

# **FLORA OF BANGLADESH**

**NO. 79**

## **CELASTRACEAE**

EDITOR

**SARDER NASIR UDDIN**

June 2022

By

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AND

**MOHAMMAD AMDADUL HOQUE**

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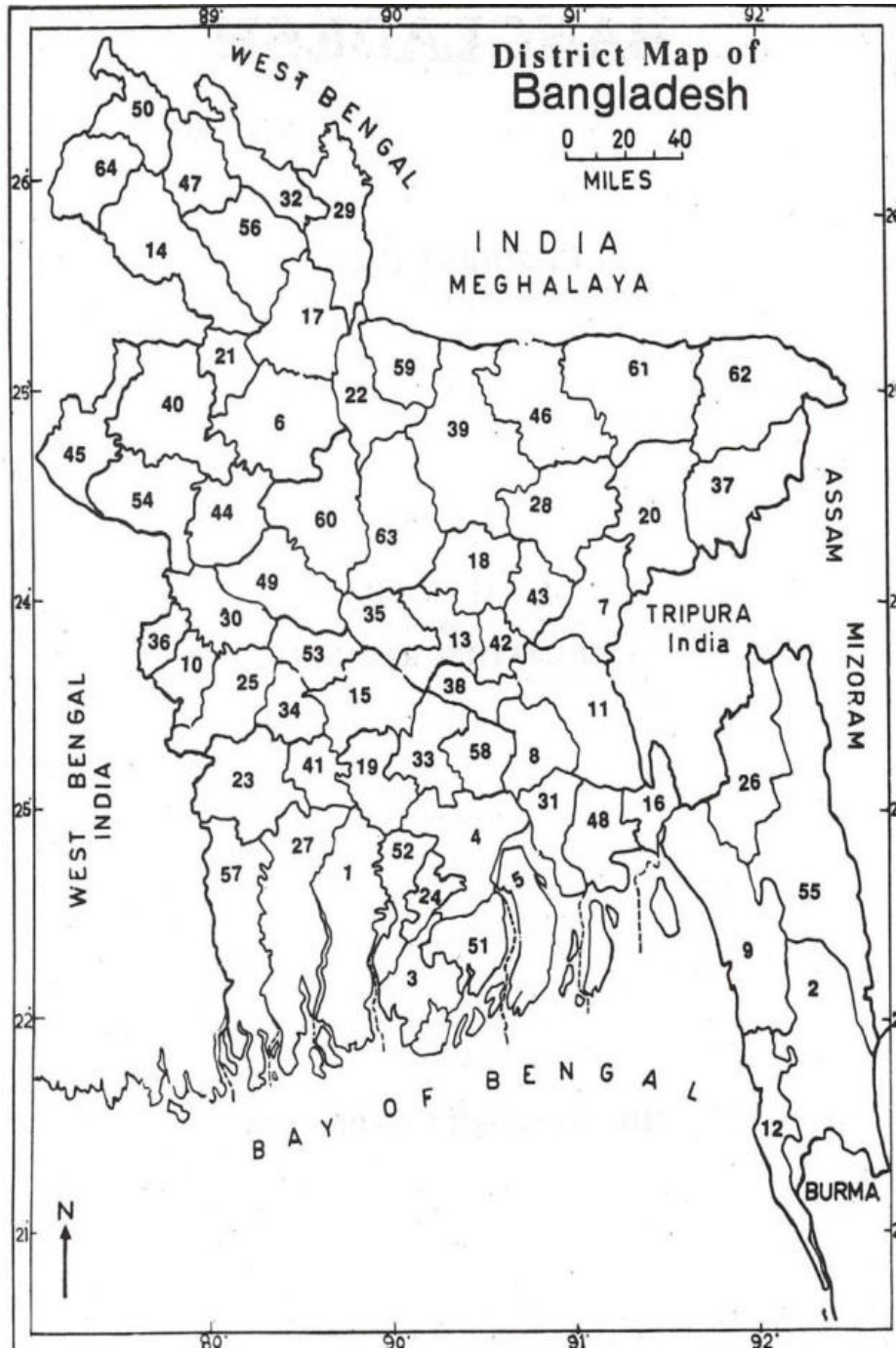
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(Fig. District Map of Bangladesh -  
64 districts with Nos. 1, 2, 3.....)



## List of Districts

The serial numbers correspond to those given in the map.

1.	Bagerhat	33.	Madaripur
2.	Bandarban	34.	Magura
3.	Barguna	35.	Manikganj
4.	Barishal	36.	Meherpur
5.	Bhola	37.	Maulvi Bazar
6.	Bogura	38.	Munshiganj
7.	Brahamanbaria	39.	Mymensingh
8.	Chandpur	40.	Naogaon
9.	Chattogram	41.	Narail
10.	Chuadanga	42.	Narayanganj
11.	Cumilla	43.	Narsingdi
12.	Cox's Bazar	44.	Natore
13.	Dhaka	45.	Nawabganj
14.	Dinajpur	46.	Netrakona
15.	Faridpur	47.	Nilphamari
16.	Feni	48.	Noakhali
17.	Gaibandha	49.	Pabna
18.	Gazipur	50.	Panchagarh
19.	Gopalganj	51.	Patuakhali
20.	Habiganj	52.	Pirojpur
21.	Jaipurhat	53.	Rajbari
22.	Jamalpur	54.	Rajshahi
23.	Jashore	55.	Rangamati
24.	Jhalakati	56.	Rangpur
25.	Jhenaidaha	57.	Satkhira
26.	Khagrachhari	58.	Shariatpur
27.	Khulna	59.	Sherpur
28.	Kishoreganj	60.	Sirajganj
29.	Kurigram	61.	Sunamganj
30.	Kushtia	62.	Sylhet
31.	Lakshmipur	63.	Tangail
32.	Lalmonirhat	64.	Thakurgaon

## LIST OF FAMILIES PUBLISHED

	Fl. No.		Fl. No.		Fl. No.
Acoraceae	67	Cuscutaceae	55	Pedaliaceae	2
Aizoaceae	34	Dichapetalaceae	23	Periplocaceae	47
Alangiaceae	68	Dilleniaceae	56	Phytolaccaceae	1
Annonaceae	52	Dipterocarpaceae	25	Plumbaginaceae	42
Araceae	75	Elatinaceae	39	Polemoniaceae	2
Aristolochiaceae	78	Flagellariaceae	3	Pontederiaceae	24
Asclepiadaceae	48	Fumariaceae	3	Potamogetonaceae	40
Averrhoaceae	18	Gesneriaceae	65	Punicaceae	22
Avicenniaceae	31	Haloragaceae	8	Rhamnaceae	61
Basellaceae	2	Hydrocharitaceae	28	Rhizophoraceae	7
Bignoniaceae	70	Hydrocotylaceae	44	Ruppiaceae	19
Bixaceae	35	Hydrophyllaceae	1	Sabiaceae	62
Boraginaceae	77	Juncaceae	29	Salicaceae	20
Bromeliaceae	74	Lamiaceae	58	Sapindaceae	59
Buddlejaceae	13	Linaceae	26	Solanaceae	53
Burmanniaceae	38	Lecythidaceae	60	Sonneratiaceae	12
Burseraceae	36	Loranthaceae	33	Sphenocleaceae	5
Butomaceae	2	Martyniaceae	1	Stemonaceae	41
Cannabidaceae	14	Malvaceae	54	Stylidiaceae	32
Cannaceae	73	Melastomaceae	76	Taccaceae	72
Capparaceae	57	Meliaceae	71	Tiliaceae	64
Caricaceae	1	Menispermaceae	51	Trapaceae	27
Cassythaceae	43	Menyanthaceae	49	Tropaeolaceae	3
Casuarinaceae	1	Molluginaceae	17	Turneraceae	3
Celastraceae	79	Moringaceae	2	Typhaceae	69
Ceratophyllaceae	10	Nymphaeaceae	9	Urticaceae	66
Combretaceae	50	Ochnaceae	3	Vitaceae	63
Commelinaceae	4	Onagraceae	6	Xyridaceae	46
Convolvulaceae	30	Orobanchaceae	21	Zannichelliaceae	11
Costaceae	45	Oxalidaceae	15	Zygophyllaceae	16

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## CELASTRACEAE R. Brown

Sarder Nasir Uddin and Mohammad Amdadul Hoque

Trees, erect or scandent shrubs or woody climbers. Stem sometimes producing rootlets (*Euonymus* spp.), rarely buttressed at the base (*Bhesa*), or with aerophores, sometimes thorny (*Maytenus* spp.), sometimes with elastic or resinous threads in the leaves, inflorescence, floral parts, fruits, branchlets, showing on fractures. Leaves simple, alternate, spiral, decussate or opposite, sometimes fascicled on short branchlets; blade laminar, margins entire, crenate, serrate, or dentate, venation pinnate, secondary veins reticulate, sometimes black-dotted beneath; stipules small, simple or lacinate, caducous or absent. Inflorescence axillary, terminal or ramiferous cymose, thyrsoïd, racemose, rarely paniculate or single-flowered. Flowers actinomorphic, bisexual or unisexual. Calyx 4- or 5-lobed, imbricate, rarely valvate, persistent, united at the base. Petals 4 or 5, imbricate, contorted, rarely valvate, free, caducous, sometimes persistent, upper surface smooth, fimbriate or fleshy papilla-like appendages. Stamens (2-) 3-5, rarely 8-10, alternate with the petals, filaments inserted on or within the disk, caducous or persistent, free or rarely connate at the base; anthers 2-celled, rarely 1-celled, ovoid, ellipsoid or subglobose, rarely reniform, basifixed or dorsifixed, longitudinally or laterally dehiscent, introrse, extrorse, or latrorse. Disk often conspicuous, annular, fleshy or membranous, flat or cupular, lobed or dentate. Ovary immersed in the disk, sometimes concealed, glabrous, sometimes pubescent or covered with papilla-like processes at the base, 3-5 celled or rarely multicelled, stylous or rarely hollowed at the top, stigmas simple or 2-3 lobed, ovules usually 2 in each cell, sometimes 1-18, anatropous or pendulous. Fruits loculicidally dehiscent capsules, schizocarp of 2-5 indehiscent mericarps, drupe, berry, or samara with a single surrounding wing, rarely an indehiscent capsule or nut with lateral style, pericarp bony, leathery, chartaceous, or fleshy, smooth, angular, deeply lobed, or connate, rarely chinate, laterally winged. Seeds 1-12, smooth or furrowed, albuminous or exalbuminous, sometimes winged, wing membranous, basal, exarillate or aril basal to completely enveloping seed, aril membranous, fleshy, rarely mucilaginous; cotyledons flat, foliaceous or thick, connate, germination epigeous.

A family of about 1194 species belonging to 97 genera (Jinshuang *et al.*, 2008), mainly distributed in the tropics and subtropics, some in temperate regions. In Bangladesh, the family is represented by 8 genera and 20 species.

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#### Abbreviations used in the text

- CAL = The Central National Herbarium, Kolkata  
 DACB = Bangladesh National Herbarium  
 K = The Royal Botanic Gardens Kew Herbarium

#### KEY TO THE GENERA

- |  |                    |
|--|--------------------|
| 1. Pistil hollow in the apical part  | <b>Siphonodon</b>  |
| + Pistil not hollow in the apical part   | <b>2</b>           |
| 2. Leaves spirally arranged or alternate   | <b>3</b>           |
| + Leaves decussate or opposite   | <b>5</b>           |
| 3. Venation cross-bar like; petiole thickened at the apex beneath; styles 2                  | <b>Bhesa</b>       |
| + Venation reticulate; petiole not thickened at the apex beneath; style 1                    | <b>4</b>           |
| 4. Scandent shrubs, unarmed; seeds completely enveloped by aril; ovary free from disc        | <b>Celastrus</b>   |
| + Erect shrubs or small trees, armed; seeds partially enveloped by aril; ovary embedded disc | <b>Maytenus</b>    |
| 5. Petals united at base; disc inconspicuous; fruits splitting on one side, 1-seeded         | <b>Microtropis</b> |

- |    |   |                     |
|----|---|---------------------|
| +  | Petals free; disc conspicuous; fruits splitting loculicidally, three to many seeded | <b>6</b>            |
| 6. | Ovary 2-loculed or one locule by abortion; ovules 2 in each locule                  | <b>Cassine</b>      |
| +  | Ovary 3-5-loculed; ovules 1-18 in each locule                                       | <b>7</b>            |
| 7. | Ovary 4-5 loculed; fruit 4-5 cornered or lobed; seeds with arils, not winged        | <b>Euonymus</b>     |
| +  | Ovary 3-loculed; fruit 3 angled, lobed or winged; seeds without arils, winged       | <b>Lophopetalum</b> |

**Bhesa** Buch.-Ham. *ex* Arn., Edinb. New Phil. J. 16: 315. 1834.

Type species: *Bhesa moja* Buch.-Ham.

Evergreen trees, up to 20 m tall. Trunks buttressed at base, branchlets terete, light to dark brown, glabrous. Leaves alternate or spiral, entire, coriaceous, midrib and nerves with very fine parallel secondary veins, prominent on both sides; petioles long, terete or slightly furrowed above, geniculate at the upper end underneath; stipules caducous, convolute, ovate or lanceolate, membranous, finely lengthwise veined, leaving large scars. Inflorescence cymose, paniculate, or racemose, solitary or paired, axillary or pseudo-terminal; pedicels with an articulation; bracts small, caducous. Flowers bisexual, 5-merous, or rarely 4-merous, whitish to greenish, fragrant. Calyx deeply lobed, lobes imbricate, sometimes valvate. Petals contorted. Stamens inserted on the disk, anthers longitudinally dehiscent, introrse, latrorse, basifixed, obtuse, shortly apiculate. Disk fleshy, cupular to plate-form, intrastaminal, subentire or 5-lobed, glabrous, puberulous. Ovary free, glabrous or usually with a tuft of hairs at the top, 2-celled; styles 2, filiform, free or slightly united at the base; stigma small, ovules 2 in each cell, anatropous. Capsule simple fusiform or 2-lobed, longitudinally dehiscent by 2 valves, mostly 1-2 seeded. Seeds oblong, completely or partly covered by the fleshy aril.

**Bhesa robusta** (Roxb.) Ding Hou, Blume. Suppl. 4: 152. 1958. M.K.Alam, Pl. Taxon. Series, Bull. 5: 24. 1988; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 79. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 188. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 995. 2018. *Celastrus robustus* Roxb., Fl. Ind. 2: 395. 1824. *Bhesa moja* Buch.-Ham., Edinburgh New Philos. J. 16: 315. 1834. *Kurrimia robusta* (Roxb.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 34(2): 73. 1870; S.Kurz, Forest Fl. Brit. Burma 1: 253. 1877. *Sarcosperma tonkinense* Lecomte, Bull. Mus. Natl. Hist. Nat. 24: 534. 1918. *Kurrimia sinica* Hung T. Chang & S.Ye Liang, Acta Sci. Nat. Univ. Sunyatseni 1: 100, f. s.n. 100. 1981.



