype K !).

*Fls.:* Nov.-Dec.

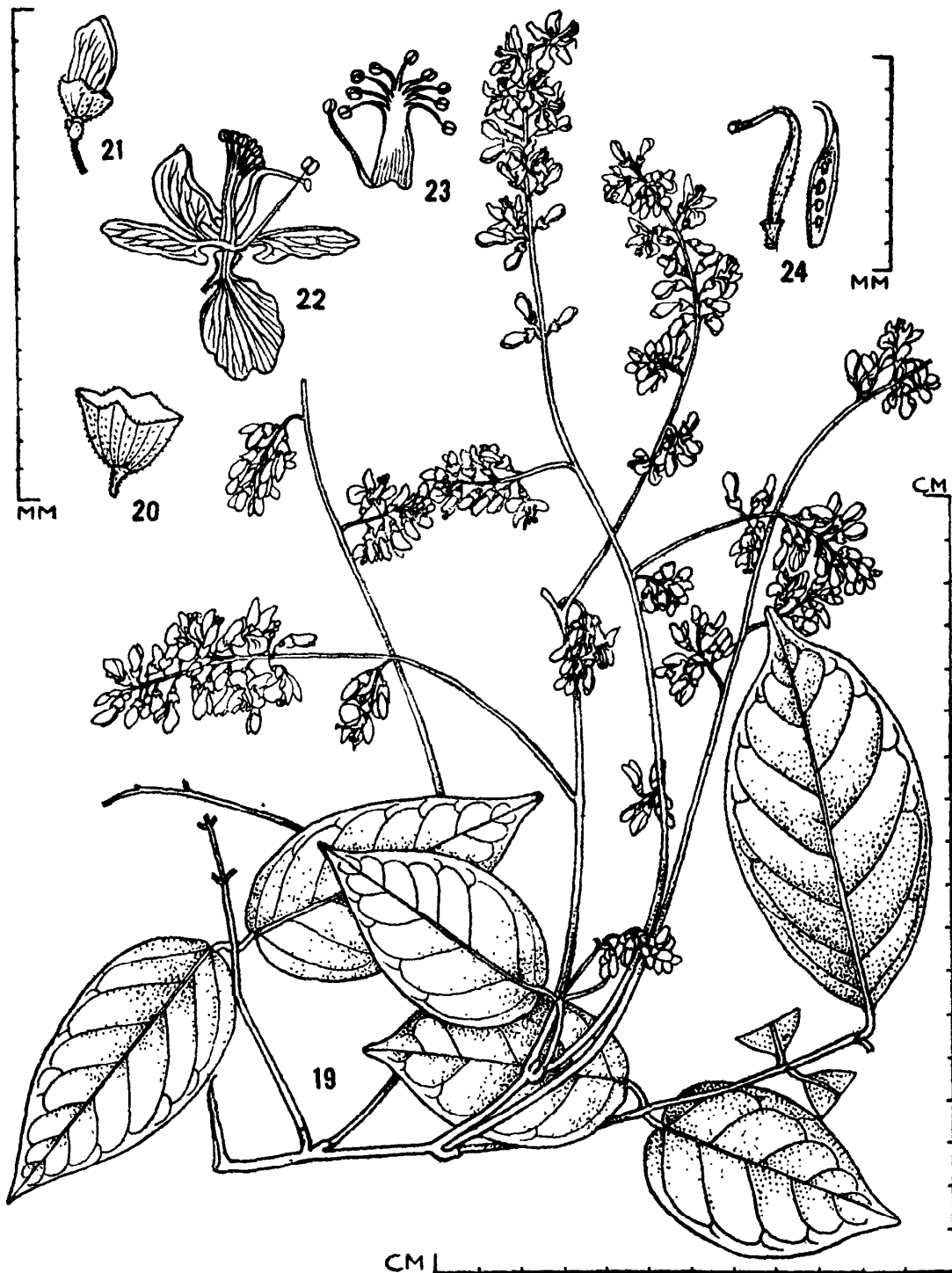
*Distrib.:* A rare plant known only from North Bihar. INDIA: Bihar; NEPAL.

*Specimen examined:* Gobardhana forest, 113 m, Champaran district, North Bihar, Nov. 1963, *B. V. Shetty* 253 (CAL).

*Notes:* Besides the type and the recent collection from the type locality the plant has recently been reported from Kosi catchment area, Nepal (Thoth. *l. c.* 1976). According to Haines (*l. c.* 1922) there were no flowers in his specimens and so the floral characters were described for the first time in 1976 by the author (Thoth. *l. c.* 1976).

