

FASCICLES OF FLORA OF INDIA

FASCICLE 10

ANNONACEAE : TRIBE—UVARIEAE

DEBIKA MITRA (*née* DAS)



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

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Date of Publication : 25th September, 1982

ANNONACEAE : TRIBE—UVARIEAE†

DEBIKA MITRA (*née* DAS)*

UVARIEAE

Hook. f. & Thoms. Fl. Ind. 1: 91. 1855 *et* in Hook. f. Fl. Brit. Ind. 1: 46. 1872; Sinclair in Gard. Bull. Singapore 14: 178. 1955.

Trees, shrubs or climbers. Leaves simple, alternate, exstipulate, coriaceous, glabrous, sometimes pubescent or stellate pubescent. Flowers hermaphrodite, rarely unisexual or polygamous, in few-flowered cyme or solitary, extra-axillary or leaf-opposed. Sepals 3, imbricate or valvate, free or connate at the base. Petals 6, 3+3, 1 or both series imbricate in bud, free or sometimes connate below, variable in size and shape, inner series smaller, sometimes subequal. Stamens numerous, free, sometimes a few (in *Sageraea*), spirally arranged on the torus, hypogynous, truncate, filaments inconspicuous, anther-cells concealed by the overlapping connectives (*Uvarioid* type). Carpels many, sometimes a few (in *Sageraea*); ovules 1-many, when many usually in 2 rows; style distinct or absent; stigma capitate or U-shaped. Torus convex, flat or depressed. Ripe carpels many, free, berried, a few to many-seeded, sessile or stalked.

Type : *Uvaria* L.

Distrib. : 4 genera and 19 species in India.

1a. Trees or shrubs. Sepals imbricate:

2a. Flowers axillary or fascicled on the tubercles. Anthers sunk in the truncate and quadrate connectives. Ovules usually many

...2. *Sageraea*

2b. Flowers extra-axillary. Anthers not sunk in the connectives which is convex at the top. Ovule 1

...3. *Trivalvaria*

+ Editor for Fam. Annonaceae (Tribe Uvarieae) : K. THOTHATHRI, Botanical Survey of India, Howrah-711103.

* Botanical Survey of India, Howrah-711103.

1b. Climbers or scandent. Sepals valvate :

3a. Petals imbricate, more than 1 cm long. Flowers opening wide when mature ...4. *Uvaria*

3b. Petals imbricate only at the tip, less than 1 cm long. Flowers not opening wide when mature ...1. *Cyathostemma*

1. CYATHOSTEMMA

Griff. Notulae 4: 707. 1854 et Ic. Pl. 4. t. 650. 1854; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 57. 1872; Sinclair in Gard. Bull. Singapore 14: 219. 1955; Fries in Engl. & Prantl, Nat. Pflanzenfam. ed. 2. 17a. 2: 73. 1959; Hutchinson, Gen. Fl. Pl. 1: 82. 1964.

Scandent to woody climbers, pubescent with simple or stellate hairs. Flowers bisexual or unisexual, in pendulous or clustered cymes from old branches, or leaf-opposed or extra-axillary, sometimes terminal, globose. Sepals 3, valvate, connate, hairy. Petals 6 (3+3) valvate at the base, imbricate at tip, coriaceous, clawed, convex outside. Stamens many, linear, anthers subintrorse, connectives obliquely incurved. Carpels many; ovaries pubescent; style cylindric, glabrous, notched, sometimes absent; stigma U-shaped; ovules many in 2-rows. Torus flat, margin convex. Ripe carpels oblong-ovoid with irregular bulges, seeds many.

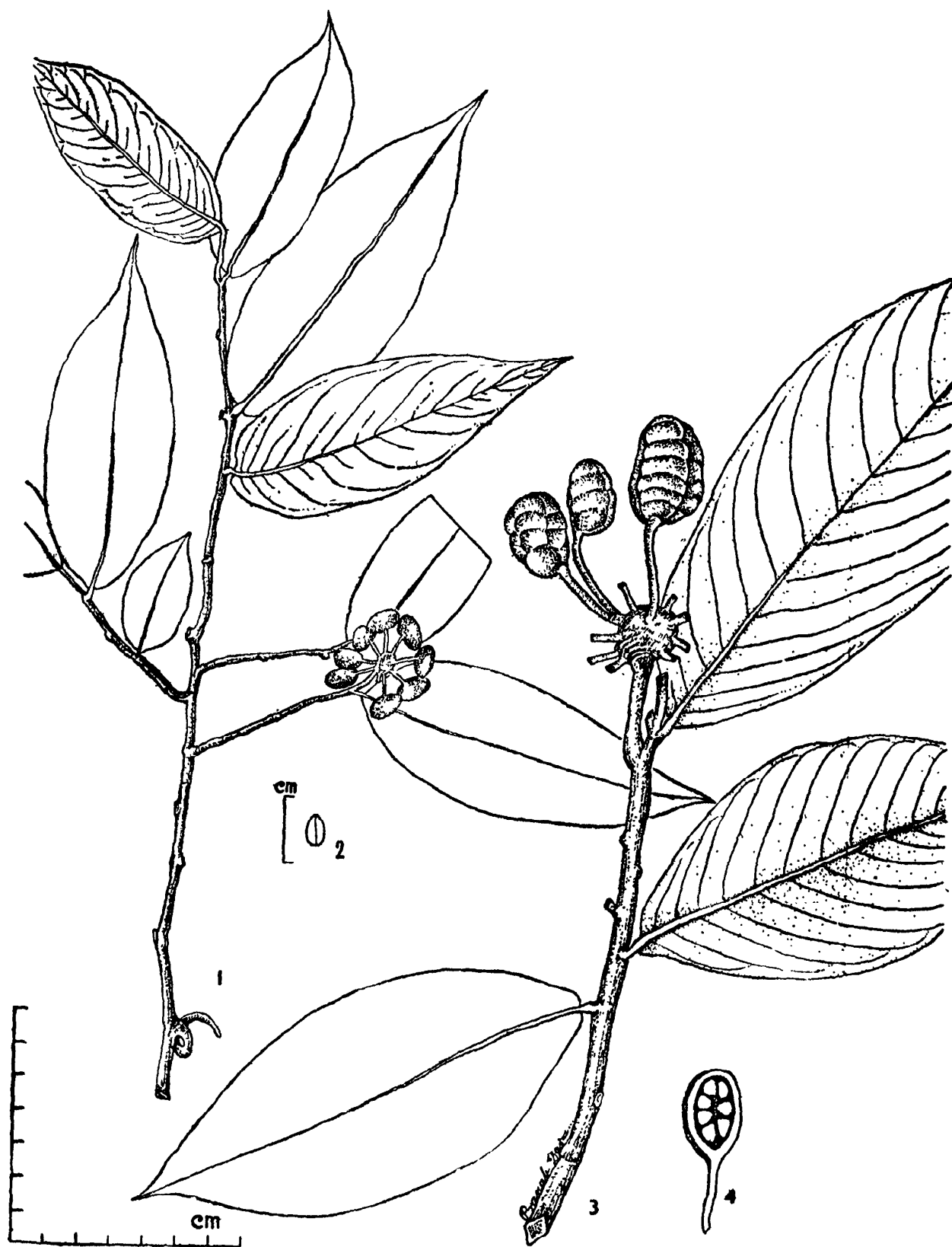
Distrib. : ca 8 species distributed in INDIA, BANGLADESH, BURMA, MALAYSIA, THAILAND, BORNEO & NEW GUINEA. 2 species in India.