*Kurrimia pulcherrima* Wall., Numer. List 4336. 1831; M.A. Lawson in Hook.f., Fl. Brit. India 1: 622. 1875; D.Prain, Beng. Pl. 1: 232. 1903 (Indian rep. ed. 1963); D.Brandis, Indian Trees: 164. 1906; R.L.Heinig, List Pl. Chitt. Coll. & HT.: 12. 1925; U.N.Kanjilal *et al.*, Fl. Assam 2: 270. 1938.

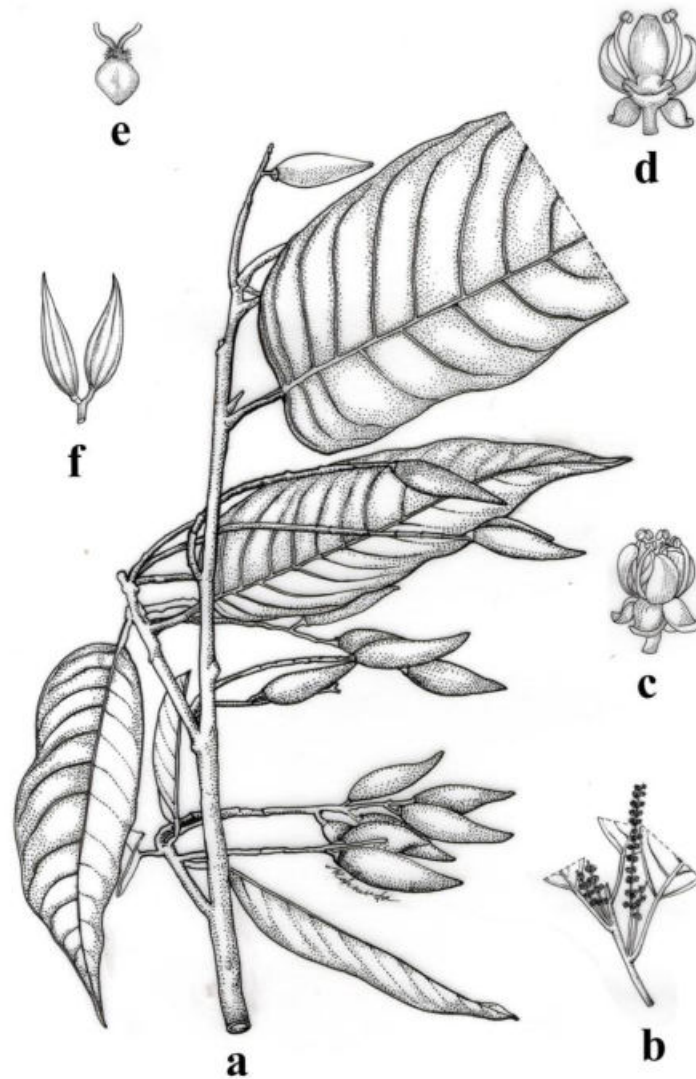


Figure 1: **Bhesa robusta** (Roxb.) Ding Hou: a) Fructing shoot; b) flowering shoot; c) flower; d) open flower; e) gynoecium; and f) fruits.

Bengali: *Hinuri, Shak-Kachra, Shilkoil, Tamser.*

Evergreen trees, 20-(-40) m tall. Branches thick, strong; bark usually purple-brown, rough on surface, peeling off profusely in strips, often with large leaves and bud scars; buttresses up to 2 m high. Leaves alternate, sometimes subopposite on young twigs; lamina elliptic or oblong-elliptic, sometimes ovate-oblong, 10-25 × 4-8 cm, base obtuse, rounded, subcuneate or slightly cordate, apex acute to shortly acuminate, subleathery, glossy, nerves 12-17 pairs, secondary veins inconspicuous, petioles cylindrical, 1-3 cm long, swollen at the apex; stipules lanceolate, 5-10 mm long. Inflorescence axillary racemes, 3-5-branched, up to 15 cm long, many flowered; peduncles short, pedicels 1 mm long. Flowers small, yellowish green. Calyx lobes linear-lanceolate, ovate or subrotundate, 1.5-2.0 × 1.0-1.2 mm, narrowly acuminate or obtuse at apex. Petals obovate-oblong, 2.5-3.0 × 0.7-1.2 mm, obtuse, becoming strongly reflexed. Stamens 2 mm long, filaments subulate, anthers deltoid, 0.5 mm long, obtuse, free for the lower half, latrorse. Disk cupular, subentire or obscurely notched, the rims usually puberulous. Pistil 2.0-2.5 mm long, ovary compressed globose, 1 mm in diameter, with a tuft hairs at the apex, style 2, thick and large, basally with tufted hairs, free, longer than the ovary; stigma small. Fruits capsular, 2.0-3.5 × 1.0-1.5 cm, narrowly ellipsoid or ovoid, with 2 vertical grooves, much tapered to the apex into a beak, usually 1-seeded. Seeds elliptic-ovoid or oblong, 1.0-1.5 cm long, usually on a knob-like thickened placenta, brown or brown-red, glossy; completely or partly enveloped by the aril, white or brown. *Fl. & fr.*: 2-12. *Primary lowland forests, sometimes in periodically inundated forests; up to 1000 m altitude.*

**Chattogram:** Specific locality & date unknown, 1887, *Dr. King* 533 (Cal 86781). **Chittagong Hill Tracts:** Specific locality unknown, 15 xi 1887, *Dr. King* 622 (Cal 86782). **Habiganj:** Satchari, 18 iv 1985, *A.M.Huq & M.K.Mia*, H-6967 (DACB 13080). **Moulvibazar:** Lawachara National Park, Kamalgonj, 4 ii 2009, *S.N. Uddin*, N-3391 (DACB 43308); 11 v 2009, *S.N. Uddin*, N-3575 (DACB 43036); 18 viii 2009, *S.N. Uddin*, N-3920 (DACB 35643); 10 xi 2009, *S.N. Uddin*, N-4052 (DACB 36919). **Sylhet:** Specific locality (altitude 3000ft !) & date unknown, *J.D. Hooker & T.Thomson*, 4334 (K000669901).

India, Bhutan, Nepal, Myanmar, Thailand, Cambodia, Vietnam, Laos, Indonesia and Malaysia.

Timber is hard, durable and takes good polish and is used for making beams, furniture, houses and boats.

**Cassine** L., Sp. Pl.: 268. 1753.  
Type species: *Cassine peragua* L.

Evergreen shrubs or small trees, glabrous. Leaves decussate, subopposite or alternate, coriaceous, entire or crenulate, stipules small, caducous. Inflorescence axillary or extra-axillary cymes, with distinct peduncles. Flowers bisexual or rarely unisexual, 4-5 merous. Calyx lobes unequal, imbricate. Petals imbricate, spreading. Stamens inserted on the disk, filaments subulate, short, anthers deltoid or subglobose, versatile, introrse. Disk fleshy, flat, orbicular to 5-lobed. Pistil shortly conical, flask-like, the base slightly united with the disk, or partly immersed in it, ovary 2-celled, rarely 3-4 celled, style short or obscure, stigmas 2-lobed or obscure, ovules 2 in each cell, erect, attached at the base. Fruits an indehiscent drupe, woody, 1-2 celled, exocarp fleshy, endocarp firm-leathery. Seeds 1-2, aril absent.

**Cassine glauca** (Rottb.) O.Kuntze, Rev. Gen. Pl. 1: 114. 1891. S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 189. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 996. 2018. *Mangifera glauca* Rottb., Nye Saml. Kongel. Danske Vidensk. Selsk. Skr. 2: 534. 1783. *Celastrus glaucus* Vahl, Symb. Bot. 2: 42. 1791. *Schrebera albens* Retz., Observ. Bot. 6: 25, 1791. *Loureira albens* Raeusch., Nomencl. Bot. ed. 3: 67. 1797. *Elaeodendrum glaucum* (Rottb.) Pers., Syn. Pl. 1: 241. 1805; M.A. Lawson in Hook.f., Fl. Brit. India 1: 623. 1875. *Euonymus grossus* Wall., Fl. Ind. 2: 408. 1824. *Rhamnus nerija* Spreng., Syst. Veg. 4(2): 86. 1827. *Euonymus tinus* Buch.-Ham., Numer. List 4292. 1831. *nom. nud.* *Elaeodendron paniculatum* Wight & Arn., Prodr. Fl. Ind. Orient. 157. 1834. *Elaeodendron roxburghii* Wight & Arn., Prodr. Fl. Ind. Orient. 157. 1834. *Elaeodendron dichotomum* Royle, Ill. Bot. Himal. Mts. 167. 1835. *Elaeodendron oxyodon* Turcz., Bull. Soc. Imp. Naturalistes Moscou 36(1): 603. 1863. *Barringtonia sphaerocarpa* C.A.Gardner, Forest. Dept. Bull. W. Austral. 32: 69. 1923.

Bengali: *Buta pata*, *Rajjehul*

Medium-sized tree, up to 25 m tall and 1 m in diameter, branchlets reddish, bark red inside, exuding a watery sap when cut. Leaves opposite or subopposite, elliptic to elliptic-oblong, obovate, ovate or ovate-oblong, 5-15 × 3-6 cm, coriaceous, base cuneate, obtuse, apex obtuse or rounded, sometimes shortly acute, margin crenulate, or subentire, dark green, glaucous beneath, nerves 4-9 paired, petioles 4-10 mm long, channelled. Inflorescence cymose, dichotomously branched, few-flowered, usually at the upper part of the branchlets, up to 13 cm long, peduncles 2.5-6.5 cm long, red, pedicels 2-5 mm long. Flowers 5-merous, whitish, 5 mm in diameter. Calyx 4 to 5-lobed, lobes

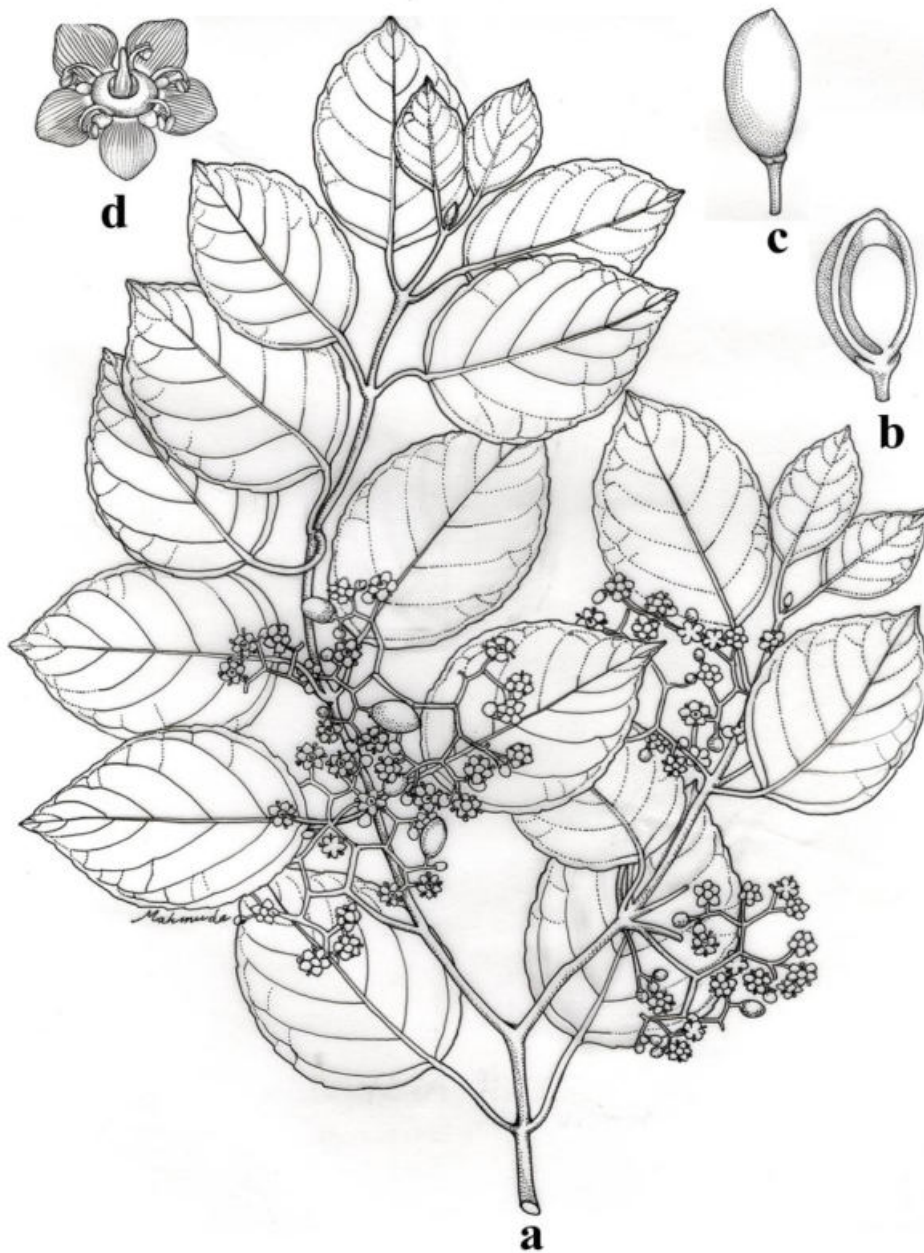


Figure 2: **Cassine glauca** (Rottb.) O.Kuntze: a) Flowering shoot; b) LS of a fruit; c) fruit; and d) flower.

reniform,  $0.5 \times 1.5$  mm, rounded, membranous. Petals oblong,  $3.0 \times 1.5$  mm. Disk c 2 mm in diameter. Stamens 1 mm long, inserted on the outer margin of the disk, filaments recurved, anthers with a 2-lobed connectives. Pistil 1 mm long, partly immersed, the emerging part shortly conical. Fruit a dry, ovoid drupe, stone covered by a thin leathery exocarp and mesocarp, broadly ellipsoid, 1-10 cm long, usually two longitudinally furrows on the outside, exocarp and mesocarp coriaceous, thin, endocarp stony, up to 7 mm thick, usually 1-celled and 1-seeded. Seeds oblong-elliptic, obtuse at both ends,  $1.5 \times 1.0$  mm.  $2n = 34$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 9-4. *Heterogeneous primary forests.*

**Dhaka:** Near Rokeya Hall, Dhaka University Campus, 22 v 1980, *Mahbuba Khanam* 867 (DACB 24402).

India, Myanmar, Cambodia and Malaysia.