11. *D. heyneana* (Wt. & Arn.) Benth. in Miq. Pl. Jungh. 1: 252. 1852 et Journ. Linn. Soc. 4(Suppl.): 110. 1860; Bennet in Journ. Indian Forestry 1(1): 23. 1978. *Pongamia heyneana* Wt. & Arn. Prodr. Fl. Pen. Ind. Or. 1: 263. 1834 (*excl. cit.* Wall. Cat. 5916) non Grah. 1831-32. *Derris heyneana* Benth. var. *paniculata* Baker in Hook. f. Fl. Brit. Ind. 2: 244. 1878. *D. bakeri* Thoth. in Bull. Bot. Surv. Ind. 3(2): 187. 1961 (1962).

**Figs. 19-24**



*Derris heyneana* (Wt. & Arn.) Benth.

Figs. 19-24: 19. Flowering branch. 20. Calyx cup. 21. & 22. Flower closed and open. 23. Staminal sheath. 24. Pistils, one with ovary longitudinally split showing ovules.

Climbers. Leaves 13.2-21.0 cm long; leaflets 5-9, ovato-elliptic to oblong, rarely obovate, 7.5-12.5 × 3-6 cm, glabrous, base rounded to cuneate, apex obtuse; petiolules 4-5 mm long. Panicles axillary, much branched, up to 30 cm long, silky puberulous. Flowers 0.9-1.1 cm, 4-5 on short, bracteate peduncles; pedicels slender. Calyx widely campanulate, 1.5-2.5 mm, puberulous without. Vexillum ovate to ovato-oblong, 0.8-0.9 cm. Staminal sheath 0.8-0.9 cm long. Pistil 0.8 cm long, ovary linear-oblong, silky pubescent; ovules 2-4. Pods widely ovate, flat, 5.2 × 3.5 cm, glabrous, reticulately veined, distinctly winged on both the sutures; seed 1.

*Type:* India: Without precise locality, Western Peninsula, *Wight* 920 (Lectotype K !, Isolectotypes CAL !, MH !).

*Fls.:* Feb.-May; *Frts.:* June.

*Distrib.:* INDIA: Karnataka, Goa, Maharashtra; a rare plant endemic to Western Ghats.

*Specimens examined:* Amboli Ghat, Apr. 1902; *Gammie* 15055 (BLAT, BSI); Aynshi Ghat, Jun. 1885, *Talbot* 1223 (CAL); Gudshalli, 500 m, 1919, *Bell* 5760 (BLAT, K).

*Ecol.:* In wet evergreen forests of Western Ghats, up to an elevation of 1000 m.

**12. *D. kanjilalii* Sahni et Naithani in Indian Forester 102: 402. 1976.**

Scandent shrubs. Leaves 18-21 cm long; leaflets 9, ovato-oblong, 4-8 × 2.0-3.5 cm; petiolules glabrous. Flowers 1.0 cm; pedicels 3-8 mm long. Calyx-cup campanulate, 3 mm, entire to minutely toothed. Vexillum ovate, 9-11 × 3.5 mm; wings narrow, 8 × 2 mm. Stamens monadelphous. Pistil 8 mm long. Pods oblong, 6-8 × 1.7 cm, glabrous, faintly reticulate, winged on both the sutures, the wing on the ventral suture less developed.

*Type:* India: Pilibhit, Uttar Pradesh, *Sri Ram* 246 (DD).

*Distrib.:* INDIA: Uttar Pradesh; so far recorded only from the type locality; endemic.

**13. *D. lushaiensis* Thoth. in Bull. Bot. Surv. Ind. 12: 104. 1970 (1972).**

Climbing shrubs. Leaves 25.5-33.0 cm long; leaflets oblong-cuneate, 9-12 × 2.5-3.8 cm, glaucous beneath; petiolules 5-6 mm long; stipules ovate,

2.0 × 2.3 mm. Racemes axillary, nodes produced into peduncles, each bearing 2-3 pedicellate flowers. Flowers 1.4-1.6 cm; pedicels 5-8 mm long. Calyx campanulate, 4-5 mm, puberulous to pubescent without, mouth 4-toothed, teeth triangular-ovate. Vexillum obovato-oblong, 1.2-1.5 cm long, ecallose; wings and keels narrowly oblong. Staminal sheath 1.2-1.5 cm long. Pistil 1.2-1.4 cm long, ovary linear-oblong, pubescent; style flattened, stigma capitate; ovules 2-4. Pod not known.