1a. Flowers in simple cymes; bracts basal and median. Leaves 7-12 cm long ...1. *C. micranthum*

1b. Flowers in dichotomous cymes; bracts distichous, forming zig-zag appearance. Leaves 12-17(27) cm long ...2. *C. viridiflorum*

1. *Cyathostemma micranthum* (A. DC.) Sinclair in Gard. Bull. Singapore 14: 225. 1955. *Guatteria micrantha* A. DC. Mem. Soc. Phys. Geneve 5 : 218. 1832. *Uvaria micrantha* Hook. f. & Thoms. Fl. Ind. 1: 103. 1855 et in Hook. f. Fl. Brit. Ind. 1: 51. 1872; Kurz, For. Fl. Brit. Burma 1: 29. 1877; King in Ann. Roy. Bot. Gard. Cal. 4: 26. t. 18. 1893. *U. sumatrana* Kurz, Rep. Veg. Andamans (app. 4). 29. 1870; Hook. f. & Thoms. l. c. 1: 51. 1872. *Popowia nitida* King l. c. 4: 118. t. 165B. 1893.

Figs. 1-2



Figs. 1-2 : *Cyathostemma micranthum* (A. DC.) Sinclair

1. Branch with ripe carpels. 2. Seed.

Figs. 3-4 : *Uvaria hamiltonii* Hook. f. & Thoms.

3. Branch with ripe carpels. 4. L. S. of ripe carpel.

Climbers, young branches rusty-tomentose, glabrous with age. Leaves 2-4 cm broad, oblong-lanceolate, long acuminate, base rounded or slightly cuneate, glabrous except the rufous pubescent midrib above, sometimes sparsely pubescent beneath; petioles 2-3 mm, brown pubescent. Flowers bisexual, leaf-opposed or terminal, in 2-5-flowered cyme; pedicels 6-8 mm, rusty-brown tomentose with 2 orbicular bracts. Sepals 2.0-2.5 mm long, sub-rotund, obtuse, connate at the base, pubescent outside, glabrous inside. Petals greenish-yellow, tomentose; outer 4-5 × 3-4 mm, broadly ovate, acute, margins fold inward at the apex; inner shorter, slightly clawed. Stamens, ± 1 mm long, top of the connectives round, flat. Carpels, ± 1 mm long; ovaries oblong; stigma sessile, bilobed. Ripe carpels many, 5-7 mm in diam., globose or subglobose with bulges; stalk 2-2.5 cm, slender. Seeds in 2 rows, smooth, plano-convex, brown.

Type: Amherst, Martaban, Burma, Wallich Num. List 6449 (G, K, Photo !).

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

Distrib.: INDIA : Andaman & Nicobar Islands. BURMA, MALAYSIA, THAILAND, INDONESIA, PHILIPPINES, NEW GUINEA.

2. *C. viridiflorum* Griff. Notulae 4: 707. 1854 *et* Ic. 4: t. 650. 1854; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 57. 1872; Kurz, For. Fl. Brit. Burma 1: 33. 1877; King in Ann. Roy. Bot. Gard. Cal. 4: 11. t. 37. 1893.

Climbers. Leaves 5.5-8.0 cm broad, oblong-lanceolate or oblong-elliptic, acute, base narrowed, minutely cordate; petioles 5-7 mm long, pubescent. Flowers bisexual, greenish-yellow; peduncles rusty-tomentose, 1-many arising from the same place; bracts tomentose, persistent, one basal at each bifurcation and one about the middle of each pedicel. Sepals $\pm 3 \times 5$ mm, broadly ovate, obtuse, reflexed, rusty-tomentose, connate at the base. Petals $\pm 5 \times 5$ mm, broadly ovate, acute; outer with a thick rudimentary claw; inner slightly narrowed with thick and distinct claw. Stamens ± 2 mm long, connectives truncate, incurved. Carpels 4-5 mm long, tomentose; stigma sessile, U-shaped or horse-shoe-shaped; ovules many, biseriate. Ripe carpels 2.5-4.0 cm long, oblong-obtuse, irregularly bulged, glabrous, thick-walled; stalk ± 2 cm long, stout. Seeds 5-6 in 2 rows.

Type: Malacca, Maingay 35 (K).

Fls.: June-July; *Frts.:* Sept.-Dec.

Distrib.: INDIA : Andaman Islands; MALAYSIA.

2. SAGERAEA

Dalz. in Hook. Kew Journ. Bot. 3: 207. 1851; Hook. f. & Thoms. Fl. Ind. 1: 93. 1855; Benth. & Hook. f. Gen. Pl. 1: 22. 1862; Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3: 2: 29. 1891; Chatterjee in Proc. Linn. Soc. London 154: 263. 1941-42; Sinclair in Gard. Bull. Singapore 14: 180. 1955; Hutchinson, Gen. Fl. Pl. 1: 79. 1964. *Bocagea* Hook. f. & Thoms. in Hook f. Fl. Brit. Ind. 1: 92. 1872, *non* St. Hilaire 1825.

Elegant trees. Leaves glabrous, glossy above. Flowers uni-or bisexual, small, globular in bud, solitary, axillary or fascicled, often on woody tubercles in old branches. Sepals 3, imbricate, orbicular or ovate, ciliate. Petals 6 in 2 series, usually orbicular, subequal, concave, imbricate, free. Stamens 6-28 in 2 or more series, 1-2 mm, thick; anther cells dorsal, oblong, connectives produced not hiding anthers. Ovules 6-14, biseriate; style very short or absent; stigma usually capitate. Torus flat or convex. Ripe carpels solitary or a few together, globose, thin-walled, nearly sessile or stalked.

