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FASCICLE 8
LEGUMINOSAE : GENUS—DERRIS
K. Thothathri

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Date of Publication: 26th July, 1982
LEGUMINOSAE: GENUS—DERRIS†

K. Thothathiri*

DERRIS LOUR.


Woody climbers, scendant shrubs, rarely erect trees. Leaves alternate, imparipinnate, stipulate; leaflets 3-many, opposite, extipellate. Flowers in axillary or terminal racemes or panicles; bracteoles 2. Calyx campanulate, mouth truncate, rarely toothed. Corolla exserted, vexillum obovate to suborbicular, 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-zoncolporate and ornamentation psilate to faintly reticulate.


† 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.


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 callosites. 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 callosites. Pods distinctly winged on both the sutures ...Sect. 4. *Dipteroderris*


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


1a. Vexillum with 2 distinct callosites 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 callosites at base ...13. D. lushajensis

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. kanjitalii*

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


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.


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.


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

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, thathathri 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.


Climbers; younger branches lenticellate. Leaves 9.5-14.3 cm long; leaflets 5.7-8 (9), 2.5-8.0 x 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 x 1.0-2.5 cm, at times falcately oblong, narrowly winged on the dorsal and ventral sutures; seeds 1.2, 1.8 x 0.8 cm, oblong.

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

1b. Leaflets 2.5-4.0 (-7.5) x 1.5-2.5 cm, elliptic to elliptic-oblong. Pods elliptic-oblong, 2.5-7.7 x 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

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

\textit{Type:} India: Shevagherry hills, Aug. 1936, \textit{Wight} 834 (Holotype K !, Isotypes CAL !, LE !).

\textit{Distrib.:} \textit{India:} Tamil Nadu; rare and endemic.

\textit{Specimen examined:} Kalakkadu reserve forest, 1300 m, Tinnevelly district, Tamil Nadu, 1976, \textit{Oates} 136—Sheet 2/2 (K).

Benth. var. \textit{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 elliptic-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. Stamina leath 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 \(\ldots\text{var. } \textit{brevipes}\)

2b. Leaflets 8-13 × 4.5-5.8 cm, coriaceous; lateral veins 8-10 pairs.
Pods turgid \(\ldots\text{var. } \textit{coriacea}\)

1b. Pods 10-14 cm long \(\ldots\text{var. } \textit{travancorensis}\)
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).


Type: India: Fl. Ind. Or. (Mount Nilgiri), Hohenacker 1598 (Holo- type K !, Isotype LE !).

Distrib.: INDIA: Kerala, Tamil Nadu.


Type: India: Vellavamallay. 2333 m. Travancore. Nov. 1890. Bour- dillon s. n. (MH !).

Distrib.: INDIA: Kerala.


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; _Frt._: 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).


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; pedicels 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.

14
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).


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.


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.


_Fig._ 18

Climbers; younger parts pubescent. Leaves 15-31 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: Phonac Hill, 1827, Wall. Num. List no. 5883 (Holotype K).

_Fls._: Feb.-March; _Fruits_: 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).


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

_Distrib._: INDIA: Andaman Islands; endemic.


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; petioles 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).


*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.

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 !).

**Frs.:** May.

**Distrib.:** INDIA: Meghalaya; **BANGLADESH**.

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


**Ruphong-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; **Frs.:** 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%).


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 nectarless. 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).


Figs. 19-24
*Derris heyneana* (Wt. & Arn.) Benth.

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); Ainshi 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.


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.


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.


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 (Iholo et Isotypes DD!).

Frts.: April.

Distrib.: INDIA: Uttar Pradesh; endemic.


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; **Frs.:** 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).


**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.; **Frs.:** 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. hainesiana* flowers vary from blue to whitish pink.
Derris monticola (Kurz) Prain


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.).


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 !).

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

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


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

Erect trees, 10-24 m high. Leaves 6.5-25.5 cm long; leaflets, elliptic-oblanceolate, 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-pedate 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 vained, 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.


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).


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).

Frgs.: June.

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


Pl. I

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

Woody climbers; stems attaining 30-40 cm in diam. Leaves 7.0-18.5 cm long; leaflets oblong to obovate-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-orbiculare, 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 !).


_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.


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.


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 1).

Fls.: Jan.-March.

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

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


Climbers. Leaves 15.5-26.2 cm long; leaflets 5-7, ovato-oblong to oblong, 8.0-15.5 x 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 x 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).

_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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<td>PITTOSPORACEAE</td>
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