*Type:* India: Valley near Fort Lungleh, 1000-2000 m, South Lushai Hills, Mizoram, Mar. 1899, *A. T. Gage* 23A-C (Holo et Isotypes CAL !).

*Fls.:* March.

*Distrib.:* INDIA: Mizoram; so far known only from the type locality; endemic.

**14. *D. macrocarpa* Thoth. in Bull. Bot. Surv. Ind. 3(2): 192. 1961 (1962).**

Climbing shrubs. Leaves 19.5-21.5 cm long; leaflets 7-9, obovate, 6.0-11.3 × 3.0-5.5 cm, cuneate at base, shortly cuspidate, glaucous beneath; petiolules 5-6 mm long. Flowers not known. Infructescence racemose, nodes of racemes produced into short peduncles, each bearing 2-3-stalked pods; rachis of the infructescence glabrous. Pods 5.0-12.5 × 2.2-2.7 cm, flat, glabrous, faintly reticulated, winged on both the sutures, the wing on the ventral suture less developed; seeds 1-3.

*Type:* India: Nishangara, Bahraich district, Uttar Pradesh, Apr. 1920, *Sri Ram* 2667 A & B (Holo et Isotypes DD!).

*Frts.:* April.

*Distrib.:* INDIA: Uttar Pradesh; endemic.

**15. *D. marginata* (Roxb.) Benth. in Miq. Pl. Jungh. 1: 252. 1852 et Journ. Linn. Soc. 4(Suppl.): 111. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 245. 1878; Prain, Beng. Pl. 1: 409. 1903 (Repr. ed. 1: 292. 1963); Kanjilal et al. Fl. Assam 2: 112. 1938; Ohashi in Hara's Fl. East. Himal. 149. 1966. *Dalbergia marginata* Roxb. Fl. Ind. 3: 230. 1832.**

Climbers. Leaves 15.0-32.0 cm long; leaflets 5(-7), elliptic-oblong, 6.0-16.5 × 3.0-7.7 cm, apex shortly cuspidate, terminal largest; petiolules 9 mm long. Panicles axillary and terminal, 12.0-22.5 cm long, copiously branched. Flowers 1.2-1.5 cm; pedicels 1.0-1.5 cm long. Calyx widely

campanulate, 2.5-3.5 mm, glabrous. Corolla pink; vexillum ovato-oblong to ovato-orbicular, 1.1-1.3 cm long. Staminal sheath 1.0-1.2 cm long. Pistil 1.0-1.2 cm long, ovary silky; ovules 3-4. Pods oblong, rarely elliptic, glabrous, reticulately veined, distinctly winged on both the sutures; seeds 1-2, reniform, brownish black.

*Type:* Bangladesh: Sylhet, HBC, Wall. Num. List no. 5909A (Lectotype CAL!, Isolectotype LE!).

*Fls.:* Oct.-May; *Frts.:* March.

*Distrib.:* INDIA: West Bengal, Sikkim, Assam; BANGLADESH, BURMA.

*Specimens examined:* Sylhet, Wall. Num. List no. 5909B (Syntype CAL, K); Near Doimari, Kamrup, Jan. 1915, *U. Kanjilal* 5046 (ASSAM).

**16. *D. monticola* (Kurz) Prain** in Journ. Asiat. Soc. Beng. 66(2): 361. 1897; Kanjilal *et al.* Fl. Assam 2: 115. 1938. *Millettia monticola* Kurz *l. c.* 42: 67. 1863; Baker in Hook. f. Fl. Brit. Ind. 2: 106. 1876.

#### **Figs 25-29**

Climbers. Leaves 21.0-28.5 cm long; leaflets 9-11, oblong, 6.5-9.3 × 2.0-3.0 cm, glabrous, narrowed at base, shortly cuspidate; petiolules 3-4 mm long, rachis and petiolules puberulous. Racemes axillary, up to 14 cm long, flowers crowded at nodes. Pedicels 3-4 mm long, pubescent. Calyx narrowly campanulate, 4 mm, pubescent without, deltoid with 5 teeth. Vexillum ovato-orbicular, 1.2-1.3 cm long; keels auricled near the claw. Staminal sheath 1.1-1.3 cm long. Pistil 1.0-1.2 cm long, ovary pubescent; style flattened; ovules 4-5. Pods oblong, thin, reticulately veined, winged on both the sutures; seeds 2-3.