Distrib. : ca 9 species distributed in INDIA, BANGLADESH (Chittagong hill tracts), SRI LANKA, BURMA, MALAYSIA, THAILAND, CAMBODIA, VIETNAM, BORNEO & PHILIPPINES. 4 species in India.

- 1a. Flowers unisexual ...2. **S. elliptica**
- 1b. Flowers bisexual:
 - 2a. Flowers sessile, usually solitary ...5. **S. listeri** var. **andamanica**
 - 2b. Flowers distinctly pedicelled; pedicels 1-3 cm long, usually fascicled:
 - 3a. Stamens 25-28. Inner petals smaller than outer. Leaves elliptic ...1. **S. dalzellii**
 - 3b. Stamens 12. Inner petals larger or almost equalling the outer set. Leaves oblong or lanceolate:
 - 4a. Leaves 10-20 cm long. Pedicels 1.0-1.5 cm long ...4. **S. laurifolia**
 - 4b. Leaves 25-35 cm long. Pedicels 2.5-3.0 cm long ...3. **S. grandiflora**

1. **Sageraea dalzellii** Bedd. Ic. Pl. Ind. Or. 9. t. 42. 1874; King in Ann. Roy. Bot. Gard. Cal. 4: 8. 1893 *pro parte*; Gamble, Fl. Pres. Madr. 1: 12. 1915 (Repr. ed. 1: 8. 1957). *Bocagea dalzellii* Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 92. 1872 *pro parte*.

Kaitha (Kan.); *Maujanara*, *Kanakkaita* (Mal.); *Nedunattu* (Tam.).

Small evergreen trees. Leaves 25-35×8-11 cm, elliptic to elliptic-oblong, subacute to obtuse, rounded at the base, glabrous; petioles 1.0-1.5 cm long, stout, glabrous. Flowers axillary, fascicles of 4-8 flowers on woody tubercles in older branches; pedicels 2-3 cm long, bracteate at the base. Sepals 1.5-2.0 mm across, connate at the base. Petals ± 6 mm across, orbicular, bright yellow, concave. Stamens ± 2 mm long, all fertile, anther-cells dorsal and distinct, top of the connectives thin and flat in outer series and thick and quadrate in inner ones. Carpels 3-5, oblong, hairy; ovaries wide at the base; ovules about 12; style short; stigma capitate, slightly curved. Ripe carpels ± 4 cm long, subglobose, glabrous. Seeds many, 2 cm long, biseriate, transversely striate.

Type : Anamallay Hills, *Beddome s. n.* (K, MH !).

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

Distrib.: INDIA : Kerala and Tamil Nadu.

2. **S. elliptica** (A. DC.) Hook. f. & Thoms. Fl. Ind. 1: 93. 1855; King in Ann. Roy. Bot. Gard. Cal. 4:6. t. 34. 1893. Parkinson, For. Fl. Andamans 77. 1923. *Uvaria elliptica* A. DC. in Mem. Soc. Phys. Geneve (A. DC.) 5: 203. 1832. *Bocagea elliptica* Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 92. 1872.

Large trees, all parts except flowers glabrous. Leaves 20-35×4-9 cm, narrowly oblong, acute at apex, base usually rounded, rarely cordate; petioles thick, ± 4 mm long. Flowers reddish in colour; pedicels ± 6 mm long, with several bracts near the base. Sepals ± 4 × 5 mm, semi-orbicular, glabrous, ciliate at the margin. Petals ± 6×5 mm, ovate-orbicular, concave, ciliate at the margin, thick, inner smaller. Stamens 12-18; anthers extrorse. Carpels 3, ± 2 mm long; stigma sessile, capitate; ovules about 8. Ripe carpels 2-3, ± 2.5 cm in diam., glabrous; seeds 4-5 in 2 rows.

Type: Tavoy, Burma, Wallich Num. List 6470 (K, G, CAL !).

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

Distrib.: INDIA: Andaman Islands (on the authority of Parkinson l. c. 77); BURMA, MALAYSIA, THAILAND, CAMBODIA, VIETNAM, BORNEO.

Uses: Wood heavy, straight grained and elastic; used locally for boat-building and making bows.

Notes: There are no Indian specimens available either at CAL, DD or PBL.

3. *S. grandiflora* Dunn in Kew Bull. 1914 : 182. 1914; Gamble, Fl. Pres. Madr. 1: 12. 1915 (Repr. ed. 1 : 8. 1957).

Medium to large-sized trees, all parts except the flowers glabrous. Leaves 7-8 cm broad, oblong, short acuminate, rounded at the base; petioles 8-9 mm long. Flowers clustered below the leaf-scars. Sepals 2-3 mm long, connate at the base, ciliate. Petals rotundate, ciliate, outer 1.5 cm long, inner slightly larger. Stamens 12, obovate, anther-cells distant. Carpels 3-5; ovaries strigose; stigma almost sessile, entire; ovules 12-14. Ripe carpels not known.

Type: Keni, Travancore, *Bourdillon* 469 (K, MH !).

Fls.: Nov.-Dec.