Dried leaf powder is used as a fumigator to rouse women from hysterical syncope and as a snuff to relieve ordinary headache. Fresh root bark is used to cure swelling (Kirtikar *et al.*, 1933). Timber is hard, durable and takes good polish and used for making furniture, doors, frames and construction of houses.

**Celastrus** L., *Sp. Pl.* 1: 196. 1753.

Type species: *Celastrus scandens* L.

Deciduous or evergreen, scandent shrubs, branchlets terete, glabrous or pubescent, solid or hollow, with oblong or circular gray lenticellate. Leaves alternate or spirally arranged, petioled, elliptic to orbicular, dentate, crenate, subentire or finely ciliate serrulate, stipules small, usually linear or deeply lacinate, caducous. Inflorescence axillary or terminal, cymose, thyrsoïd, or flowers solitary; peduncled or sessile, few to many-flowered. Flowers 5-merous, small, light greenish, unisexual or rarely bisexual, pedicelled and articulated. Calyx campanulate, persistent, lobes imbricate or valvate. Disk usually membranous, or fleshy, annular to cupuliform, entire or slightly 5-lobed, intrastaminal. Fertile stamens inserted on the margin of the disk, filaments glabrous or papillose, anthers ovoid or oblong-ellipsoid, obtuse or apiculate, dorsifixed, versatile, latrorse or introrse, sterile stamens much smaller in size, anthers usually ovate-oblong, acute or acuminate. Ovary free from the disk, 3-celled, style usually columnar, stigmas 3-lobed, lobes obscure, or rarely each 2-fid, sterile pistil in male flowers much smaller than the fertile one, ovules 2 or 1 in each cell, anatropous. Capsule subglobose, rarely subcylindric, tipped by the persistent style, loculicidally 3-valved, valves bearing parts of projecting style. Seeds 1-6, ellipsoid, embedded in fleshy, aril, aril carnos, red to orange-red.

## KEY TO THE SPECIES

- |    |   |                       |
|----|---|-----------------------|
| 1. | Fruit 1-loculed, 1-seeded   | <b>2</b>              |
| +  | Fruit 3-loculed, 3-6-seeded   | <b>3</b>              |
| 2. | Lenticels of young branchlets not obvious; floral disk thin, cupuliform; stamens inserted on margin of disk                       | <b>C. hindsii</b>     |
| +  | Lenticels of young branchlets obvious; floral disk carnos, shallowly discoid or slightly pillow-form; stamens inserted below disk | <b>C. monospermus</b> |
| 3. | Inflorescences generally terminal   | <b>C. paniculatus</b> |
| +  | Inflorescences axillary, or both axillary and terminal  | <b>C. stylosus</b>    |

**Celastrus hindsii** Benth. in Kew J. Bot. 3: 334. 1851; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 87. 2000. *Celastrus venulosus* Wall., Cat. no. 4321. 1831. *nom. nud.*; M.A.Lawson in Hook.f., Fl. Brit. India 1: 618. 1875; U.N.Kanjilal *et al.*, Fl. Assam 2: 269. 1938; M.K.Alam, Pl. Taxon. Series, Bull. 5: 24. 1988. *Celastrus approximatus* Craib, Bull. Misc. Inform. Kew 1926: 349. 1926. *Celastrus axillaris* Ridl., J. Malayan Branch Roy. Asiat. Soc. 1: 56. 1923. *Celastrus cantonensis* Hance, J. Bot. 23: 323. 1885. *Celastrus marianensis* Koidz., Bot. Mag. (Tokyo) 30: 400. 1916. *Celastrus merrillii* Tardieu, Bull. Soc. Bot. France 95: 180. 1948. *Celastrus oblongifolius* Hayata, Icon. Pl. Formosan. 3: 58. 1913. *Celastrus racemulosus* Hassk., Hort. Bogor. Descr. 1: 155. 1858. *Flueggea serrata* Miq., Fl. Ned. Ind. 1(2): 356. 1859.

Bengali: *Bhumlati*

Evergreen scandent shrubs or lianas. Branchlets terete, gray or purple, lenticels not obvious; axial buds ovate-triangular, 1.0-1.5 mm long. Leaves elliptic or narrowly ovate-elliptic to elliptic-oblongate, 5-15 × 3-6 cm, base cuneate, obtuse or rounded, apex acute to caudate-acuminate, margin sparsely serrate, coriaceous, glabrous, often gray-green when dry, lateral nerves 5-8 pairs, densely reticulate on both surfaces; stipules lacinate; petiole 5-10 mm long. Inflorescence axillary and terminal, (1-) 3-5-flowered cymes, up to 12 cm long; ; pedicels 4-5 mm, jointed at upper middle. Flowers greenish. Sepals semi-orbicular, imbricate, 1.5-2.0 mm long, obtuse, short ciliate, sometimes erose. Petals oblong-obovate, 2-5 × 1.2-2.5 mm, obtuse, glandular-ciliate. Disc cupular, membranous, shallowly lobed, lobe triangular. Stamens inserted on the margin of the disc, glabrous, fertile ones c. 2.5 mm long; filaments subulate, glabrous;



Figure 3: *Celastrus hindsii* Benth.: a) Flowering shoot; and b) flower.

anther ovate-orbicular; pistillode in male flowers c. 1.5 mm long. Ovary flask-shaped, c. 2 mm long; style columnar, c. 1 mm long; stigma 3-lobed; anther of staminodia hastate. Fruits capsular, ovoid to subglobose, 8-10 × 6-8 mm, unilocular, 1-seeded; style persistent on young fruit, up to 1.5 mm long. Seeds broadly ellipsoid, 6-8 × 4-5 mm, smooth, brownish; aril orange. *Fl. & fr.*: 5-10. *Evergreen forests and thickets; between 300-700 m altitude.*

The species was earlier recorded by Kanjilal *et al.* (1938) from greater Sylhet district, but since then no other specimen has been collected from any part of the country.

China, India, Indonesia, Japan, Malaysia, Myanmar, Thailand and Vietnam.

**Celastrus monospermus** Roxb., *Fl. Ind.* 2: 394. 1824. M.A. Lawson in Hook.f., *Fl. Brit. India* 1: 618. 1875; D.Brandis, *Indian Trees*: 163. 1906; U.N.Kanjilal *et al.*, *Fl. Assam* 2: 269. 1938; K.Ramamurthy in N.P. Singh *et al.*, *Fl. India* 5: 87. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, *Encycl. Fl. Fauna Bangladesh* 7: 190. 2008. *Catha benthamii* Gardner & Champ., *Hooker's J. Bot. Kew Gard. Misc.* 1: 310. 1849. *Catha monosperma* Benth., *London J. Bot.* 1: 483. 1842. *Celastrus benthamii* (Gardner & Champ.) Rehder & E.H.Wilson, *Pl. Wilson.* 2: 358. 1915. *Celastrus championii* Benth., *Hooker's J. Bot. Kew Gard. Misc.* 3: 334. 1851. *Monocelastrus monospermus* (Roxb.) F.T. Wang & T.Tang, *Acta Phytotax. Sin.* 1(2): 137. 1951.

Bengali: *Aakbiji kujari, Gelamtaru*

Evergreen, scandent shrubs, up to 10 m tall. Branchlets purplish brown, with sparse, elliptic or suborbicular lenticels. Leaves simple, narrowly elliptic, elliptic to ovate-oblong, 8-16 × 4-7 cm, membranous, glabrous on both sides, base cuneate to obtuse, apex acute to acuminate, margin serrate, secondary nerves 5-7 pairs, curved towards the apex, petioles 1-2 cm long, stipules lacinate. Inflorescence axillary thyrses or rarely terminal laxly branched, umbellate or paniculate cymes, up to 20 cm long, spreading, usually glabrous or sometimes pubescent, pedicels 1-4 mm long on fruits, distinctly articulated at the base. Flowers white to greenish-yellowish, 3 mm in diameter. Male flowers: calyx lobes triangular-suborbicular, 0.7-1.0 × 1.0 mm, glandular-ciliate; petals 5, rectangular-elliptic or obovate-oblong, 2.5-3.0 × 1.5-1.8 mm, entire, obtuse, revolute during blossoming; disk carnos, flat, fleshy, shallowly 5-lobed, lobe apex approximately truncate; stamens 5, 2.5-3.0 mm long, inserted on margin of the disk, filaments subulate, glabrous, anthers ovoid, obtuse; sterile pistil in male flowers columnar, 1.2 mm long. Female flowers: sepals, petals like in male flower; staminodes 0.9-1.1 mm long; Pistil approximately ampullaceous, 2.5-3.0



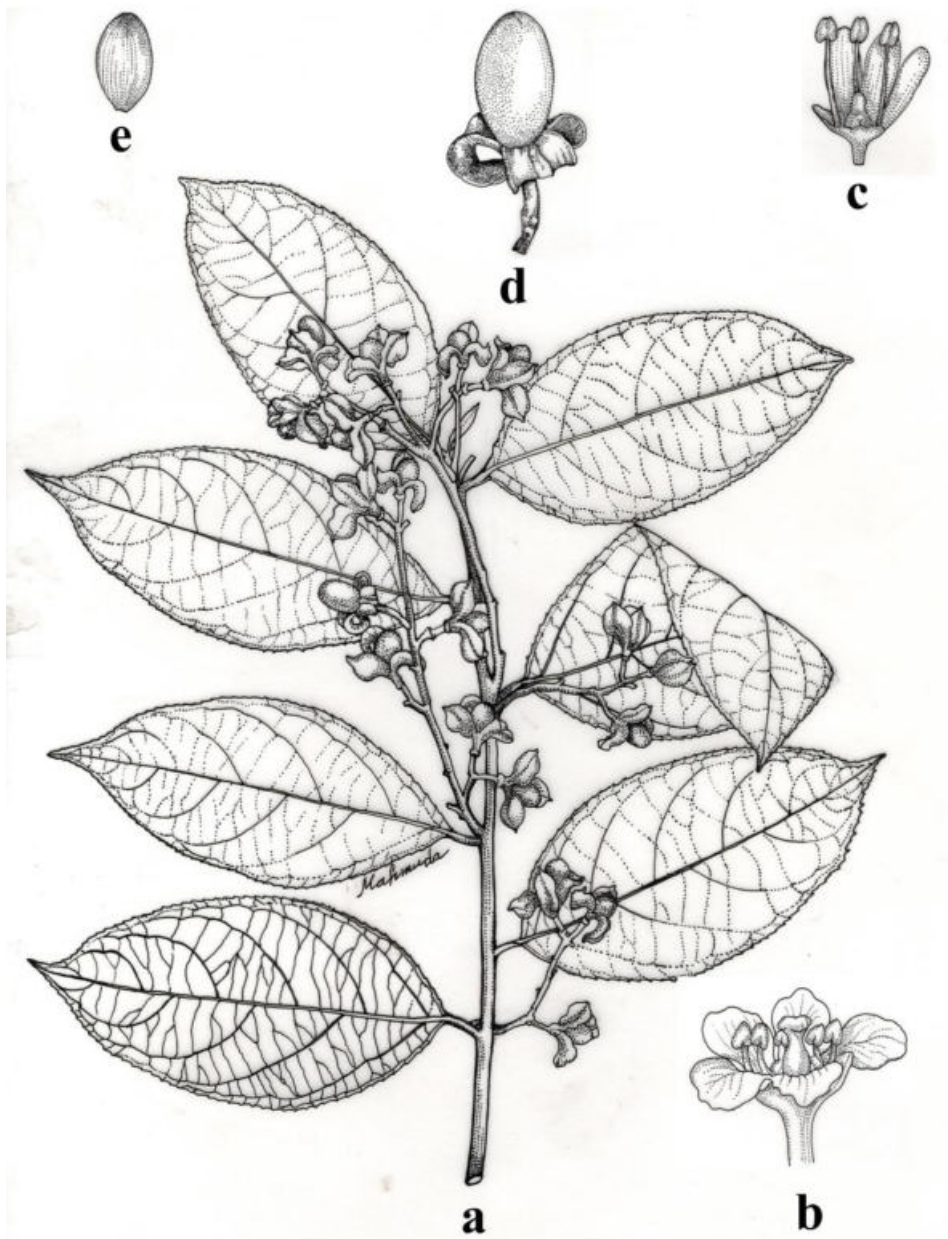


Figure 4: *Celastrus monospermus* Roxb.: a) Flowering shoot; b) flower; c) open flower showing anther and gynoecium; d) fruit; and e) seed.

mm long, ovary subglobose, narrowed into the style, stigmas 3-lobed, reflexed. Fruits capsular, ellipsoid, rarely globose, 10-18 × 9-14 mm, valves ovate-oblong, 12-20 × 8-10 mm, revolute when dry, margin crispate, unilocular, 1-seeded. Seeds ellipsoid, 10-15 × 6-9 mm, yellowish to reddish-brown, smooth, or slightly verrucose, aril purplish brown. *Fl. & fr.* 3-10. *Thickets and dense forests; from sea level to 1000 m altitude.*

**Chittagong Hill Tracts:** Specific locality & date unknown, 1886, Dr. King, 182 (CAL86331).

Bhutan, India, Myanmar, Pakistan, Vietnam and China.

**Celastrus paniculatus** Willd., Sp. Pl. 1: 1125. 1797. M.A. Lawson in Hook.f., Fl. Brit. India 1: 617. 1875; S.Kurz, Forest Fl. Brit. Burma 1: 252. 1877; D.Prain, Beng. Pl. 1: 231. 1903 (Indian rep. ed. 1963); D.Brandis, Indian Trees: 162. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 268. 1938; M.K.Alam, Pl. Taxon. Series, Bull. 5: 24. 1988; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 87. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 190. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 997. 2018. *Celastrus rothianus* Schult., Syst. Veg. 5: 423. 1819. *Ceanothus paniculatus* Roth, Nov. Pl. Sp. 154. 1821. *Celastrus nutans* Roxb., Fl. Ind. 2: 390. 1824. *Celastrus alnifolius* D.Don, Prodr. Fl. Nepal. 190. 1825. *Celastrus pubescens* Wall., Numer. List 4303. 1831. *Scutia paniculata* G.Don, Gen. Hist. 2: 34. 1832. *Diosma serrata* Blanco, Fl. Filip. 168. 1837. *Catha paniculata* Scheidw., Allg. Gartenzeitung 10: 275. 1842. *Celastrus metzianus* Turcz., Bull. Soc. Imp. Naturalistes Moscou 31(1): 448. 1858. *Euonymus euphlebiophyllus* Hayata, Icon. Pl. Formosan. 5: 15. 1915. *Celastrus euphlebiophyllus* (Hayata) Kaneh., Formosan Trees (rev. ed.) 2: 383, f. 340. 1936.