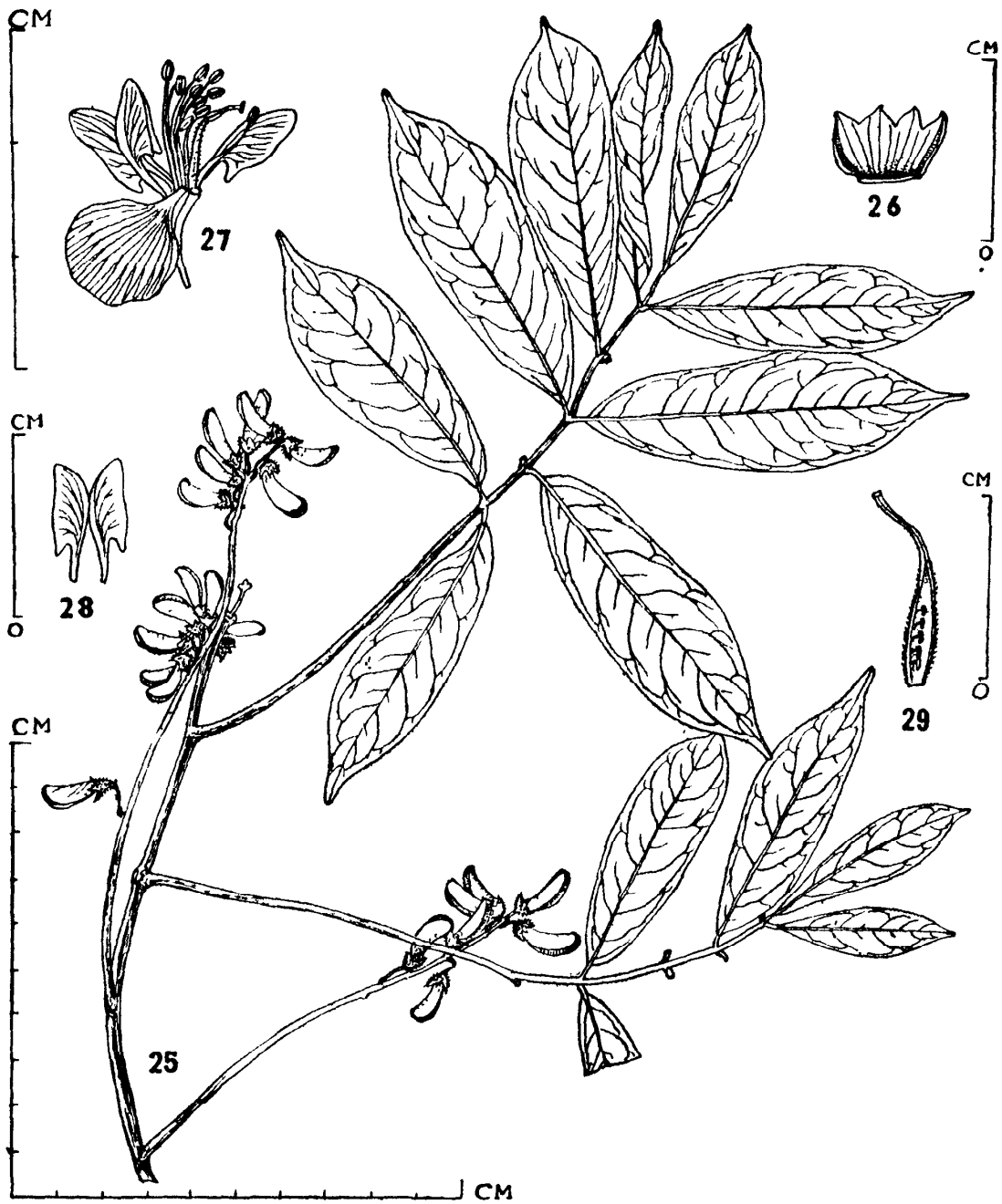
*Type:* Burma: Nattoung, 2200-2400 m, Pegu, Kurz 1776 (CAL!).

*Fls.:* March-Aug.; *Frts.:* July-Sept.

*Distrib.:* INDIA: West Bengal, Assam; BURMA; a rare plant.

*Specimens examined:* Khasi & Jaintia hills, 1897, *Mann s. n.* (CAL); Duttabong, 2000 m, Darjeeling, 1876, *Collector ?* 692B (CAL).