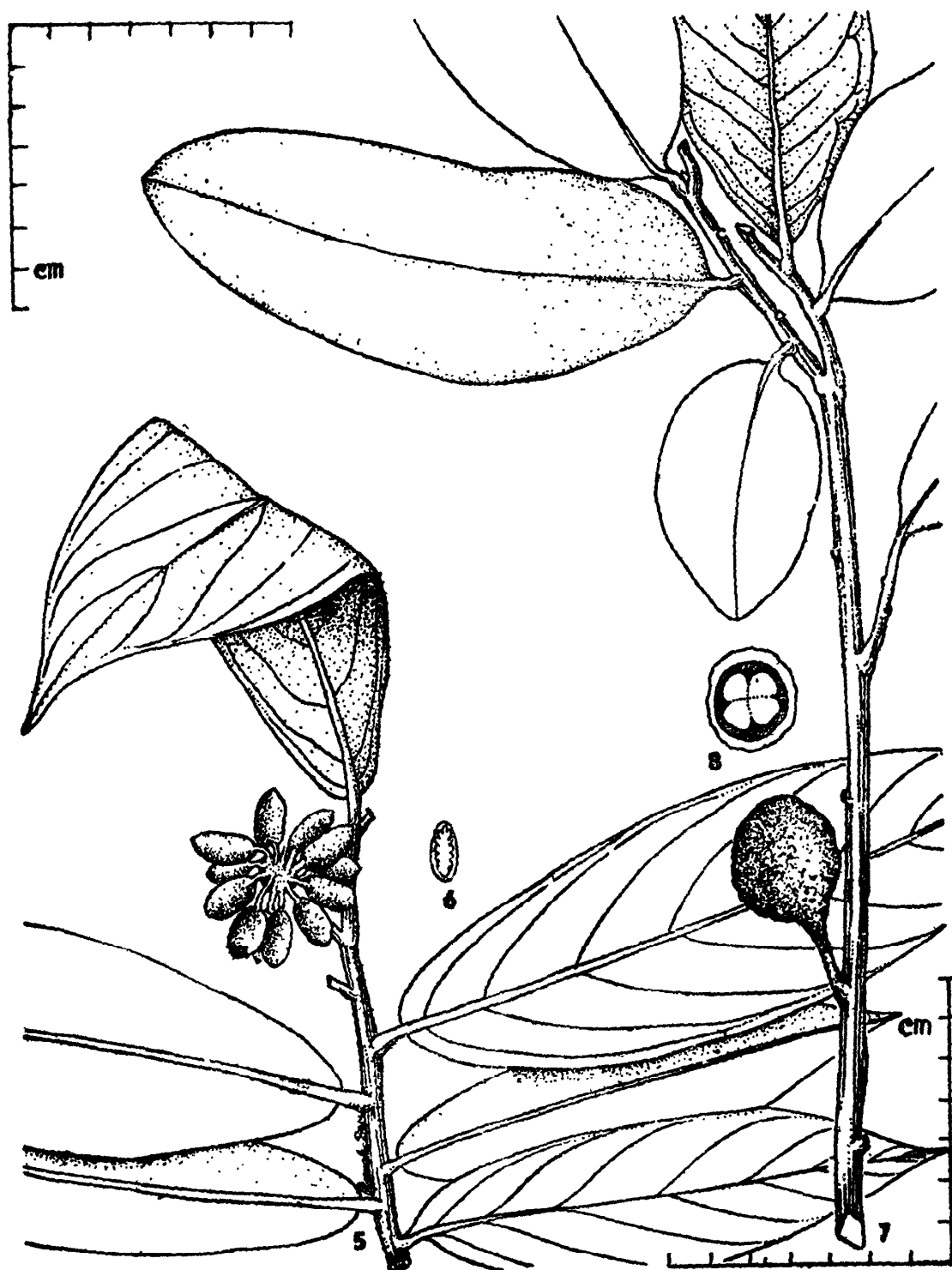
Distrib.: INDIA : An endemic species from Kerala.

4. *S. laurifolia* (Grah.) Blatter in J. Bombay nat. Hist. Soc. 34: 294. 1931. *Guatteria laurifolia* Grah. Cat. Bombay Pl. 4. 1839. *Sageraea laurina* Dalz. in Kew Journ. bot. 3: 207. 1851; King in Ann. Roy. Bot. Gard. Cal. 4: 7. t. 35B. 1893 *pro parte*. *Bocagea dalzellii* Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 92. 1872 *pro parte*; Cooke, Fl. Pres. Bomb. 1: 17. 1901 (Repr. ed. 1: 18. 1958) *pro parte*.

Figs. 7-8

Sagare (Kan.); *Sageri* (Mar.).

Medium-sized trees. Leaves oblong-lanceolate, acute, base cuneate sometimes rounded, glabrous; petioles $\pm$ 1 cm long. Flowers solitary or in small fascicles on short tubercles below the leaves, sometimes axillary; a few scaly bracts at the base of the pedicels. Sepals $\pm$ 1.5 mm across, slightly connate at the base, minutely ciliate. Petals 5-8 mm across, white, concave, glabrous except the ciliate margin. Stamens in 2 rows, outer sometimes sterile and flattened, variable in size and shape, connectives broad. Carpels 3-5, $\pm$ 2 mm long; ovaries elliptic-ovate, glabrous; stigma almost sessile, capitate; ovules 8-10. Ripe carpels 1-2, globose, $\pm$ 2.5 cm across wrinkled when dry. Seed 1.



Figs. 5-6 : *Trivalvaria argentea* (Hook. f. & Thoms.) Sinclair
 5. Branch with ripe carpels. 6. L. S. of ripe carpel.
 Figs. 7-8 : *Sageraea laurifolia* (Grah.) Blatter.
 7. Branch with ripe carpel. 8. T. S. of ripe carpel.

Type: Malabar, Concan, *Stocks & Law s. n.* (K, CAL !).

Fls.: Oct.-Nov.; *Frts.:* Jan.-Feb.

Distrib.: INDIA : Maharashtra, Karnataka, and Tamil Nadu. This is an endemic species of the Western Ghats.

Uses: This species yields good timber.

5. *S. listeri* King in Ann. Roy. Bot. Gard. Cal. 4: 7. t. 35A. 1893.

This is reported only from Chittagong, Bangladesh. However, var. *andamanica* occurs in the Andaman Islands which is distinguished from var. *listeri* as follows :

1a. Stamens 9. Bracts 1-3. Main lateral nerves 6-8 pairs ...var. ***listeri***

1b. Stamens 15. Bracts about 10. Main lateral nerves 8-12 pairs .
...var. ***andamanica***

var. ***andamanica*** Chatterjee *et* Mukerjee in Proc. Linn. Soc. 154: 268. 1941-42.

Chopi (Andaman).

Flowers solitary, rarely in pairs; bracts at the base of the sessile flowers, semi-circular or reniform. Petals 6, equal, strap-shaped. Stamens 2 mm long.

Type: R. E. P. Regd. No. 12585, Andaman Islands, 28.3.1900 (K, CAL !).

Fls.: Mar.-April; *Frts.:* Oct.-Nov.

Distrib.: INDIA : Andaman Islands; BURMA.

Uses: It yields good timber suitable for making planks.

3. TRIVALVARIA

Miq. in Ann. Mus. Bot. Lugd.-Bat. 2: 19. 1865; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 67. 1872 (Sect. *Trivalvaria*); Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3: 2: 33. 1891 (Sect. *Trivalvaria*); Fries, *l. c.* ed. 2, 17a. 140. 1959; Hutchinson, Gen. Fl. Pl. 1: 87. 1964.

Shrubs or small trees. Leaves large, usually glabrous, midrib prominent below, lateral nerves decurrent at the midrib. Flowers polygamous, extra-axillary, solitary or 2-3 together, sessile or shortly pedicelled. Sepals 3, free, imbricate. Petals 6 in 2 series, imbricate, both series free or inner adhering by edges, concave or vaulted, tomentose. Torus convex. Stamens numerous, short, top of the connectives usually rhomboid. Carpels many, villose, uniovulate; style oblong; stigma usually capitate. Ripe carpels many, ellipsoid, shortly stalked. Seed 1.