Bengali: *Malkangni, Kujari, Kujri*. English: Black Oil Tree, Climbing Staff Plant

Evergreen shrubs or low trees, up to 8 m tall. Bark pale brown, rough and cracked, exfoliating in small scales; branchlets pubescent or glabrous, with prominent elliptic lenticels; axillary buds small, 1-2 mm, triangular. Leaves simple, elliptic to oblong-elliptic, ovate, or obovate to suborbicular, 5-12 × 2-5 cm, base cuneate, obtuse or rounded, apex mucronate to acuminate, margin serrate, coriaceous, glabrous, sometimes pubescent beneath, especially on the venation, midrib elevated on both surfaces, nerves 5-8 pairs, ascending; petioles 5-15 mm long. Inflorescence terminal, usually thrice to multi-compound panicles, up 8-15 cm long, spreading, usually pubescent; peduncles 6-10 mm long; pedicels tomentose, up to 5 mm long on fruits, distinctly articulated at the



Figure 5: *Celastrus paniculatus* Willd.: a) Flowering shoot; b) flower; c) fruit; and d) LS of a fruit.

base. Flowers greenish, 5-merous, dioecious. Calyx lobes semi-orbicular, imbricate, shortly ciliate,  $0.7-1.0 \times 1.5$  mm, free. Petals 5, oblong or obovate-oblong, obtuse, entire,  $2.5-3.0 \times 1.0-1.8$  mm. Disk cupular, membranous, slightly 5-lobed, lobes obscure or slightly triangular. Stamens 5, inserted on margin of disk, c. 3 mm long, filaments subulate, anthers ovoid, obtuse. Sterile pistil in male flowers columnar, 1.2 mm long. Staminodes in female flowers 1.3 mm long. Pistil 2.0-2.5 mm long, ovary globose, style columnar, stigmas 3-lobed, each bifid, slender. Fruit capsular, subglobose,  $8-12 \times 5-10$  mm, three locular, 3-6 seeded, valves broadly elliptic, bright yellow. Seeds ellipsoid,  $3.5-5.5 \times 2.0-5.0$  mm, aril yellowish to orange-red, smooth, or with obscure areoles.  $2n = 46$  (Fedorov, 1969). *Fl. & fr.*: 4-9. *Thickets and forests; up to 1000 m altitude.*

**Sylhet:** Jafflong, 20 x 1986, *A.M. Huq & M.M.K. Mia*, H-7914 (DACB 13081).

Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam; Australia and the Pacific islands (New Caledonia).

Seeds of the plant are used as brain and liver tonic. Also in curing joint pain, paralysis and general weakness. Seed oil is used in curing cough, asthma, leprosy, headache and skin diseases like leucoderma and skin sore (Kirtikar *et al.*, 1933). Young flowers are used as vegetables (Kunkel, 1984).

**Celastrus stylosus** Wall. *ex* Roxb., *Fl. Ind.* 2: 401. 1824. M.A. Lawson in Hook.f., *Fl. Brit. India* 1: 618. 1875; U.N.Kanjilal *et al.*, *Fl. Assam* 2: 268. 1938; K.Ramamurthy in N.P. Singh *et al.*, *Fl. India* 5: 89. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, *Encycl. Fl. Fauna Bangladesh* 7: 191. 2008. *Gymnosporia neglecta* M.A.Lawson in Hook.f., *Fl. Brit. India* 1: 619. 1875.

Bengali: *Styli kuzari*

Deciduous, scandent shrubs or lianas, up to 5 m tall. Branchlets terete, glabrous, rarely thinly lenticellate; winter buds small, ovate-globose, c. 2 mm wide. Leaves simple, elliptic or obovate-oblong,  $7-13 \times 3-6$  cm, base cuneate, obtuse or rounded, apex acute to acuminate, margins shallowly serrate, membranous or leathery, upper surface slightly green or light brown when dry, glabrous, lower surface pubescent along veins, glabrous later, lateral nerves 5-8 pairs, venation loosely reticulate; petioles 1-2 cm long; stipules filiform. Inflorescence axillary or terminal cymes, 0.5-3.0 cm long, 3-7-flowered, puberulous; peduncle 5-15 mm long; pedicels 3-7 mm long with yellowish white setae. Flowers numerous, greenish-white. Sepals cup-shaped, 2.5 mm in diameter, 5-lobed, lobes elliptic or oblong,  $1.5-2.0 \times 1.5$  mm, crenate to entire, margin slightly erose. Petals 5,



Figure 6: *Celastrus stylosus* Wall. ex Roxb.: a) Fructing shoot; and b) flower.

obovate or oblong, 2.5-4.0 × 1-2 mm, obtuse, crenulate, papillose on both sides. Disk cupular, membranous, lobe semicircular or approximately obtuse-triangular. Stamens 5, slightly shorter than corolla, c. 2 mm long, filaments subulate, glabrous or papillose, arising between the disk lobes, anthers ovoid, obtuse. Sterile pistil in male flowers columnar, 1 mm long. Staminodes in female flowers c. 1 mm long. Pistil 2-3 mm long, ovary subglobose, style distinctly columnar, stigmas 3-lobed, lobes bifid, slender, revolute. Fruit capsular, subglobose, 6-10 × 4-8 mm, orange-red, thick and woody, valves broadly elliptic, three locular, 3-6 seeded, fructiferous stipe and fruit stipe glabrous, often with elliptic lenticels. Seeds ellipsoid or lunar, 3.5-5.5 × 1.5-2.5 mm, plano-convex to benate, covered with distinct fleshy, yellow aril. *Fl. & fr.*: 12-7. *Seasonal evergreen forests, thickets and hilly forests; up to 800 m altitude.*

The species was earlier recorded by A.M. Lawson (1875) from greater Sylhet district, but since then no other specimen has been collected from any part of the country.

Bhutan, China, India, Malaysia, Myanmar, Nepal, Thailand and Vietnam.

**Euonymus** L., Sp. Pl. 1: 197. 1753.

Type species: *Euonymus europaeus* L.

Erect or climbing, evergreen or deciduous shrubs or small trees, branchlets glabrous. Leaves opposite, decussate, very rarely spiral, alternate or verticillate, sometimes with dark dots underneath, entire, serrulate, or crenate, stipules minute, lanceolate, caducous. Inflorescence axillary, usually lax cymose, rarely flowers in fascicles, pedicels articulated. Flowers bisexual, 4- or 5-merous. Calyx deeply lobed, imbricate, rounded, entire, erose, minutely denticulate. Petals imbricate, spreading or reflexed, entire, erose, shortly ciliate or long fimbriate, smooth or finely areolate on the inner surface. Disk distinct, fleshy or thin, flat, 4- or 5-angular or lobed, or rounded, very rarely cupular, smooth, or covered with fleshy papilla-like processes. Stamens inserted on the disk, anthers deltoid, depressed oblong or broadly ovoid, obtuse or shortly apiculate, slightly free at the base, longitudinally or obliquely dehiscent, either 2-celled or 1-celled, filaments obscure or distinct. Pistil immersed in the disk, free part of the pistil terete or slightly 4-5 angular or winged toward the base, gradually narrowed to the apex, the basal part sometimes covered with papillose-like processes, stigmas obscure, obtuse or discoid, ovary 4- or 5-locular, partly or wholly immersed in the disk, ovules erect to pendulous, 2(-12) per locule. Fruit a capsule, loculicidally dehiscent, often coloured, usually (3-) 4-5 angular or lobed, sometimes globose, rugose, prickly, apex obtuse, acute or concave. Seeds 1 to several, typically 2 developing, ellipsoid, aril basal to enveloping seed.

## KEY TO THE SPECIES

- |    |  |                      |
|----|--|----------------------|
| 1. | Capsule partite almost to base   | <b>2</b>             |
| +  | Capsule not partite or partite up to middle only   | <b>3</b>             |
| 2. | Flowers 5-merous; inflorescence 6-15 flowers; petals fringed, oblong. white                | <b>E. lucidus</b>    |
| +  | Flowers 4-merous; inflorescence 1-7 flowers; petals entire, rounded, green                 | <b>E. lawsonii</b>   |
| 3. | Capsule echinate   | <b>E. echinatus</b>  |
| +  | Capsule smooth   | <b>4</b>             |
| 4. | Scandent shrubs; capsule unlobed or with shallow rounded lobes, apex rounded or nearly so  | <b>E. theifolius</b> |
| +  | Small trees of erect shrubs; capsule lobed, angled or winged, apex retuse, acute or obtuse | <b>5</b>             |
| 5. | Petals fringed or denticulate; leaves entire   | <b>6</b>             |
| +  | Petals entire or crenulate; leaves serrate or entire                                       | <b>7</b>             |
| 6. | Cymes 7 or more flowered; petiole 1-2 cm long  | <b>E. attenuatus</b> |
| +  | Cymes 1-3 flowered; petiole 3-8 mm long  | <b>E. indicus</b>    |
| 7. | Flowers 4-merous   | <b>E. bullatus</b>   |
| +  | Flowers 5-merous   | <b>8</b>             |
| 8. | Petals white or greenish   | <b>E. glaber</b>     |
| +  | Petals dark red  | <b>E. laxiflorus</b> |

**Euonymus attenuatus** Wall. *ex* M.A.Lawson in Hook.f., Fl. Brit. Ind. 1: 610. 1875. D.Brandis, Indian Trees: 158. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 262. 1938; M.K.Alam, Pl. Taxon. Series, Bull. 5: 24. 1988; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 94. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 192. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 998. 2018.

Evergreen, small trees or shrubs, up to 5 m tall, branchlets spreading, smooth, weakly ridged, bark greyish. Leaves lanceolate-oblong to elliptic-oblong, 6-14 × 2-5 cm, thinly coriaceous, glabrous, base cuneate, apex acute to shortly acuminate, margin entire or with few teeth near the apex, nerves 6-8 pairs,

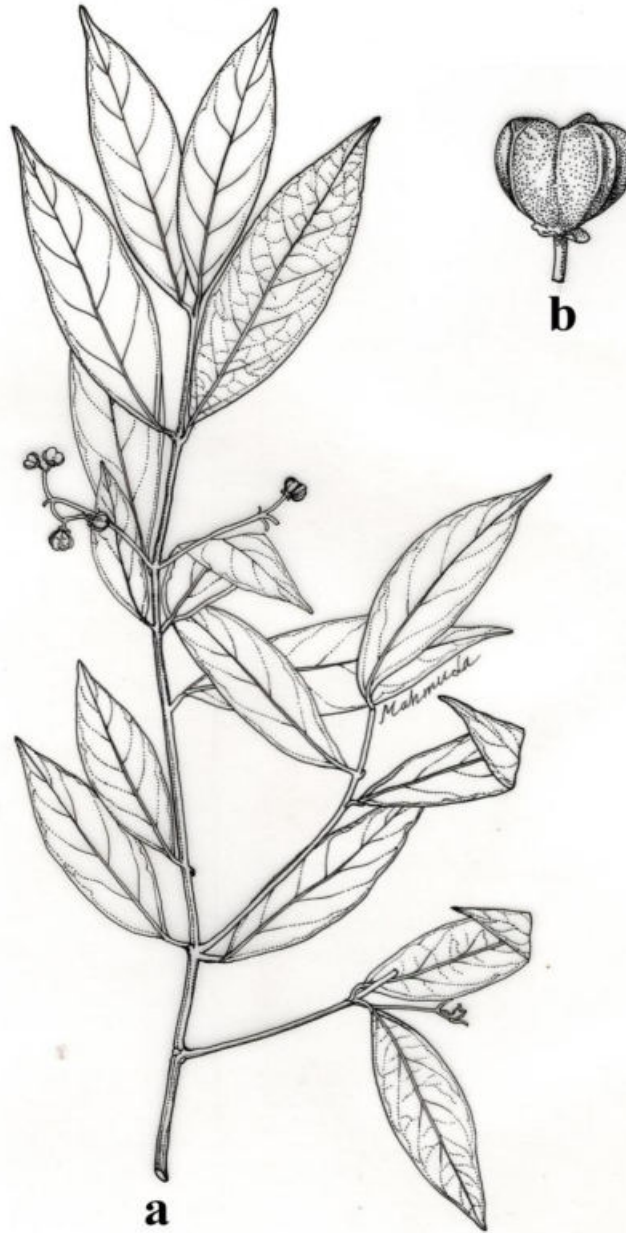


Figure 7: *Euonymus attenuatus* Wall. ex M.A.Lawson: a) Fructing shoot; and b) fruit.



weakly prominent above, petioles up to 2 cm long. Inflorescence axillary or extra-axillary, dichotomously branched cymes, peduncles up to 6 cm long, thickening in fruits, bracts ovate, shortly ciliate, pedicels 2.0-2.5 mm long. Flowers greenish-yellow, 5-merous, some flowers occasionally 4-merous. Sepals 5, unequal, usually the outer 2 smaller, broadly obovate, obtuse. Petals 5, obovate-orbicular, 3.0-3.5 × 3.0-3.5 mm, fringed at margin. Disk 5-lobed, orbicular, 1.2 mm in diameter. Stamens very short, inserted near the margin of the disk, anthers with 2 spreading cells, triangular. Pistil 0.6 mm emerging from the disk, 5-angular at the base, style cylindrical. Fruits capsular, obovoid, 8-12 × 12-15 mm, deeply (4-) 5-angled, red. Seed usually 1 in each cell, black, arillate. *Fl. & fr.*: 5-11. *Hill slopes, up to an altitude of 1000 m.*

**East Bengal:** Specific locality & date unknown, 1861-62, W. Griffith, 1970 (CAL 35120). **Sylhet:** Specific locality (Khasia, 6000 ft altitude!) & date unknown, J.D.Hooker & T.Thomson, 968 (K 000669152).

India, Bhutan and Indonesia.

**Euonymus bullatus** Wall. *ex* Lodd., Bot. Cab. 18: t. 1749. 1831. M.A. Lawson in Hook.f., Fl. Brit. India 1: 610. 1875; D.Brandis, Indian Trees: 159. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 263. 1938; M.K.Alam, Pl. Taxon. Series, Bull. 5: 24. 1988; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 94. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 193. 2008.