*Notes:* *D. monticola* is the only species with blue-flowers; in *D. hainnesiana* flowers vary from blue to whitish pink.



*Derris monticola* (Kurz) Prain

Figs. 25-29: 25. Flowering branch. 26. Calyx cup. 27. Flower. 28. Keels. 29. Pistil with ovary longitudinally split showing ovules.

17. **D. ovalifolia** (Wt. & Arn.) Benth. in Miq. Pl. Jungh. 1: 252. 1852 *ex parte et Journ. Linn. Soc.* 4(Suppl.): 115. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 247. 1878. *Pongamia ovalifolia* Wt. & Arn. Fl. Pen. Ind. Or. 1: 262. 1834; Wt. Ic. Pl. Ind. Or. t. 328. 1840.

Climbers. Leaves 13-19 cm long; leaflets ovate to ovato-oblong, 2.5-6.3 × 1.5-3.7 cm, obtuse to emarginate; petiolules 4-6 mm. Racemes axillary, 10-16 cm long, mostly on leafless branches, rachis geminate with 3-4 flowers at the nodes. Calyx widely campanulate, 2-3 mm, 5-toothed. Corolla bright red; vexillum ovato-orbicular, 6-7 mm, margin ciliate; keels shorter than wings. Staminal sheath 6 mm long. Pistil 7 mm long, ovary puberulous, non-stipitate; ovules 2-4. Pods narrowly oblong, 3.0-5.2 × 1.0-1.2 cm, strap-shaped, distinctly winged on the dorsal suture; seeds 1-2, oblong, brown, 8.0 × 3.5 mm, testa wrinkled.

*Type:* India: Western Peninsula, *Wight* 917 (Holotype K !, Isotypes CAL !, MH !, LE !).

*Distrib.:* INDIA: Peninsular India; a rare and threatened plant which in all probability has become extinct.

*Specimen examined:* Pondicherry, *Collector ? s. n.* (K).

*Notes:* The characters of the pod which were unknown till now are given for the first time based on a specimen at Kew (l. c.).

18. **D. pseudo-robusta** Thoth. in Bull. Bot. Surv. Ind. 3(2): 181. 1961 (1962).

Scandent shrubs; younger parts minutely puberulous. Leaves up to 21 cm long, stipulate; leaflets 15, elliptic oblong to obovate at times, 4.0-6.5 × 1.5-3.0 cm, acute at apex, rounded at base, glabrous above, minutely puberulous beneath; petiolules 2-3 mm long. Flowers not known. Infructescence axillary, racemose, 10.0-35.0 cm long, nodes slightly produced, each bearing 2-3-stalked pods; stalks 4-5 mm long. Pods oblong, 5-12 × 1.4-2.0 cm, strap-shaped, narrowed at the base, curved and pointed at apex, reticulately veined, brown silky hairy, distinctly winged on the dorsal suture; seeds 3-8, marked.

*Type:* India: Kheti-Tincha, Tirap F. D. Nefa (Arunachal Pradesh), Aug. 1958, *Panigrahi* 14550A & B (Holotype CAL !, Isotype ASSAM !).

*Frts.:* August.

*Distrib.:* INDIA: Meghalaya, Arunachal Pradesh; a rare plant.

*Specimens examined:* Garampani, Nongringkhoh, Jowai district, Meghalaya, Balakrishnan 47038, 46887 (ASSAM).

19. *D. robusta* (Roxb. ex DC.) Benth. in Journ. Linn. Soc. 4(Suppl.): 104. 1860 pro parte; Baker in Hook. f. Fl. Brit. Ind. 2: 241. 1878 pro parte; Prain, Beng. Pl. 1: 408. 1903 (Repr. ed. 1: 292. 1963); Kanjilal *et al.* Fl. Assam 2. 111. 1938. *Dalbergia robusta* Roxb. (Hort. Beng. 53. 1814, *nom. nud.*) ex DC. Prodr. 2: 417. 1825; Wt. Ic. Pl. Ind. Or. t. 244. 1840. *D. krowee* Roxb. Fl. Ind. 3: 229. 1832.

*Mouhila, Kitkura* (Asm.); *Buro* (Kumaon).