Distrib.: ca 7 species distributed in INDIA, BANGLADESH, BURMA, MALAYSIA, THAILAND, BORNEO, INDONESIA. 3 species in India.

1a. Leaves 12-15 cm long, lanceolate. Pedicels 3-5 mm long with lanceolate bract. Outer petals valvate, inner imbricate ...3. **T. kanjilalii**

1b. Leaves 15-24 cm long, oblong-lanceolate. Pedicels minute with ovate bract. Both series of petals imbricate :

2a. Flowers in fascicle on woody tubercle. Petals unequal, outer larger, ovate, acute. Sepals densely gland-dotted outside ...1. **T. argentea**

2b. Flowers solitary or in pairs. Petals equal, orbicular. Sepals silky-tomentose outside ...2. **T. dubia**

1. **Trivalvaria argentea** (Hook. f. & Thoms.) Sinclair in Sarawak Mus. J. 5: 603. 1951. *Polyalthia agrentea* Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 67. 1872. *Popowia hookeri* King in J. Asiat. Soc. Beng. 61: 2: 97:1892 et in Ann. Roy. Bot. Gard. Cal. 4: 123. t. 165A. 1893; Kanjilal et al. Fl. Assam 1: 36. 1934.

Figs. 5-6

Shrubs. Leaves 15-21 × 3.5-9.0 cm, acuminate, rounded at the base, glabrous, glaucous beneath. Petioles 5-7 mm long. Flowers very small, extra-axillary. Sepals 3 × 2 mm, ovate, acuminate. Petals of outer series ± 2.5 × 1.5 mm, pubescent outside; inner ± 2 × 1 mm, with rudimentary claw at the base, pubescent at the midrib outside and margin and apex within. Male flowers: stamens on a sessile, central, conical column, top of the connectives capitate. Female flowers: carpels numerous, inserted on a cylindrical torus with abortive stamens at the base; ovaries oblong, densely silky; stigma sessile, capitate. Ripe carpels numerous, 1.5-2.0 cm long, pale pinkish, oblong, granulate, longitudinally circumferential grooved, stalk 3-5 mm long. Seed 1.

Type: Khasia, Sept. 1850. *J. D. Hooker & T. Thomson* (K, Photo !).

Fls.: June-July; *Frts.*: Sept.-Feb.

Distrib.: INDIA: Assam, Arunachal Pradesh, Meghalaya, Nagaland; BANGLADESH.

2. *T. dubia* (Kurz) Sinclair in Gard. Bull. Singapore 14: 47. 1955. *Polyalthia dubia* Kurz, For. Fl. Brit. Burma 1: 38. 1877. *Popowia kurzii* King in Ann. Roy. Bot. Gard. Cal. 4: 122. t. 163B. 1893 excluding syn. *Guatteria macrophylla* Bl. Bijdr. 1: 19. 1825; Kanjilal *et al.* Fl. Assam 1: 1: 36. 1934.

Shrubs to small trees; branches glabrous, furrowed. Leaves 15-24 × 5-8 cm, broadly oblong-lanceolate or elliptic-oblong, bluntly acuminate, cuneate at the base, glabrous above, slightly pubescent at the midrib beneath. Petioles pubescent, 5-7 mm long. Flowers white, polygamous, extra-axillary, solitary or in pairs, sessile or on very short and tomentose pedicels; bract ovate, brown-tomentose. Sepals 2-4 mm across, orbicular. Petals 4-7 mm across, silky-tomentose outside, glabrous inside. Stamens numerous, ± 2 mm long, top of the connectives convex and rhomboid; anthers linear. Carpels about 10, pubescent, linear, sometimes absent or abortive; stigma clavate. Ripe carpels 2 × 1 cm, rugose. Seed with 2 longitudinal channels.

Type: South Andaman, *S. Kurz* s. n. (K, CAL !).

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

Distrib.: INDIA: Andaman & Nicobar Islands, Assam; BURMA.

3. *T. kanjilalii* D. Das in Bull. Bot. Surv. Ind. 10: 263. 1968.

Small trees, 2-3, m high; young branches brown-tomentose, glabrous with age. Leaves 12-15 × 3.5-4.0 cm, lanceolate, long acuminate, glabrous. Petioles 2-3 mm long, glabrous. Flowers terminal or axillary, solitary, bisexual; pedicels brown-tomentose; bract median, acuminate, brown-tomentose. Sepals 3-4 × ± 4 mm, broadly ovate, acute, densely brown-tomentose outside, puberulous within. Petals brown-tomentose outside, puberulous within; outer petals 2.5-3.0 × ± 2.5 mm, ovate, acute; inner petals 3-4 × 2.5-3.0 mm, shortly clawed, tip incurved, more or less rhomboid. Stamens numerous, ± 1 mm long, connectives flat or slightly convex at the top. Carpels numerous, ± 1 mm long; ovaries oblong, strigose; style curved; stigma capitate, pubescent. Ripe carpels ± 5 mm in diam., subglobose, obtuse at both ends, glabrous, reddish, distinct transverse groove round the middle, thin-walled, stalk 5-7 mm long. Seed 1.

Type: Wah-Maw-iong, Khasia Hills, 20.10.1917, U. N. Kanjilal 7280 (CAL !, ASSAM !).

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

Distrib.: INDIA: Meghalaya.

4. UVARIA

L. Sp. Pl. 536. 1753; Benth. & Hook. f. Gen. Pl. 1: 23. 1862; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 47. 1872; Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3: 2: 9. 1891; Hutchinson Gen. Fl. Pl. 1: 82. 1964; Sinclair in Gard. Bull. Singapore 14: 199. 1955.

Scandent or sarmentose shrubs, usually stellate pubescent. Flowers bisexual, rarely unisexual, terminal or leaf-opposed, in few-flowered cymes, sometimes solitary, yellow, purple or reddish-brown in colour. Sepals 3, often connate below. Petals 6 (3+3), free, sometimes connate at the base. Stamens numerous, outer sometimes sterile, ovoid-oblong, truncate or subfoliaceous, top of the connectives produced. Carpels many; ovaries linear-oblong; style short, thick; ovules many, 2-seriate, rarely few and 1-seriate. Torus depressed, pubescent or tomentose. Ripe carpels many, dry or berried, often sweet and edible. Seeds a few to many, 1-2-seriate.