Small, evergreen tree, up to 8 m tall, branchlets terete, slightly flattened, thick and coarse. Leaves ovate-elliptic to broadly oblong-elliptic, 8-20 × 5-10 cm, base narrowly cuneate, apex acute or acuminate, margin entire, coriaceous at maturity, glabrous, bullate with depressions above, margin usually entire or serrulate, nerves 8-15 pairs, prominent beneath, petioles stout, channeled, up to 2 cm long. Inflorescence axillary or slightly extra-axillary, more than twice dichotomously branched, umbellate cymes, up to 14 cm long, peduncles 3-5 cm long, bracts ovate, shortly ciliate, pedicels 2-5 mm long. Flowers 4-merous, 6-8 mm in diameter, red. Sepals 4, unequal, semiround, rarely sub-reniform, slightly erose, sometimes shortly ciliate. Petals 4, obovate, 2.0-2.5 × 2.0-2.5 mm, margin usually crenulate. Disk orbicular, 1.5 mm in diameter. Stamens very short, inserted near the margin of the disk, anthers triangular. Pistil 0.6 mm emerging from the disk, 4-angular at the base, narrowed into a short, cylindrical style. Fruits capsular, obovoid, 8-10 × 9-12 mm, deeply 4-lobed, brown or yellow-brown to red-brown, usually concave at the apex. Seeds ellipsoid, brown, usually 1-3 in each cell, aril orange-red.  $2n = 48$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 4-11. *Mixed evergreen forests; up to 1000 m altitude.*

The species was earlier reported from Sylhet by Kanjilal *et al.* (1938), however, no specimens has been collected from present Bangladesh territory.



Figure 8: *Euonymus bullatus* Wall. ex Lodd.: a) Fruiting shoot.

Bhutan, India, Myanmar, China, Malaysia and Thailand.

Wood is hard and durable, used for making agricultural implements, house poles. The wood gives firewood and charcoal.

**Euonymus echinatus** Wall. in Roxb., Fl. Ind. 2: 410. 1824; M.A. Lawson in Hook.f., Fl. Brit. India 1: 611. 1875; D.Brandis, Indian Trees: 158. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 265. 1938; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 98. 2000. *Euonymus scandens* Graham, Edinburgh New Philos. J. Jan-Mar. 1827: 386. 1827. *Euonymus cinereus* M.A.Lawson in Hook.f., Fl. Brit. India 1: 611. 1875; D.Brandis, Indian Trees: 158. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 265. 1938; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 95. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 194. 2008. *Pragmotessara echinata* Pierre, Fl. Forest. Cochinch. t. 309. 1895. *Euonymus trichocarpus* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 69. 1908. *Euonymus subsessilis* Sprague, Bull. Misc. Inform. Kew 1908: 32. 1908. *Euonymus mupinensis* Loes. & Rehder, Pl. Wilson. 1: 489. 1913. *Euonymus arboricolus* Hayata, Icon. Pl. Formosan. 5: 17. 1915. *Euonymus fungosus* Ohwi, Acta Phytotax. Geobot. 5: 186. 1936. *Euonymus fungosus* ssp. *chinensis* P.S.Hsu, Acta Phytotax. Sin. 11(2): 195, pl. 25. 1966. *Euonymus echinatus* var. *vagans* (Wall.) R.C.Srivast., Fl. Sikkim 252. 1998.

Evergreen or semi-evergreen, scandent shrub, up to 2-3 m tall. Branches slender, striate, angulate, brown or gray-brown when dry, finely tubercled, produces adventitious roots from the lower surface. Leaves ovate to oblanceolate, 3-5 × 1.5-3.0 cm, base narrowly cuneate or truncate, apex acute or acuminate, margins sparsely serrate, thinly coriaceous, glabrous, pale coloured beneath, bullate with depressions above, margin serrate, lateral nerves 5-8 pairs, sometimes impressed adaxially and prominent abaxially, disappearing before reaching margin, slender; petioles stout, channelled, up to 1 cm long. Inflorescence axillary or slightly extra-axillary, 1-3-flowered cymes; peduncles 2-3 cm long; bracts ovate, shortly ciliate; pedicels 5-10 mm long. Flowers yellowish white or greenish yellow, rarely red, 4-merous, 6-8 mm in diameter. Sepals 4, unequal, semirotund, acute, sometimes shortly ciliate. Petals 4, orbicular, 1.4-2.0 × 1.2-1.6 mm, attenuate at base, greenish yellow, margin usually dentate except at base. Disk orbicular, 1.5 mm in diameter. Stamens very short, inserted near the margin of the disk, anthers triangular. Pistil 0.6 mm emerging from the disk, (4-) 5-angular at the base, narrowed into a short, cylindrical style, ovary densely papillose at base. Fruits capsular, subglobose, c. 10 mm diameter, red when fresh, brown when dry, spines 1-2 mm long, pale coloured. Seeds usually 4 in each cell, subglobose, aril bright orange. *Fl. & fr.*: 4-1. *Scrub hilly forests, sunny places on lime stones; up to 800 m altitude.*

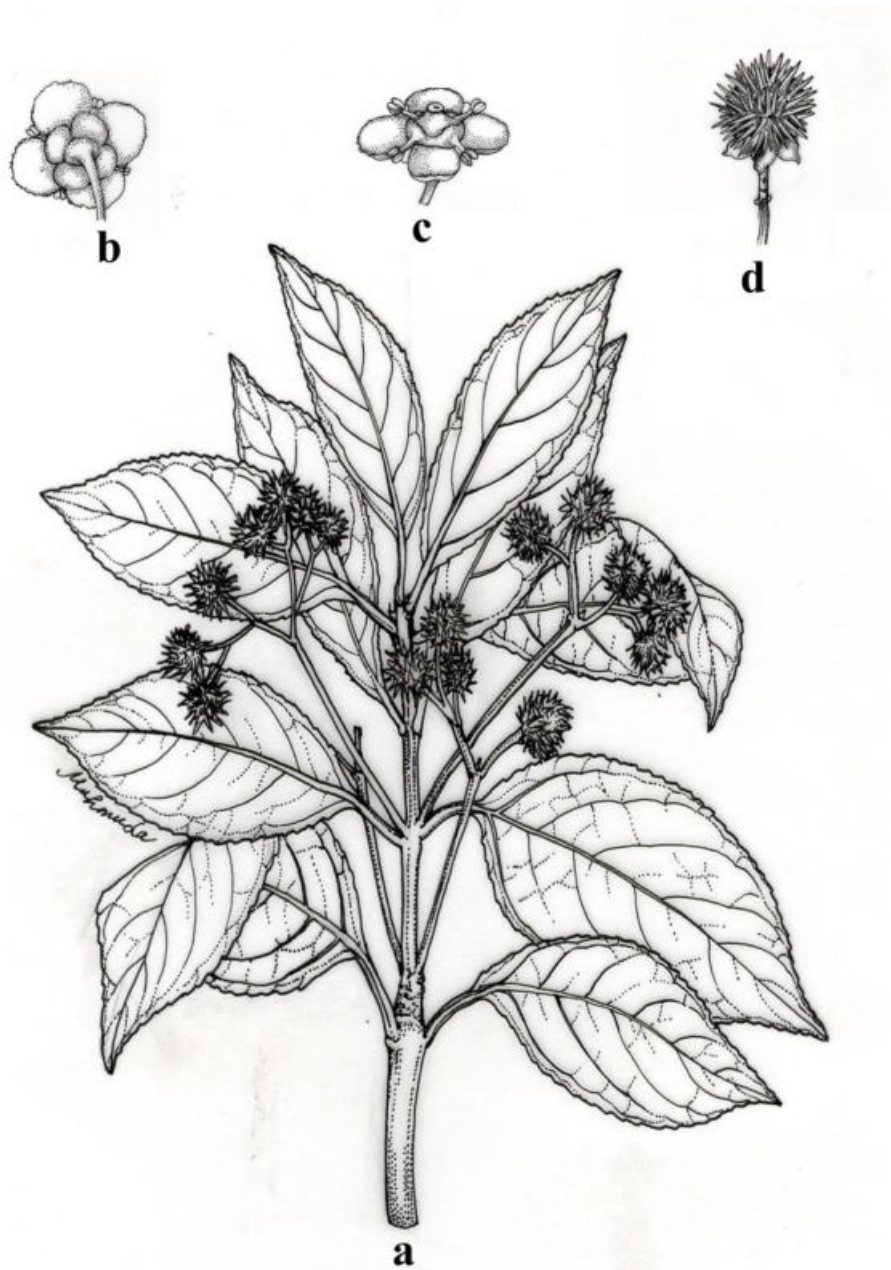


Figure 9: ***Euonymus echinatus*** Wall.: a) Fructing shoot; b) flower (dorsal view); c) flower (ventral view); and d) fruit.

The species was earlier reported from East Bengal by A.M.Lawson (1875), but since then no other specimen has been collected from any part of the country.

Bhutan, China, India, Japan, Myanmar, Nepal, Pakistan and Thailand.

**Euonymus glaber** Roxb., Fl. Ind. 2: 403. 1824. M.A. Lawson in Hook.f., Fl. Brit. India 1: 609. 1875; S.Kurz, Forest Fl. Brit. Burma 1: 248. 1877; D.Brandis, Indian Trees: 158. 1906; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 100. 2000; S.N.Uddin in Z.U.Ahmed *et at.*, Encycl. Fl. Fauna Bangladesh 7: 194. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 999. 2018. *Euonymus serrulatus* Wall., Numer. List 4296. 1831. *nom. nud.* *Euonymus mitratus* Pierre, Fl. Forest. Cochinch. t. 308. 1894. *Lophopetalum pedunculatum* Ridl., J. Straits Branch Roy. Asiat. Soc. 59: 85. 1911. *Euonymus carinatus* Craib, Bull. Misc. Inform. Kew 1926: 347. 1926. *Euonymus ligustrinus* Craib, Bull. Misc. Inform. Kew 1926: 348. 1926.

Shrubs to small, evergreen trees, up to 10 m tall. Branchlets terete, dark brown to purplish brown. Leaves elliptic or sometimes elliptic to elliptic-oblong, 7-15 × 3-7 cm, chartaceous, glabrous, base cuneate to attenuate, apex acute to acuminate, margins usually dentate-crenate in the upper half, lateral nerves 5-9 pairs, curving forward, disappearing before reaching margin; petioles 5-8 mm long. Inflorescence axillary or slightly extra-axillary, many flowered cymes, three times dichotomously branched, usually at the base of new shoot, up to 10 cm long; peduncles up to 2.5 cm long, bracts ovate, shortly ciliate, pedicels 2.0-3.5 mm long. Flowers cream-coloured, 5-merous (occasionally 4-merous), c. 6 mm in diameter. Calyx lobes unequal, usually the outer 2 smaller, semiorbicular or broadly obovate, rarely sub-reniform, slightly erose, sometimes shortly ciliate. Petals 5, suborbiculate, ovate to obovate, 2-3 × 2-3 mm, sometimes slightly contracted at the base, margin usually minutely denticulate. Disk orbicular, 1.5-2.0 mm in diameter. Stamens very short, inserted near the margin of the disk, anthers triangular. Pistil c. 0.6 mm emerging from the disk, (4-) 5-angular at the base, narrowed into a short, cylindric style. Fruits capsular, compressed globose, 10-15 × 12-17 mm, deeply (4-) 5-angled and grooved, usually concave at the apex, narrowing toward base, usually 5 notched. Seeds ellipsoid, sometimes only 1 developing, arillate. *Fl. & fr.*: 10-4. *Mixed forests, on hill slopes; up to an altitude of 800 m.*

**Bandarban:** Maurchara, Poly forest, Ruma, 25 i 2017, *K.K. Islam*, KKI-1009 (DACB 47220); 11 v 2018, *K.K. Islam*, KKI-2860 (DACB 46672); Rijnuk Chhara, Ruma, 12 v 2018, *K.K. Islam*, KKI-2966 (DACB 60791). **Chattogram:** Chandranath Hill, Sitakundo, 26 vi 1979, *M.M.K. Mia & M.M. Rahman*, M-77

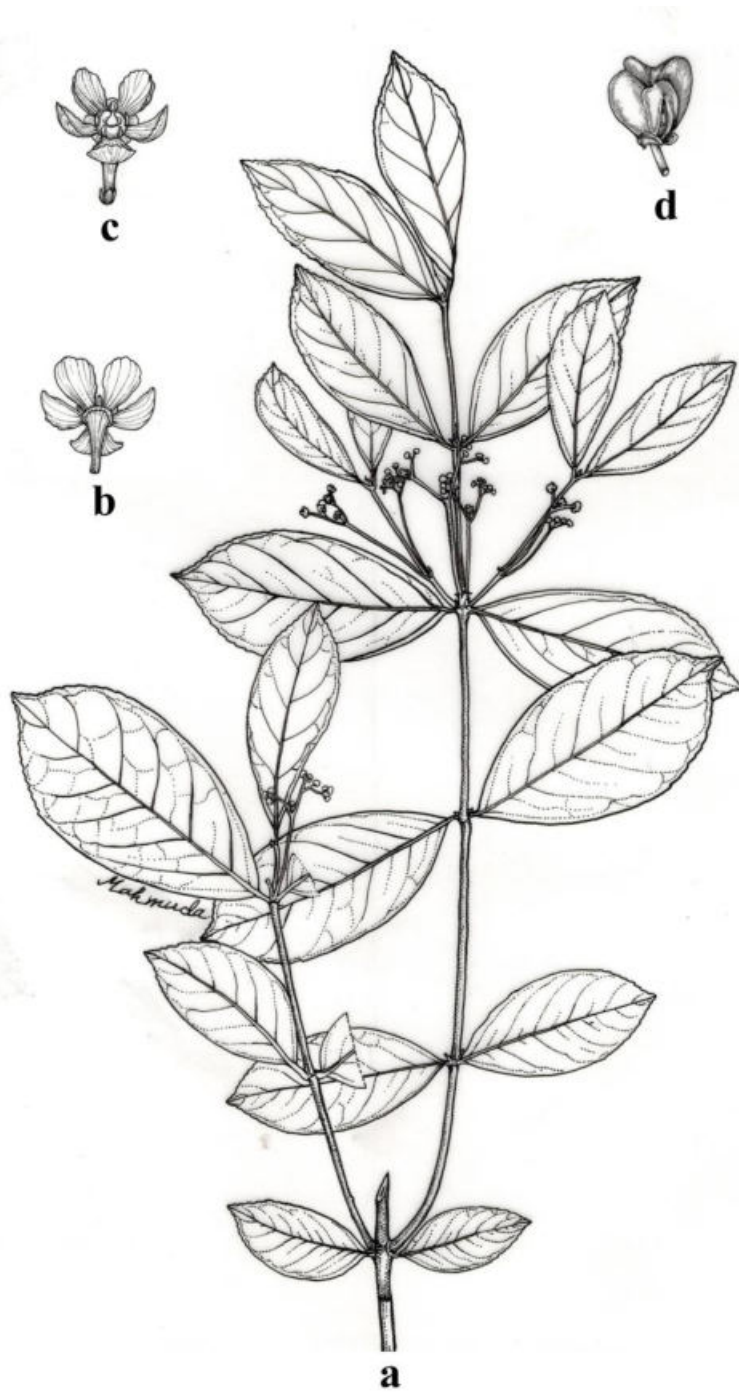


Figure 10: ***Euonymus glaber*** Roxb.: a) Flowering shoot; b) flower (dorsal view); c) flower (ventral view); and d) fruit.