Erect trees, 10-24 m high. Leaves 6.5-25.5 cm long; leaflets, elliptic-oblong, 4.3-5.5 × 1.5-2.5 cm, subopposite to opposite, unequal at base, mucronulate, minutely puberulous on both surfaces; petiolules 1-3 mm long. Racemes axillary, 21-25 cm long, nodes of racemes tumid with 2-3-pedicellate flowers. Flowers 0.8-1.0 cm; pedicels 3-5 mm long. Calyx campanulate, 2-3 mm. Corolla white; vexillum ovato-orbicular, 6-8 mm. Staminal sheath 7-8 mm long, vexillary stamen free above and below. Pistil 7-8 mm long, ovary silky pubescent; ovules 5-7. Pods strap-shaped, 3.0-8.5 × 0.6-1.5 cm, reticulately veined, glabrous to minutely silky, distinctly winged on the dorsal suture; seeds 2-6, black, 2 mm long.

1a. Pods longer and narrower (3.0-8.5 × 0.6-1.4 cm) .. var. **robusta**

1b. Pods shorter and wider (4.0-5.0 × 1.0-1.5 cm) ...var. **assamica**

var. **robusta**

*Type:* Bangladesh: Sylhet, Wall. Num. List no. 5849B (Lectotype K!, Isolectotype CAL!).

*Fls.:* April-June ; *Frts.:* Aug.-Sept.

*Distrib.:* INDIA: Eastern Himalayas, Assam, Naga hills; cultivated in Punjab, Uttar Pradesh; BURMA, BANGLADESH, S. CHINA.

*Specimens examined:* Mikir hills, May 1957, Panigrahi 9373 (CAL, ASSAM); HBC, Collector s. n. (Type of *Dalbergia krowee*, BM).





Pl. I. *Derris scandens* (Roxb.) Benth.

An extensive climber with unusually large, woody stem (40 cm in diameter)  
in the Indian Botanic Garden, Howrah.

*Uses:* Wood light brown, used for making tea-boxes. Leaves lopped for fodder. Grown for shade in the tea-gardens of eastern India.

*Chr. No.* n=11 [Mehra & Hans in *Taxon* 18(3): 314. 1969].

*Notes:* In India the species is confined to Assam and Eastern Himalayas. Reports of its occurrence in Deccan Peninsula were based on wrong identifications (Dalz. *et* Gibs. *Bombay Fl.* 77. 1861 ; Cooke, *Fl. Pres. Bomb.* 1: 404. 1902).

var. *assamica* Thoth. in *Bull. Bot. Surv. Ind.* 3(2): 180. 1961 (1962).

Leaflets larger than in the typical plant, alternate to opposite, glaucous beneath.

*Type:* India: Upper Shillong, 1933 m, Jun. 1920, *Carter 1696 A & B* (Holo *et* Isotypes CAL ).

*Frts.:* June.

*Distrib.:* INDIA: Assam; so far known only from the type locality; endemic.

20. *D. scandens* (Roxb.) Benth. in *Journ. Linn. Soc.* 4 (Suppl.): 103. 1860; Baker in *Hook. f. Fl. Brit. Ind.* 2: 240. 1876; Cooke, *Fl. Pres. Bomb.* 1(2): 404. 1902 (Repr. ed. 1: 430. 1958); Duthie, *Fl. Upper Gang. Pl.* 1(1): 268. 1903 (Repr. ed. 1: 247. 1960); Prain, *Beng. Pl.* 1: 408. 1903 (Repr. ed. 1: 291. 1963); Gamble, *Fl. Pres. Madr.* 2: 387. 1918 (Repr. ed. 1: 273. 1957); Haines, *Bot. Bih. Or.* 3: 298. 1922 (Repr. ed. 2: 312. 1961); Kanjilal *et al.* *Fl. Assam* 2: 116. 1938. *Dalbergia scandens* Roxb. *Pl. Corom.* 2: 49. t. 192. 1805. *Brachypterum scandens* (Roxb.) Benth. in *Ann. Wien. Mus.* 2: 101. 1832. *Derris timoriensis* (DC.) Pittier in *U.S. Nat. Herb.* 20: 41. 1917.

#### PL. I

*Gonj* (Hindi); *Noalata* (Beng.); *Hog Creeper* (Eng.); *Handiballi* (Kan.); *Ponnam valli*, *Muyal valli*, *Nula valli* (Mal.); *Kamocho*, *Mohaguno* (Or.); *Golari* (Gond.); *Gunj* (Punj.); *Thirudencodi*, *Tirani*, *Anaikkattu*, *Kodippungu*, *Puliyankodi* (Tam.); *Nalla tige*, *Cheratalibadu*, *Chirukatige*, *Mottasirili*, *Suruli* (Tel.).