Distrib.: ca 150 species distributed in INDIA, BANGLADESH, BURMA, SRI LANKA, CHINA, MALAYSIA, THAILAND, LAOS, CAMBODIA, VIETNAM, BORNEO, SUMATRA, JAVA, PHILIPPINES, NEW GUINEA, AUSTRALIA, NEW ZEALAND & AFRICA. 10 species in India.

1a. Flowers bisexual:

2a. Leaves densely hairy beneath:

3a. Petals less than 1.5 cm in length ...9. *U. rufa*

3b. Petals more than 1.5 cm in length:

4a. Petioles 6 mm long. Pedicels 2.5-4.0 cm long. Ripe carpels ovoid to subglobose, stalk 2.5-5.5 cm long
...4. *U. hamiltonii*

4b. Petioles 1 cm long. Pedicels 0.7-1.0 cm long. Ripe carpels oblong, stalk 1.0-1.3 cm long ...2. *U. cordata*

- 2b. Leaves glabrous (sometimes pubescent when young):
- 5a. Ripe carpels oblong-cylindric:
- 6a. Stalk of ripe carpels 4-15 cm long ...6. *U. lurida*
- 6b. Stalk of ripe carpels 1-2 cm long ...8. *U. nicobarica*
- 5b. Ripe carpels ovoid to oblong:
- 7a. Leaves not more than 10 cm long, reddish beneath when dry. Pedicels about 7 mm long ...10. *U. zeylanica*
- 7b. Leaves more than 10 cm long, brown beneath when dry. Pedicels 1-3 cm long:
- 8a. Pedicels 2-3 cm long. Petals rotund-ovate. Ripe carpels uniseriate, ± 5 cm long, stalk, 5-8 cm long ...7. *U. narum*
- 8b. Pedicels 1.0-1.5 cm long. Petals ovate. Ripe carpels biseriate, ± 3 cm long, stalk ± 4 cm long ...5. *U. hookeri*
- 1b. Flowers unisexual or polygamous :
- 9a. Flowers usually in cymes. Sepals partly connate, not splitting irregularly, stellate-tomentose outside ...1. *U. andamanica*
- 9b. Flowers solitary. Sepals connate, splitting irregularly, tuberculate outside ...3. *U. eucincta*
1. *Uvaria andamanica* King in J. Asiat. Soc. Beng. 61: 2: 21. 1892 *et* in Ann. Roy. Bot. Gard. Cal. 4: 29. t. 25. 1893; Parkinson For. Fl. And. Isl. 79. 1923.

Scandent shrubs. Leaves 17-22 $\times$ 5.5-7.5 cm, oblong to oblanceolate, shortly acuminate, narrowed, at the base, glabrous above except the puberulous midrib and lateral nerves, lower surface stellate pubescent on the midrib and lateral nerves; petioles ± 7 mm, stellate pubescent. Flowers in terminal or axillary cymes, rarely solitary, rusty stellate tomentose; pedicels ± 4 mm in bud; bract solitary, orbicular. Sepals 3, ± 4 mm long in bud, orbicular,

glabrous inside. Petals 6, outer 3, ± 5 mm diam. in bud, inner 3, smaller, orbicular, fleshy, puberulous outside. Stamens numerous, ± 1.5 mm long, narrowly elongate, top of the connectives round and flat. Ripe carpels many, ± 3 cm long, oblong, slightly tuberculate, rusty-stellate tomentose, constricted between seeds. Seeds about 8 in 2 rows, plano-convex.

Type: Port Blair, Andamans, 1. 4. 1884, *King's Collector* 207 (Lectotype, CAL!).

Fls.: Dec.-Jan.; *Frts.:* April onwards.

Distrib.: INDIA: This is an endemic species from the Andaman & Nicobar Islands.

2. *U. cordata* (Dunal) Alston, Handbook Fl. Ceylon Suppl. 6: 4. 1931. *Guatteria cordata* Dunal, Monogr. Fam. Anon. 129. t. 30. 1817. *U. macrophylla* Roxb. Fl. Ind. 2: 663. 1832; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 49. 1872; King in Ann. Roy. Bot. Gard. Cal. 4: 19. t. 10. 1893; Prain, Beng. Pl. 1: 199. 1903 (Repr. ed. 1: 129. 1963).

Bagh-runga (Beng.).

Large scandent shrubs. Leaves $13-28 \times 6.5-13.5$ cm, elliptic-oblong to ovate-oblong, base cordate, abruptly acuminate, glabrous above except midrib and lateral nerves, densely, stellate-pubescent below. Flowers about 4, clustered in extra-axillary cyme; bracts 2, broadly oval, larger one 5×7 mm. Sepals $1.5-2.0$ cm diam., united. Petals $6, \pm 1.2-1.5 \times 0.8-1.0$ cm, subequal, broad-oval, margin splitting with age, reddish-brown. Stamens many, 5-7 mm, outer staminodes larger, inner fertile shorter, connectives obliquely truncate at apex. Carpels many, 5 mm long, linear, tomentose; ovaries narrow, compressed; stigma sessile, truncate. Ripe carpels many, 2-4 cm long, scarlet, glabrous. Seeds many in 2 rows, oval, compressed, shining, dark-brown.

Type: Java, Herb. Delessert (G).

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

Distrib.: INDIA: West Bengal, Andaman & Nicobar Islands; BANGLADESH, BURMA, SRI LANKA, MALAYSIA, THAILAND, LAOS, VIETNAM, JAVA, PHILIPPINES, NEW GUINEA.

3. *U. eucineta* Bedd. ex Dunn in Kew Bull. 1914: 182. 1914; Gamble, Fl. Pres. Madr. 1: 13. 1915 (Repr. ed. 1: 9. 1957).

Scandent shrubs. Leaves 15-25 × 4.5-6.0 cm, oblong, shortly acuminate, base rounded, glabrous, rusty-pubescent beneath when young; petioles 6-10 mm. Flowers leaf-opposed; peduncle 1 cm, long, thick, tuberculate. Sepals 3, 1.2 cm in diam., globose, rounded at the apex, scabrid with rusty tubercles, hairy. Petals 6, 3+3, each $\pm 1.5-2.0 \times \pm 1.0$ cm, ovate, rounded at the apex, united at the base, slightly tomentose. Stamens numerous in male flowers, ± 2 mm, truncate, subglobose at apex, fleshy. Carpels many in bisexual flowers, multiovulate. Ripe carpels oblong, ± 2 cm long, stalk ± 4.5 cm long. Seeds many, biseriate.

Type: Russelkonda Hills, *Beddome* 50 (CAL!).

Distrib.: INDIA: Orissa; endemic.