(DACB 24077); Dhopachari, Rungunia, 03 vi 1998, C.K. Dey *et al.*, 3341 (DACB 29468); 15 ix 1998, C.K. Dey *et al.*, 3356 (DACB 29395). **Cox's Bazar**: Soankhali, Inani, 25 iii 2017, *Monir Ahmed*, MA-35 (DACB); 17 iv 2017, *Monir Ahmed*, MA-85 (DACB 58690); Jadi-pahar, Teknaf, 26 iv 2017, Niyamul Kabir *et al.*, NK 3413 (DACB). **Rangamati**: Sitarghat, Sitapahar, Kaptai, 25 iv 1997, *A.M. Huq & M.M.K. Mia*, H-10479 (DACB 31829); 29 v 2003, *S.N. Uddin*, N-1925 (DACB 36850); Sitapahar West forest, Kaptai, 03 v 1999, *A.M. Huq & M.M.K. Mia*, H-10625 (DACB); Sitapahar, Kaptai, 08 vii 2003, *S.N. Uddin*, N-2018 (DACB 44813); 24 ix 2002, *S.N. Uddin*, N-1530 (DACB 36393); 31 v 2003, *S.N. Uddin*, N-1976 (DACB 36813); 27 vi 1998, *Rahman et al.* R-3222 (DACB 28946); Baluchara, Rampahar, Kaptai, 28 v 2003, *S.N. Uddin*, N-1878 (DACB 36857); Karnafuli reserved forest, Kaptai, 03 viii 2010, *S.N. Uddin*, N-4351 (DACB 44948); Pharuia reserved forest, Bilaichari, 14 x 2008, *B. Khan et al.*, B-1069 (DACB 33319).

Cambodia, China, India, Malaysia, Myanmar, Thailand and Vietnam.

Timber has fine texture and is used for making furniture (Watt, 1972).

**Euonymus indicus** B.Heyne *ex* Wall. in Roxb., Fl. Ind. 2: 409. 1824; M.A. Lawson in Hooker's Fl. Brit. India 1: 608. 1875; D.Brandis, Indian Trees: 158. 1906; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 102. 2000. *Euonymus javanicus* Blume, Bijdr. 1146. 1827; M.A. Lawson in Hook.f., Fl. Brit. India 1: 607. 1875; S.Kurz, Forest Fl. Brit. Burma 1: 249. 1877; D.Brandis, Indian Trees: 158. 1906; M.B.Raizada, Indian Forester 67(5): 247. 1941; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 104. 2000. *Euonymus goughii* Wight, Icon. Pl. Ind. Orient. 1: t. 215. 1839. *Euonymus timorensis* Zipp. *ex* Span., Linnaea 15: 186. 1841. *Euonymus sphaerocarpus* Hassk., Cat. Hort. Bot. Bogor. 229. 1844. *Euonymus sumatranus* Miq., Fl. Ned. Ind. 1(2): 589. 1859. *Euonymus bancanus* Miq., Fl. Ned. Ind., Eerste Bijv. 513. 1861. *Euonymus horsfieldii* Turcz., Bull. Soc. Imp. Naturalistes Moscou 36(1): 598. 1863. *Euonymus alatus* Elmer, Leafl. Philipp. Bot. 4: 1484. 1912. *Euonymus elmeri* Merr., Philipp. J. Sci., C 12: 281. 1917. *Euonymus coriaceus* Ridl., Fl. Malay Penins. 5: 299. 1925. *Euonymus micropetalus* Ridl., Fl. Malay Penins. 5: 299. 1925.

Evergreen shrubs or trees, up to 20 m high; branchlets terete, slightly quadrangular at tip. Leaves elliptic to ovate-lanceolate or elliptic-oblong, 5-20 × 3-9 cm, apex acute to acuminate, base cuneate, rounded or attenuate, margin entire, sometimes obscurely serrulate towards apex, chartaceous to subcoriaceous, glabrous, shining; lateral nerves conspicuous, 5-8 pairs; petiole 5-10 mm long; stipules linear-subulate, caducous. Inflorescence axillary or extra-



Figure 11: **Euonymus indicus** B.Heyne ex Wall.: a) Flowering shoot; b) flower; c) stamen; and d) fruit.

axillary, simple cymes, usually 1 to several flowers on a short, tubercular glomerule, very rarely in obscure or very short peduncle; pedicels 1-2 cm long; bracts lanceolate, c. 1 mm long, fringed. Flowers 5-merous. Sepals fleshy, suborbiculate, reniform or ovate, unequal, 1.5-4.0 × 1-4(-6) mm, glabrous, entire or fringed, persistent. Petals greenish-yellow, broadly obovate or suborbiculate,



4-5 × 3-6 mm, fringed. Disc lobed, fleshy, 2.5-3.0 mm diameter. Stamens inserted on the disc near the margins, c. 2.5 mm long; filaments short, flattened. Ovary sunken in the disc, triloculed. Fruits capsular, obovoid-clavate rarely globose, 2.0-3.5 × 1.5-2.5 cm long, retuse at apex, smooth, red, wings projected. Seeds 1 or 2 in each locule. *Fl. & fr.*: 1-10. *Evergreen forests; up to 1000 m altitude.*

**Chattogram:** Hazarikhil, 29 viii 1936, V.S. Rao, 5639 (CAL); Kalapani, Hazarikhil Wildlife Sanctuary, 19 viii 2014, S.N. Uddin, N-5401 (DACB 42324).

India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand and Vietnam.

**Euonymus laxiflorus** Champ. *ex* Benth., Hooker's J. Bot. Kew Gard. Misc. 3: 333. 1851. *Euonymus crosnieri* H.Lev. & Vaniot, Bull. Soc. Bot. France 51: 146. 1907. *Euonymus cuspidatus* Loes., Notizbl. Königl. Bot. Gart. Berlin 3: 77. 1900. *Euonymus forbesianus* Loes., Bot. Jahrb. Syst. 30: 457. 1902. *Euonymus incertus* Pit., Fl. Indo-Chine 1: 874. 1912. *Euonymus paniculatus* Wight *ex* M.A.Lawson, Fl. Brit. India 1: 609. 1875; D.Brandis, Indian Trees: 158. 1906; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 105. 2000. *Euonymus pellucidifolius* Hayata, Icon. Pl. Formosan. 3: 57. 1913. *Euonymus rostratus* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 10: 36. 1917. *Euonymus rubescens* Pit., Fl. Indo-Chine 1: 875. 1912. *Euonymus vaniotii* H.Lév., Repert. Spec. Nov. Regni Veg. 13: 259. 1914. *Masakia pellucidifolia* (Hayata) Nakai, J. Jap. Bot. 24: 11. 1949.

Shrubs, 2-4 m tall; branches glabrous, greenish gray, terete, twigs greenish, 4-angled or striate when dry. Leaves opposite, simple, exstipulate; leaf blade elliptic-obovate or ovate, 6-10 × 2.5-3.5 cm, base attenuate, margin quite entire or with a few crenatures, apex caudate or obtusely-acuminate; leathery, smooth, shiny, lateral veins unclear or invisible; petiole 3-8 mm long. Inflorescence axillary or supra-terminal cymes, lax, dichotomously branched with about 7 flowers together; peduncle slender, 2.0-3.5 cm long; pedicel 6-10 mm long. Flowers 5-merous, scarlet, c. 8 mm in diameter. Sepals semi-orbicular, imbricate, red. Petals 5, scarlet, sub-orbicular, margin crenate, wavy. Stamens 5, filaments very short, alternate to petals, inserted on the disc; anthers yellow. Disc large, 4-5-lobed, fleshy, flat, green. Ovary sunk in the disc, style short, thick, stigma 3-5 lobed, ovule 2, in each locule, erect. Capsule obovoid, base attenuate, 5-angled and grooved, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 8-10 × c. 10 mm. Seeds ovoid, dark brown, partially covered by orange aril. *Fl. & fr.*: 3-11. *Evergreen forests, scrubs, along water courses; between 300-500 m altitude.*



Figure 12: **Euonymus laxiflorus** Champ. ex Benth.: a) Flowering shoot; b) flower (dorsal view); and c) flower (ventral view).

**Moulvibazar:** Madhabkundo Eco-park, Barolekha, 18 vii 2009, *S.N. Uddin*, N-5253 (DACB 43670).

Cambodia, China, India, Japan, Laos, Malaysia, Myanmar, Nepal, Taiwan and Vietnam.

***Euonymus lawsonii*** C.B. Clarke *ex* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 195. 1904. U.N. Kanjilal *et al.*, Fl. Assam 2: 263. 1938; K. Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 105. 2000; M.K. Alam & S.N. Uddin in S.N. Uddin & M.A. Hassan, Vas. Fl. Chittagong & CHT. 2: 999. 2018.

Small trees. Branchlets terete, slender, bark grey, reticulately fissured outside, white & finely fibrous inside. Leaves elliptic-oblong to lanceolate, 7-12 × 2.5-4.0 cm, apex acuminate, base cuneate to rounded, membranous or thinly chartaceous, margins sharply serrate except lower part, lateral nerves 6-9 pairs, rather distinct especially beneath, arcuate tertiary prominently reticulate; petiole 6-8 mm long. Inflorescence axillary, 1-7 flowered, 1-8 cm long, laxly cymes on dichotomously branched, peduncle very slender, 2-3 cm long; pedicels almost filiform, 6-8 mm long. Flowers 4-merous, 5-6 mm diameter. Sepals 4, broad obtuse or rounded, concave, entire. Petals 4, greenish, orbicular, much exceeding sepals, revolute at tip, margins finely veined, undulate. Fruits capsular, thinly coriaceous, 6-8 × 10-12 mm long, deeply 4-angled, not winged. Seeds with orange aril. *Fl. & fr.*: 1-12. *Evergreen forest, along water courses; up to 500 m altitude.*

**Sylhet:** Khasi Hills (altitude 4000-5500 ft !), 24 xi 1885, C.B. Clarke, 40063A (K000669181).

India.

***Euonymus lucidus*** D. Don, Prodr. Fl. Nepal. 191. 1825. M.K. Alam & S.N. Uddin in S.N. Uddin & M.A. Hassan, Vas. Fl. Chittagong & CHT. 2: 1000. 2018. *Euonymus japonicus* Wall., Fl. Ind. 2: 405. 1824. *Euonymus pendulus* Wall. *ex* Roxb., Fl. Ind. 2: 406. 1824. *nom. nud.*; M.A. Lawson in Hook. f., Fl. Brit. India 1: 612. 1875; D. Brandis, Indian Trees: 159. 1906; S.N. Uddin in Z.U. Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 195. 2008. *Vyonomus pendula* C. Presl, Abh. Königl. Böhm. Ges. Wiss. V, 3: 462. 1845. *Euonymus*

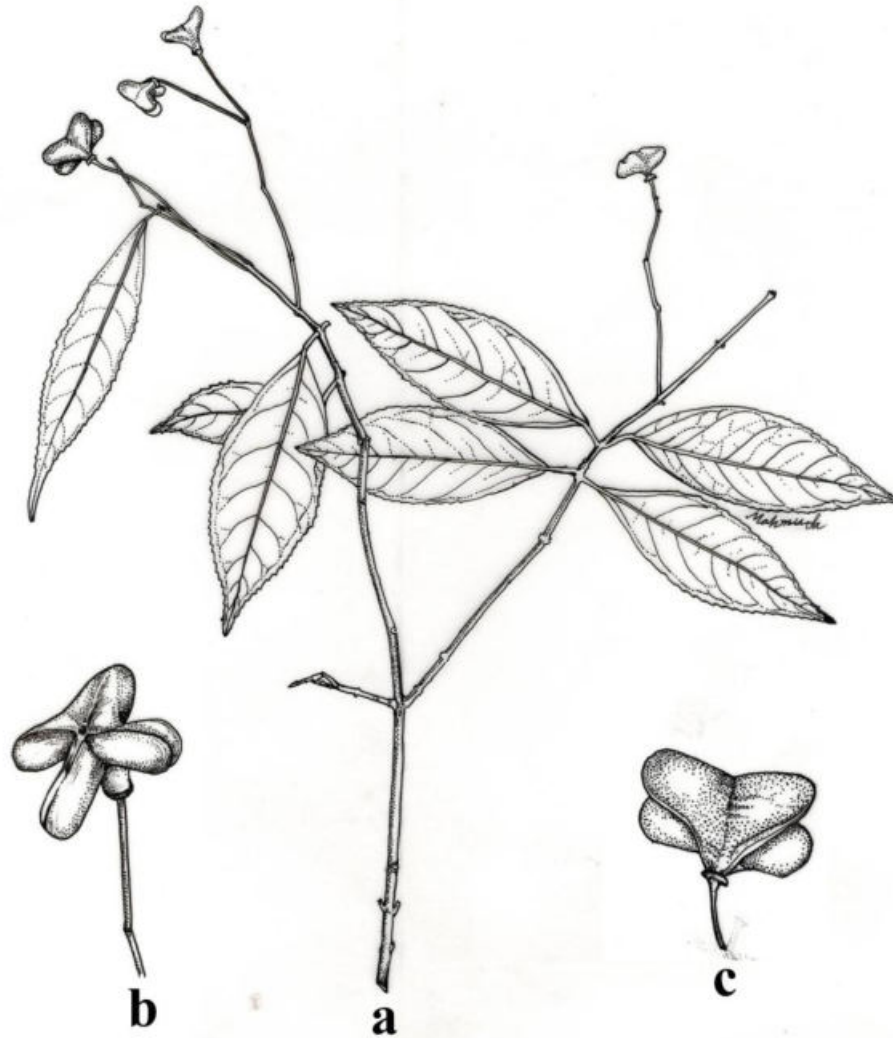


Figure 13: *Euonymus lawsonii* C.B. Clarke ex Prain: a) Fruiting shoot; b) fruit (ventral view); and c) fruit (dorsal view).