Woody climbers; stems attaining 30-40 cm in diam. Leaves 7.0-18.5 cm long; leaflets oblong to obovato-oblong, 4.0-8.5 (-10) × 1.5-3.5 (-4) cm, base rounded to cuneate, apex retuse, glabrous above, puberulous below; stipels linear. Racemes axillary and terminal, at times branched, 18-38 cm

long; nodes of racemes tumid with a cluster of pedicellate flowers borne on short stalks. Corolla white to pink; vexillum ovato-orbicular, 0.9 cm. Staminal sheath 0.9-1.0 cm long. Pistil 0.9-1.0 cm long; ovules up to 8. Pods narrowly oblong, 3.5-12.0 × 1.0-1.6 cm, reticulately veined, adpressed with minute, silky hairs, winged on the dorsal suture; seeds 1-5, reddish brown, 8 × 5 mm.

1a. Pods laterally constricted between the seeds. Pedicels slender, up to 1.1 cm long ...var. *scandens*

1b. Pods not laterally constricted between the seeds. Pedicels stout, up to 0.9 cm long ...var. *saharanpurensis*

var. *scandens*

*Type:* India: Plate 192 of Roxb. Pl. Corom. 2: 49. 1798 (Lectotype CAL !).

*Fls.:* June-Aug.; *Frts.:* Oct.-Dec.

*Distrib.:* Throughout INDIA ; BURMA, SRI LANKA, BANGLADESH, PAKISTAN, MALESIA, AUSTRALIA, THAILAND, S. CHINA.

*Chr. No.:* n=13 (Toxopeus in Euphytica 1(3): 175-183. 1952).

*Uses:* Bark used as fibre; plant used as a fish-poison.

var. *saharanpurensis* (Thoth.) Thoth. in Bull. Bot. Surv. Ind. 13: 164. 1971 (1973). *D. timoriensis* (DC.) Pittier var. *saharanpurensis* Thoth. l. c. 12: 105. 1970 (1972).

Leaflets 7-9, oblong. Racemes 18-38 cm long. Pods 4-7 × 1.0-1.1 cm.

*Type:* India: Botanical Garden, Saharanpur, Uttar Pradesh, *E. Kleingen* 1305/87 (Holotype LE !).

*Distrib.:* INDIA: Uttar Pradesh; so far known only from the type locality.

**21. *D. secunda* Baker in Hook. f. Fl. Brit. Ind. 2: 247. 1878.**

Climbers. Leaves 18-21 cm long, stipulate; leaflets 6.0-8.5 × 2.2-3.0 cm, narrow to rounded at base, cuspidate, rigidly coriaceous; petiolules 3-4

mm long, glabrous. Racemes axillary, up to 11 cm long, rachis pubescent. Flowers 7 mm; pedicels short. Calyx campanulate, 2-3 mm, 5-toothed, pubescent without. Vexillum ovato-oblong, 6 mm long. Pistil 5-6 mm long, ovary oblong, silky pubescent; ovules up to 4. Pod not known.

*Type:* India: Goalpara, Assam, *Hamilton* in Wall. Num. List no. 5890 (K !).

*Fls.:* Jan.-March.

*Distrib.:* INDIA: Assam; a rare species, endemic.

*Specimen examined:* Toruputa, Duphla hills, 2466 m, Jan. 1875, *Lister* 203 (CAL).

22. *D. thothathrii* Bennet in Journ. Indian Forestry 1(1): 23. 1978. *Pongamia heyneana* Grah. in Wall. Cat. 5916. 1831-32 (*nom. nud.*) non Wt. & Arn. (1834). *Derris heyneana* Baker in Hook. f. Fl. Brit. Ind. 2: 244. 1878. non Benth. (1852); Cooke, Fl. Pres. Bomb. 1(2): 405. 1902 (Repr. ed. 1: 432. 1958) non Benth.; Gamble, Fl. Pres. Madr. 2: 388. 1918 (Repr. ed. 1: 273. 1957) non Benth.; Thoth. in Bull. Bot. Surv. Ind. 3(2): 186. 1961 (1962) non Benth.