4. *U. hamiltonii* Hook. f. & Thoms. Fl. Ind. 1: 96. 1855 *et* in Hook. f. Fl. Brit. Ind. 1: 48. 1872; Prain, Beng. Pl. 1: 199. 1903 (Repr. ed. 1: 129. 1963); Kanjilal *et al.* Fl. Assam 1: 44. 1934; Haines, Bot. Bih. Or. 1: 10. 1921 (Repr. ed. 1: 10. 1961); Gamble, Fl. Pres. Madr. 1: 12. 1915 (Repr. ed. 1: 9. 1957); Hara, Fl. E. Himalaya 97. 1966.

Figs. 3-4

Latkan (Beng.); *Lakantinli* (Or.).

Scandent shrubs. Leaves 15-25 × 7-11 cm, elliptic to elliptic-oblong or obovate, acuminate, rounded or slightly cordate at base, densely rufous stellate-tomentose below. Flowers solitary or 2-3 together, extra-axillary, brown-tomentose; bract solitary, suborbicular 0.5-1.0 cm long. Sepals 3, 1.0-1.2 × 1.0 cm, connate at base, broadly ovate, ultimately reflexed, brown-tomentose outside, pubescent within, thin. Petals 6, 2-3 × 1.2-1.5 cm, brick-red, obovate; tip incurved, coriaceous, both surfaces brown-tomentose. Stamens many, ± 4 mm, anthers linear, top of the connectives oblong, pubescent. Carpels many, ± 4 mm; ovaries quadrate, pubescent; stigma sessile, glabrous. Ripe carpels about 10, 1.5-2.5 cm long, orange-coloured, tomentose. Seeds many, flat, shining.

- 1a. Petals brick-red, 2-3 cm long. Pedicels 2.5-4.0 cm long. Main lateral nerves 20-25 pairs ...var. *hamiltonii*
- 1b. Petals reddish-yellow, 1.0-1.5 cm long. Pedicels 1.5-2.0 cm long. Main lateral nerves 12-16 pairs ...var. *kurzii*

var. *hamiltonii*

Type: Monghir Hills, *Hamilton ex Wallich* Num. List 6485E (CAL!).

Fls.: May-July; *Frts.:* Aug.-Sept. (sometimes persistent till Dec.).

Distrib.: INDIA: Uttar Pradesh, Bihar, West Bengal, Sikkim, Assam, Meghalaya, Tripura, Orissa, Andhra Pradesh, Andaman and Nicobar Islands; NEPAL, BURMA, THAILAND.

var. *kurzii* King in Ann. Roy. Bot. Gard. Cal. 4: 17. 1893; Parkinson For. Fl. And. Isl. 79. 1923.

Leaves wide at base, often minutely cordate. Flowers on shorter pedicels. Petals ovate-oblong.

Type: South Andaman, 9.7.1884, *King's Collector* 338 (CAL!).

Fls.: July.

Distrib.: INDIA: Andaman & Nicobar Islands.

5. *U. hookeri* King in Ann. Roy. Bot. Gard. Cal. 4: 28. t. 22. 1893; Cooke Fl. Pres. Bomb. 1: 9. 1901 (Repr. ed. 1: 10. 1958); Prain, Beng. Fl. 1: 200. 1903 (Repr. ed. 1: 129. 1963). *U. narum* Wall. ex Hook. f. & Thoms. Fl. Ind. 1: 102. 1855 *pro parte*. *U. narum* Wall. ex Hook. f. var. *macrophylla* Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 50. 1872.

Climbers, all parts except inflorescence glabrous. Leaves 11-16 × 2.6-5.5 cm, oblong or oblong-lanceolate, acute or slightly acuminate, base almost rounded, petioles ±5 mm. Flowers solitary, terminal or leaf-opposed; pedicels 1.0-1.5 cm long, pubescent. Sepals 3, each ±1 × ±1 cm, broadly ovate, connate at the base, tuberculate, pubescent. Petals 3+3, each 1.0-1.5 × ±0.9 cm, ovate, tips reflexed, tomentose outside, pubescent inside, connate at base. Stamens numerous, ±2.5 mm long, linear, connectives almost flat. Carpels many, ±1.5 mm long, linear-oblong; styles short, thick; ovules many. Ripe carpels many, 1.7-3.0 cm long, ovoid or oblong, tapering to the apex, glabrous; stalk stout, 3.2-4.5 cm long. Seeds many, biseriate, reddish-brown, shining.

Type: South India, Wallich Num. List 6473C (CAL ! 6473, K).

Fls.: May onwards; *Frts.:* Sept.-Jan.

Distrib.: INDIA: Karnataka, Kerala and Tamil Nadu.

6. **U. lurida** Hook. f. & Thoms. Fl. Ind. 1: 101. 1855 *et* in Hook. f. Fl. Brit. Ind. 1: 50. 1872; King in Ann. Roy. Bot. Gard. Cal. 4: 28. 1893; Haines Bot. Bih. Or. 1: 10. 1921 (Repr. ed. 1: 11. 1961); Kanjilal *et al.* Fl. Assam 1: 45. 1934.

Gaichiria (Or.).

Large woody climbers. Young parts with rusty-stellate hairs. Leaves 16-21 × 3.5-6.5 cm, oblong or oblong-lanceolate, acute or shortly acuminate, round or subcuneate at the base, glabrous with age, petioles 1.0-1.5 cm long. Flowers terminal or leaf-opposed, 1-2-flowered; pedicels 1.0-1.5 cm long, stout, ebracteate. Sepals 3, 1.5-2.0 cm long, broadly ovate, connate at the base, pubescent within. Petals 3+3, outer 2.0-2.5 × 2.0 cm, connate at the base, brick-red, broadly ovate with inflexed tips, densely pubescent within. Stamens many, 2-3 mm long, cuneate with truncate tips. Carpels numerous, ± 4 mm, oblong, pubescent; stigma sessile, subcapitate. Ripe carpels many, 2-4 cm long, constricted, glabrous. Seeds 3-6 in a single row, compressed, globose.

1a. Ripe carpels cylindric, stalk 4-6 cm long ...var. **lurida**

1b. Ripe carpels strongly triquetrous, stalk 12-15 cm long
...var. **sikkimensis**

var. **lurida**

Type: Northern slopes of Khasia Hills, alt. 2000 ft. *Hook. f. & T. Thomson s. n.* (CAL !, Photo K !).

Fls.: Jan.-May; *Frts.:* Aug.-Oct.

Distrib.: INDIA: Bihar, Orissa, Assam, Meghalaya, Andaman & Nicobar Islands.

var. **sikkimensis** King in Ann. Roy. Bot. Gard. Cal. 4: 29. t. 23. 1893.