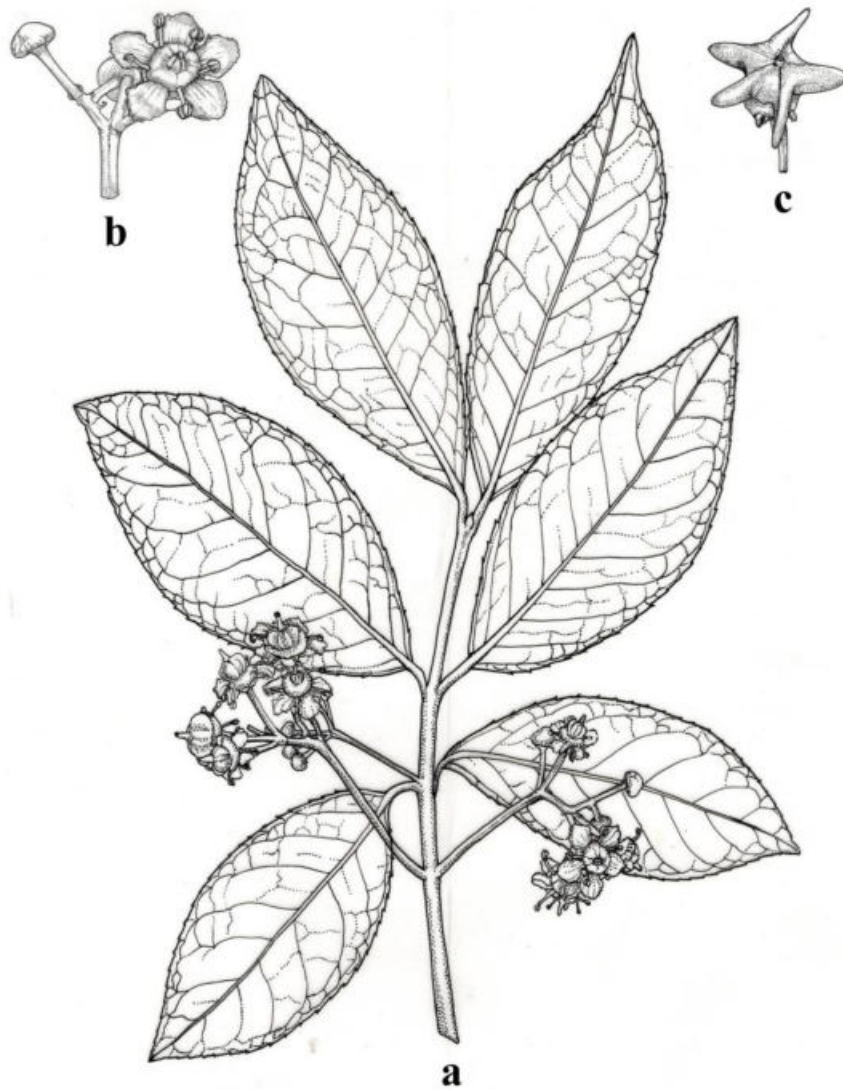


Figure 14: *Euonymus lucidus* D. Don: a) Flowering shoot; b) flowering branch; and c) fruit.

*pendulus* Wall. ex M.A.Lawson, Fl. Brit. India 1: 612. 1875; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 106. 2000. *Pragmatropa pendula* Pierre, Fl. Forest. Cochinch. t. 309. 1895.

Small, evergreen trees or large shrubs, up to 10 m tall. Branchlets terete, drooping, twigs striate or sometimes 4-angled, green or brown when dry. Leaves elliptic or oblong-elliptic, 7-11 × 3-4 cm, base narrowly cuneate or attenuate, apex acute or acuminate, margin sharply serrate, chartaceous, upper surface shining, pale below, glabrous, lateral nerves invisible, or sometimes 6-8 pairs, slightly curving forward, netting and disappearing before reaching margin; petioles sturdy, 1-2 cm long, channeled; stipules hairy. Inflorescence axillary or slightly supra-axillary or clustered cymes; peduncles stout, 2-5 cm long, dichotomously branched with many flowers; bracts ovate; pedicels up to 5.0 mm long. Flowers greenish-white, 5-merous, sometimes combined with 4-merous, 7-8 mm in diameter. Sepals 5, unequal, suborbicular, obtuse, fimbriate. Petals 5, white, oblong, 2.0-2.5 × 2.0-2.5 mm, fimbriate. Disk orbicular, 1.5 mm in diameter. Stamens as long as petals, inserted near the margin of the disk, anthers ovate, short. Pistil 0.6 mm long, emerging from the disk, 4-angular at the base, narrowed into a short, filiform style. Fruits capsular, globose, 1.2-1.4 cm diameter, 4- or 5-lobed, angle sharp, more or less winged, reddish brown when fresh, dark brown or gray when dry. Seed usually 1 in each cell, dark brown, enclosed in a thin, reddish aril.  $2n = 32$  (Kumar and Subramaniam, 1986). *Fl. & fr.* 4-12. *Evergreen, hilly forests; up to 1000 m altitude.*

**Cox's Bazar:** Chowfoldondhi, Cox's Bazar sadar, 31 x 2016, *Niyamul Kabir et al.*, NK-1512 (DACB 56402).

Bhutan, China, India, Myanmar, Nepal and Pakistan.

Wood is used for carving, and also as fuel.

***Euonymus theifolius*** Wall. ex M.A.Lawson in J.D. Hooker, Fl. Brit. India. 1: 612. 1875. D.Brandis, Indian Trees: 159. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 264. 1938; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 107. 2000; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 1000. 2018. *Euonymus paravagans* Z.M.Gu & C.Y.Cheng, Bull. Bot. Res., Harbin 11(3): 19. 1991. *Pragmotessara theifolia* Pierre, Fl. Forest. Cochinch. t. 309. 1895.

Evergreen shrubs or ascending subshrubs, 2-3 m tall, sometimes trailing on trees with adventitious roots, rarely epiphytic. Branches and twigs terete, usually brown or yellow. Leaves opposite, simple, estipulate; blade oblong-elliptic,



Figure 15: *Euonymus theifolius* Wall. ex M.A.Lawson: a) Fruiting shoot.

elliptic-lanceolate or ovate, 5-14 × 2-5 cm, base cuneate, margins crenulate to serrate, apex acute or acuminate, glabrous, lateral veins 5-8 pairs, distinct on both sides, reticulate, arcuate; petiole 5-10 mm long, channeled. Inflorescence axillary, 5-7-flowered cymes, dichotomously 2-4 times branched; peduncle 2-3 cm long, slender; pedicel 2-5 mm long. Flowers 4-merous, 4-5 mm diameter. Sepals semirovate, c. 1 × 2 mm. Petals membranous, nearly orbicular, 3-5 × 3-5 mm, short clawed, entire, greenish or whitish, about 7 nerved, spreading upwards from the base. Disc shallowly discoid, c. 2 mm diameter. Stamens c. 1 mm long. Ovary sunk in the disc, c. 1 mm long above disc, smooth; styles short. Capsules globose, 5-8 mm diameter, obscurely angled or not, smooth, brown or brown-yellow. Seeds arilate; aril yellowish red. *Fl. & fr.*: 5-12. *Evergreen forests, scrubs and seasonal rain forests; between 150-700 m altitude.*

**Cox's Bazar:** Kudumgath, Horikhola, Whykeong, 01 xi 2008, *S.N.Uddin*, N-3129 (DACB). **East Bengal:** Specific locality & date unknown, 1861-62, W. Griffith, 1960 (CAL 35377).

Bhutan, China, India, Myanmar, Nepal and Thailand.

**Lophopetalum** Wight *ex* Arn., *Ann. Mag. Nat. Hist.* 3: 150. 1839.

Type species: *Lophopetalum wightianum* Arn.

Small to tall evergreen trees, buttresses sometimes present and up to 8 m high, branchlets mostly dark, terete, and mostly flattened at the nodes. Leaves decussate or opposite, sometimes subopposite, distinctly very shortly petioled, rarely sessile, blade rarely subpeltate, margin entire, stipules a tuft of hair-like processes, caducous. Thyrses axillary, 1 (-3), sometimes branched from the very base, divaricate. Peduncle distinct, sometimes very short or absent, bracts deltoid or lanceolate, shortly ciliate or fimbriate, pedicels articulated at the base. Flowers bisexual, 5-merous. Calyx dish-shaped, lobes rounded or triangular, spreading, inflexed or reflexed. Petals imbricate, inner surface covered with lamellate, cristate or fimbriate appendages, rarely bearing a tuft of fleshy papillae at the centre or naked. Disk usually flat, fleshy, 5-angular, rounded or distinctly 5-lobed. Stamens inserted on the disk, filaments filiform, dorso-centrally fixed, anthers broadly ovoid or ellipsoid, versatile, introrse, apex obtuse or shortly apiculate. Ovary partly immersed in the disk, trigonal or pyramidal, gradually narrowed into cylindrical, short style, 3-celled, stigmas obscure, ovules 4-18 in each cell, arranged in 2 rows. Capsule oblong or slightly spindle-shaped, 3-lobed, winged or angular, loculicidally dehiscent. Seeds flat, oblong, the wings surrounding the seed, albumen scanty or absent.

**Lophopetalum wightianum** Arn., *Ann. Nat. Hist.* 3: 151. 1839. M.A. Lawson in *Hook.f., Fl. Brit. India* 1: 615. 1875; D.Brandis, *Indian Trees*: 161. 1906; M.K.Alam, *Pl. Taxon. Series, Bull.* 5: 25. 1988; K.Ramamurthy in N.P. Singh *et*



*al.*, Fl. India 5: 116. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 196. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 1001. 2018. *Lophopetalum fimbriatum* Wight, Ill. Ind. Bot. 1: 178. 1840; M.A. Lawson in Hook.f., Fl. Brit. India 1: 615. 1875; S.Kurz, Forest Fl. Brit. Burma 1: 255. 1877; D.Prain, Beng. Pl. 1: 231. 1903 (Indian rep. ed. 1963); R.L.Heinig, List Pl. Chitt. Coll. & HT.: 12. 1925; U.N.Kanjilal *et al.*, Fl. Assam 2: 266. 1938. *Euonymus fimbriatus* Baill. ex Laness., Pl. Util. Col. Franç. 312. 1886. *Lophopetalum winkleri* Loes., Notizbl. Bot. Gart. Berlin-Dahlem 13: 221. 1936.

Bengali: *Rakton, Sutrong*

Large evergreen trees, up to 50 m tall and 2 m diameter, sometimes buttressed, branchlets terete, sometimes slightly 4-angular. Leaves elliptic to elliptic-oblong, sometimes ovate to ovate-oblong, 10-25 × 5-10 cm, subcoriaceous, base subpeltate, base obtuse, rounded or cuneate, apex acute or apiculate, sometimes acuminate, lateral nerves 6-12 pairs; petioles terete, rarely sulcate, 1.5-2.5 cm long. Inflorescence terminal or axillary panicles, up to 15 cm long, branching near the base, branchlets stout, obliquely spreading; peduncles obscure or up to 5 cm long; pedicels 5-10 mm long. Flowers 10-12 mm in diameter, yellow; buds conical or subglobose. Calyx 5-lobed, as large as the disk, lobes triangular, acute, shortly ciliate. Petals yellow, broadly ovate or suborbicular, 4-6 × 4-6 mm, margin undulating, inner surface covered with lamellate, cristate or fimbriate appendages. Disk cupular, concave, red in bud, flat or dish-shaped at anthesis, 5 mm in diameter, 5-lobed, epipetalous. Stamens inserted near the ovary, filaments 2.5 mm long, anthers oblong or ovoid, apiculate, 1.5 mm long. Pistil red, ovary triangular, narrowed upward into the style, ovules 12-18 per cell. Fruits capsular, oblong, 10-15 × 3-6 cm long, deeply 3-angled. Seeds few, oblong, flat, broadly winged, 6.5-7.5 × 1.5-2.5 cm (including wings).  $2n = 40$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 12-6. *Wet lowland forests, riverine and temporarily inundated forests, up to an altitude of 800 m.*

**Chattogram:** Hajarikhil, 21 iii 2000, *M.S. Khan et al.*, K-10318 (DACB 29081). **Chittagong Hill Tracts:** Specific locality & date unknown, 1886, Dr. King 352 (CAL 85949). **Habiganj:** Rema-Kalenga Wildlife Sanctuary, Chunarughat, 02 iv 1997, *M.S. Khan et al.*, K-9766 (DACB 30405). **Moulvibazar:** Lawachara National Park, Kamalgonj, 19 viii 2009, *S.N. Uddin*, N-3943(2) (DACB 35775); 15 viii 1976, *M.S. Khan et al.*, K-4234 (DACB 13079).

Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar and Thailand.

The timber is not so good in quality but used for making boxes, houses and country boats.



Figure 16: *Lophopetalum wightianum* Arn.: a) Flowering shoot; b) flower; and c) fruits.

**Maytenus** Molina, Sag. Stor. Nat. Chili. 177, 349. 1782.

Type species: *Maytenus boaria* Molina

Erect shrubs or small trees, rarely viny or climbing. Branches glabrous, young parts sometimes pubescent, sometimes spiny, spines terminating in a short shoot, in leaf axil. Leaves spiral, alternate, rarely opposite, or in fascicles especially on short shoots or in a leaf axil or none; stipules small, lanceolate, sparsely lacinate, caducous or estipulate; blades variable both in shape and texture even in one species, coriaceous, serrate, petiolate. Inflorescences axillary, fasciculate cymes, rarely racemose, or flowers solitary; pedicels articulated. Flowers white-green, bisexual, sometimes unisexual, 5-merous. Calyx (4-) 5 lobed. Petals (4-) 5 lobed, patent, sometimes reflexed after anthesis. Disk fleshy, flar or rarely cupular, rounded, or slightly angular, undulate, intrastaminal. Stamens inserted on the margin of the disc, or slightly just beneath it's outer margins (abortive in female flower); anthers longitudinally dehiscent, introrse. Ovary partly or rarely entirely immersed in the disc, emerging parts subglobose or slightly 3-angular, usually 2-locular, rarely 3 or 4-locular, base confluent with disk; ovules erect, often 2 per locule; stigmas 3 or 2, slender, lobed or obscure. Capsules obovoid or subglobose, sometime slightly (2-) 3-angular, 2-3 celled, leathery, loculicidally dehiscent by 2-3 valves. Seeds 2-6, ellipsoid; aril basal to enveloping seed.

#### KEY TO THE SPECIES

- |   |                     |
|---|---------------------|
| 1. Spines bearing leaves and flowers    | <b>M. wallichii</b> |
| + Spines not bearing leaves and flowers | <b>M. hookeri</b>   |

**Maytenus hookeri** Loes., Nat. Pflanzenfam. (ed. 2) 20(b): 140. 1942. K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 123. 2000; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 1003. 2018. *Maytenus hookeri* var. *longiradiata* S.J.Pei & Y.H.Li, Acta Bot. Yunnan. 3(2): 247, f. 10. 1981. *Gymnosporia acuminata* M.A. Lawson in Hook.f., Fl. Brit. India 1: 619. 1875; D.Brandis, Indian Trees: 164. 1906; U.N.Kanjilal *et al.*, Fl. Assam 2: 271. 1938.