Climbers. Leaves 15.5-26.2 cm long; leaflets 5-7, ovato-oblong to oblong, 8.0-15.5 × 3.5-6.9 cm, narrowed at base, acuminate, glabrous, subcoriaceous; petiolules 5-6 mm long. Panicles axillary, copiously branched, 20-24 cm long, grey downy. Flowers 0.8-1.0 cm; bracteoles 2, ovato-lanceolate. Corolla rose-pink; vexillum obovate to orbicular, 0.9-1.0 cm long. Staminal sheath 0.8-0.9 cm long, vexillary filament free below. Pistil 0.8-0.9 cm long, ovary oblong, pubescent; ovules 4. Pods falcately oblong, 5.5 × 2.3 cm, glabrous, reticulately veined, winged on both the sutures, the ventral narrow; seed 1.

*Type:* Concan, *Stocks*, *Law* 10 (CAL!).

*Fls.:* Dec.-March.

*Distrib.:* INDIA: Maharashtra, Karnataka, Tamil Nadu; rare and endemic.

*Specimens examined:* Mercara, Coorg, Mar. 1958, *Puri* 31991 (BSI); Vellingiri, 563 m, Coimbatore district, Feb. 1957, *Sebastine* 2410 (CAL, MH).

23. *D. trifoliata* Lour. Fl. Cochinch. 2: 433. 1790. *Robinia uliginosa* Willd. Sp. Pl. 3: 1133. 1802. *Galedupa uliginosa* Roxb. Fl. Ind. 3: 243. 1832. *Derris uliginosa* (Willd.) Benth. in Miq. Pl. Jungh. 1: 252. 1852 et Journ. Linn. Soc. 4(Suppl.): 107. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 241. 1878; Cooke, Fl. Pres. Bomb. 1(2): 404. 1902 (Repr. ed. 1: 431. 1958); Prain, Beng. Pl. 1: 408. 1903 (Repr. ed. 1: 292. 1963); Gamble, Fl. Pres. Madr. 2: 387. 1918 (Repr. ed. 1: 273. 1957); Haines, Bot. Bih. Or. 3: 298. 1922 (Repr. ed. 2: 311. 1961). *D. uliginosa* (Willd.) Benth. *β. loureiri* Benth. l.c. 108. 1860. *D. heterophylla* (Willd.) Backer ex K. Heyne, Nut. Pl. Ned. Ind. 2(2): 806. 1907 (ed. 2); Baker et Bakhuizen van den Brink, Fl. Java 1: 619. 1963.

*Panlata* (Beng.); *Kirtana* (Mar.); *Tigekranuga*, *Chirathelathige*, *Nallatige* (Tel.).

Scandent shrubs to climbers. Leaves 10.4-25.0 cm long; leaflets 3-5, 4.5-13.0×2.5-6.4 cm, rounded at base, shortly acuminate, subcoriaceous; petiolules 3-5 mm long. Racemes axillary, 5-25 cm long, nodes tumid bearing one or more flowers. Flowers 1.0-1.2 cm; pedicels 2-3 mm long. Calyx truncate, 3 mm. Corolla rose-pink; vexillum ovate to ovato-orbicular, 1.0-1.1 cm long. Staminal sheath 1.0-1.1 cm long. Pistil 0.9-1.0 cm long, ovary narrowly oblong; ovules 7-8. Pods 2.0-5.2×2.5-3.8 cm, glabrous, reticulately veined, distinctly winged on the dorsal suture; seeds 1.2, ovato-orbicular, 1.0×1.5 cm, reddish brown to black.

*Type:* Cochin-China (Vietnam), *Loureiro s. n.* (P).

*Fls.:* April-July; *Frts.:* Sept.-Oct.

*Distrib.:* INDIA: Assam, West Bengal, Orissa, Andaman & Nicobar Islands, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra; BURMA, SRI LANKA, BANGLADESH, MALESIA, N. AUSTRALIA, VIETNAM, FORMOSA, CHINA, E. AFRICA, MADAGASCAR.

*Chr. No.:* n=11 [Tjio in Hereditas 34: 135-146. 1948; Mallick & Ghosh in Taxon 17(5): 573. 1968].

*Ecol.* This is the only species of the genus growing in mangrove swamps and creeks, and also in tidal forests.

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POACEAE (TRIBE GARNOTIEAE)	3	Nov. 1979
SIMAROUBACEAE	4	April 1980
BALANITACEAE	4	April 1980
ORCHIDACEAE (GENUS COELOGYNE)	5	June 1980
PITTOSPORACEAE	6	Nov. 1980
LILIACEAE (TRIBE SCILLEAE)	7	Feb. 1981