Leaves 20-30 cm long, acuminate, slightly narrow; stalk 12-15 cm long. Seeds 2-7 in 1 or 2 rows.

Type: Mungpoo Peak, Sikkim, 1881, *King. s. n.* (CAL !).

Fls.: Oct.; *Frts.:* Aug.

7. *U. narum* (Dunal) Blume in Fl. Java 5. 1828; Cooke Fl. Pres. Bomb. 1: 9. 1901 (Repr. ed. 1: 9. 1958). *Unona narum* Dunal Monogr. Fam. Anon. 99. 1817 *pro parte*. *Uvarianarum* Wall. ex Hook. f. & Thoms. Fl. Ind. 1: 102. 1855 *et* in Hook. f. Fl. Brit. Ind. 1: 50. 1872 *pro parte*; King in Ann. Roy. Bot. Gard. Cal. 4: 27. t. 21. 1893; Gamble Fl. Pres. Madr. 1: 13. 1915 (Repr. ed. 1: 9. 1957) *pro parte*.

Kariballi (Kan.); *Narampanal* (Mal.); *Puliccan* (Tam.).

Large woody climbers, all parts except inflorescence glabrous. Leaves 10-15 × 2.5-5.7 cm, oblong-lanceolate, acuminate, base subcuneate; petioles 5 mm long. Flowers terminal, solitary; peduncle ± 1 cm long; bracts deciduous. Sepals 3, ± 5 mm in diam., rotund-ovate, connate at base, reflexed, minutely tomentose. Petals 6, 3+3, each ± 1.5 × 1.0 cm, rotund-ovate, connate at base, inflexed, minutely tomentose. Stamens numerous, ± 1.5 mm long, anther connectives broad, truncate. Ripe carpels numerous, 2-5 cm long, oblong, glabrous, scarlet; stalk 5-8 cm long. Seeds 4-6, in a single row, oval, smooth, planoconvex, chestnut-brown.

Type: *Narum-Panel*, Rheede, Hort. Malab. 2: t. 9. 1679.

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

Distrib.: INDIA: Karnataka, Kerala and Tamil Nadu; SRI LANKA.

8. *U. nicobarica* Raizada *et* Sahni in Indian For. 87: 101. 1961.

Large woody climbers; young twigs dark-brown, stellate pubescent, glabrous with age. Leaves 15-17 × 9.0-9.5 cm, broadly elliptic to oblanceolate, sometimes obovate, acuminate, base somewhat rounded to slightly cuneate, glabrous, midrib stellate-pubescent; petioles 5 mm long, stellate-pubescent. Flowers not known. Torus 2 cm in diam., subglobose. Ripe carpels several, 2.5-3.0 cm long, pericarp yellow. Seeds about 8, ± 8 × 5 mm, uniseriate, chocolate brown, shining.

Type: Trinket Champlong Bay, Great Nicobar Island, 3. 4. 1952, B. S. Chengappa 23168 (DD !).

Frts.: Oct.

Distrib.: INDIA: Great Nicobar Island.

9. *U. rufa* Blume, Fl. Java 19. t. 4 & 13C. 1828.

Climbers; young branches rusty stellate-tomentose. Leaves 10-13 × 4-6 cm, elliptic-lanceolate to oblong, apex acuminate; base slightly cordate, scabrid above, stellate-tomentose beneath; petioles 4-5 mm long, brown pubescent. Flowers in cymes of 1-4 flowers, sometimes solitary, extra-axillary, rusty stellate-tomentose; pedicels 0.7-1.0 cm long, tomentose, bract submedian. Sepals 3, 3 × 4 mm, suborbicular, connate at base, both surfaces rusty stellate-tomentose. Petals 6, each 0.7-1.0 × 0.4-0.5 cm, broadly oblong, obtuse, free, bright-red to dull reddish-purple, both surface minutely pubescent. Stamens numerous, 3-4 mm long, outer staminodes, top of the connective broad and flat. Carpels many, 4-5 mm long, quadrate, pubescent; stigma sessile, truncate. Ripe carpels about 4-20, 2.0-2.5 cm long, ovoid to oblong, mucronulate, stellate, pubescent. Seeds many in 2 rows, reddish-brown, smooth, shining.

Type: Banton, Java, *Blume s. n.* (K, L).

Fls.: May-June; *Frts.:* Sept. onwards.

Distrib.: INDIA: Andaman and Nicobar Islands; MALAYSIA, THAILAND, CAMBODIA, LAOS, VIETNAM, INDONESIA, PHILIPPINES, NEW GUINEA.

Specimens examined: Car Nicobar, 4. 6. 1975, *N. G. Nair* 2666 (CAL); Katchal Island, 4.11.1976, *Chakraborty* 4622 (CAL.); S. Nicobar, 11.9.1977, *N. P. Balakrishnan* 5692 (CAL).

10. *U. zeylanica* L. Sp. Pl. 536. 1753; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1: 51. 1872; King in Ann. Roy. Bot. Gard. Cal. 4: 26. t. 19. 1893; Gamble, Fl. Pres. Madr. 1: 13. 1915 (Repr. ed. 1: 9. 1957).

Large climbers; young branches rufous-tomentose. Leaves 6.5-9.5 × 2-3 cm, lanceolate or oblong-lanceolate, bluntly acuminate or acute, base cuneate, glabrous, petioles 3-4 mm long. Flowers terminal or leaf-opposed; pedicels rufous-pubescent, bracts a few, small. Sepals 3, 4-5 × 5-6 mm, rotund-ovate, subretuse, pubescent. Petals 3+3, 7-10 × 4-5 mm, dull-red, ovate-oblong or oblong, pubescent outside, glabrous inside. Stamens many, 1.0-1.5 mm long, broadly oblong, cuneate. Carpels many, 1 mm long, obovate-oblong, pubescent; stigma sessile, subcapitate. Ripe carpels 4-12, ±1 cm long, ovoid, pubescent, sometimes constricted, stalk 1-2 mm long. Seeds 3-6 in a single row, compressed.

Type: Ceylon, *Herman s. n.* (BM).

Fls.: Dec.; *Frts.:* Aug.

Distrib.: INDIA: Karnataka and Kerala; SRI LANKA.

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BALANITACEAE	4	April	1980
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PITTOSPORACEAE	6	Nov.	1980
LILIACEAE (TRIBE SCILLEAE)	7	Feb.	1981
LEGUMINOSAE (GENUS DERRIS)	8	July	1982
ACERACEAE (GENUS ACER)	9	Aug.	1982