Large shrubs or small trees, up to 8 m tall. Twigs slender, sometimes trailing, sparsely thorny or unarmed, older branches typically thorny. Leaf blade lanceolate to elliptic-lanceolate or oblong-ovate, 8-20 × 2.5-8.0 cm, base cuneate or acute, margin crenate or serrate, apex acuminate, thinly papery, glabrous, lateral veins tenuous, 6-9 pairs; petiole 5-12 mm long, channeled. Cymes 1-6, fascicled, each cyme 2-4(or 5) × monochasially branched or once dichotomously branched; peduncle slender, various in length, 15-20 mm long, sometimes absent; pedicel slender, 3-5 mm, 1.0-1.2 cm long when fruiting. Flowers small,

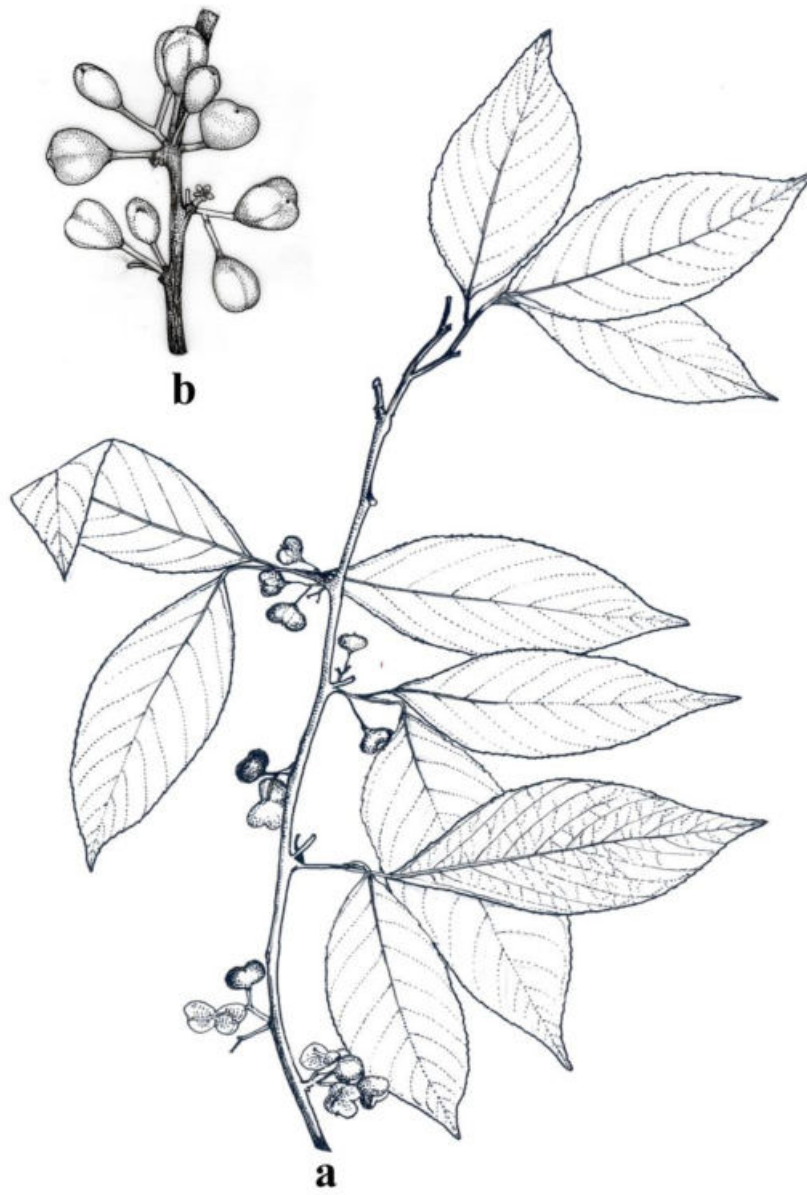


Figure 17: *Maytenus hookeri* Loes.: a) Fruiting shoot; and b) fruiting branch.

white-green, 3-5 mm in diameter. Sepals 5-lobed, triangular. Petals 6, oblong-elliptic, larger than sepals. Disk fleshy, annular, undulate or 5-lobed, intrastaminal. Stamens 5, arising from below the margin of disc; filament c. 2 mm long, anthers longitudinally dehiscent, introrse. Ovary sunk in the disc, 2-celled, rarely 3- or 4-locular, base confluent with disk; stigma 2-lobed, ovules erect, often 1 per locule. Capsule obovoid, obcordate or subglobose, flat, compressed, 6-10 × 5-7 mm, leathery, loculicidally dehiscent, usually 2-valved. Seeds 1-4, oblong-ovate or ellipsoid, ca. 2 mm diameter, black; aril fleshy covering the lower half, white, yellowish when dry. *Fl. & fr.*: 4-11. *Primary and secondary forests, hill slopes and valleys; 100-700 m altitude.*

Bhutan, China, India and Myanmar.

**Cox's Bazar:** Shilkhali, Teknaf, 23 i 2018, *Niyamul Kabir & Mehedi Hasan*, NK-6852 (DACB). **East Bengal:** Specific locality & date unknown, 1861-62, W. Griffith, 1984 (CAL 86503) & 1985 (K 000669842). **Rangamati:** Baluchhara, Rampahar, Kaptai, 30 ix 2002; S.N. Uddin, N-1616 (DACB); 16 x 2003, *S.N. Uddin*, N-2059 (DACB 41422). **Sylhet:** Khasia (Altitude 6000ft !), 02 ix 1850, *J.D. Hooker & T. Thomson*, 2298 (K000669828).

The species has medicinal properties.

**Maytenus wallichii** (G.Don) Bennet & Sahni, *Ind. For.* 103(6): 387. 1977. K.Ramamurthy in N.P. Singh *et al.*, *Fl. India* 5: 128. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, *Encycl. Fl. Fauna Bangladesh* 7: 197. 2008. *Celastrus rigidus* Wall., *Fl. Ind.* 2: 396. 1824. *Celastrus wallichianus* Wall., *Fl. Ind.* 2: 400. 1824. *Catha wallichii* G.Don, *Gen. Hist.* 2: 10. 1832. *Gymnosporia wallichiana* Spreng. *ex Wight & Arn.*, *Prodr.* 159. 1834; M.A. Lawson in Hook.f., *Fl. Brit. India* 1: 621. 1875. *Celastrus wallichianus* Spreng. *ex Wight & Arn.*, *Prodr. Fl. Ind. Orient.* 1: 159. 1834. *Euonymus rigidus* Walp., *Repert. Bot. Syst.* 1: 532. 1842. *Maytenus wallichiana* (Spreng.) D.C.S.Raju & Babu, *Bull. Bot. Surv. India* 10: 349. 1969.

Bengali: *Pataki*

Shrubs, up to 4 m tall. Branchlets terete, zigzag, thorny, spines rigid, 1-6 cm long, bearing leaves and flowers. Leaves obovate, 2.5-4.5 × 1.5-3.5 cm, base cuneate, apex obtuse or emarginate, glabrous, coriaceous, margin serrate-crenate, lateral nerves distinct, 5-6 pairs, reticulate; petioles 5-7 mm long. Inflorescence axillary or on spines, compact cymes or fascicles, up to 3 cm long; peduncles up to 2 cm long, bracts ovate, shortly ciliate; pedicels 2.0-3.5 mm long. Flowers cream-colored, 5-merous. Calyx lobes triangular. Petals 5, oblong, 2.0-2.5 × 2.0-2.5 mm, thin. Disk rounded, 1.5 mm in diameter, fleshy. Stamens 5,

FiF

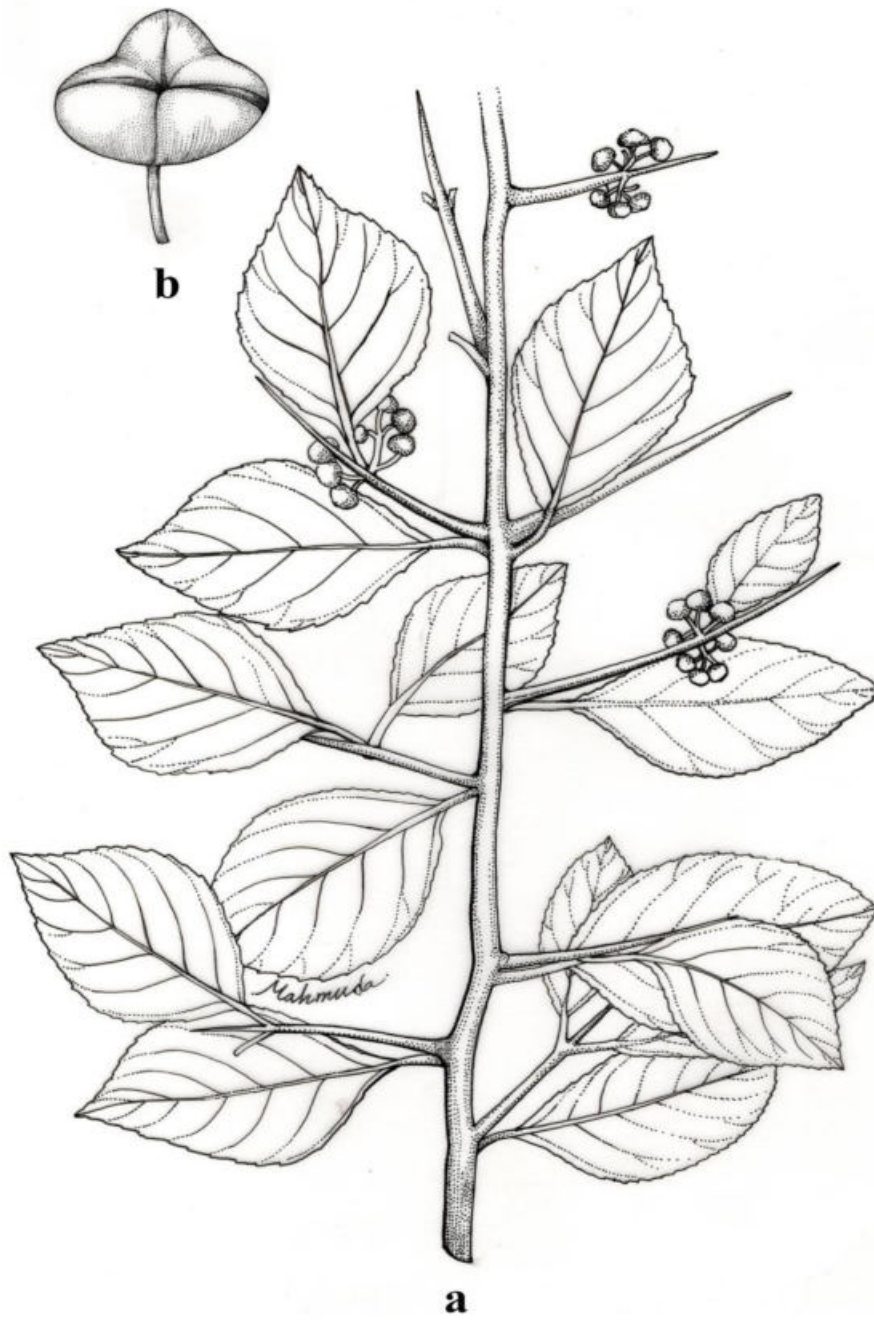


Figure 18: *Maytenus wallichii* (G.Don) Bennet & Sahnii: a) Flowering shoot; and b) fruit.

interpetaloid, inserted below the disk, short, anthers triangular. Pistil emerging from the disk, 5-angular at the base, narrowed into a short, cylindric style, stigmas capitate. Fruits capsular, inflated, obcordate, 5-12 × 4-7 mm, deeply 3-lobed, trivalved, yellowish-brown. Seeds usually 2 in each cell, flat, enclosed in red, fleshy aril. *Fl. & fr.*: 1-12. Evergreen hilly forests; up to an altitude of 1000 m.

M.A. Lawson (1875) recorded the species from Eastern Bengal (present Bangladesh).

India and Pakistan.

**Microtropis** Wall. *ex* Meisn., Pl. Vasc. Gen. 1: 68; 2: 49. 1837.

Type species: *Microtropis discolor* Wall.

Evergreen or deciduous shrubs or small trees, glabrous, rarely pubescent. Branchlets terete to somewhat quadrangular, bearing 2 filiform scales at the apex. Leaves decussate or opposite, glabrous, entire, often revolute; stipules minute, caducous or absent. Inflorescence axillary or extra-axillary or terminal, dichotomous or paniculate cymes, fascicled, or thyrsoid. Flowers bisexual, rarely unisexual, dioecious, sessile or subsessile, 5-merous (occasionally 4-6-merous). Calyx deeply lobed, lobes free, persistent in fruit, slightly enlarged, imbricate, unequal, the outer 2 or 3 usually smaller. Petals oblong, white or yellowish white, thick, concave or hooded at the apex, free or united at the base, imbricate. Stamens dorsifixed, filaments subulate, usually united at the base, anthers broadly ovoid or ovoid, introrse. Disk shallowly calathiform to annular or absent. Anthers longitudinally dehiscent, introrse, rarely extrorse. Ovary ovoid, free, 2- or 3-locular, ovules 2 in each cell, erect, style cylindric or very short, stigma obscure or discoid, 2-4 lobed. Capsules ellipsoid, leathery, not enclosed in or sitting on fleshy perianth parts, 1-locular, laterally split along one side, shortly apiculate to beaked, loculicidally dehiscent. Seed ovoid, usually 1 in each cell, erect, on a knob-like thickened placenta, enveloped by the aril, usually wrinkled, testa similar to aril, soft, smooth, red or red-brown.

**Microtropis discolor** (Wall.) Wall. *ex* Meisn., Pl. Vasc. Gen. 2: 49. 1837. M.A. Lawson in Hook.f., Fl. Brit. India 1: 614. 1875; S.Kurz, Forest Fl. Brit. Burma 1: 251. 1877; U.N.Kanjilal *et al.*, Fl. Assam 2: 267. 1938; M.K.Alam, Pl. Taxon. Series, Bull. 5: 25. 1988; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 129. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 198. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 1002. 2018. *Cassine discolor* Wall. in Roxb., Fl. Ind. 2: 378. 1824. *Microtropis sessiliflora* Merrill & F. L. Freeman., Proc. Amer. Acad. Arts 73: 284. 1940.



Figure 19: *Microtropis discolor* (Wall.) Wall. ex Meisn.: a) Flowering shoot; b) flowering bud; and c) fruit.



*Bengali: Rupicola*

Evergreen shrubs or small trees, up to 10 m tall, branchlets terete. Leaves oblong, elliptic-oblong or elliptic-ovate, 7-18 × 3-7 cm, base cuneate or attenuate, apex caudate or acuminate, margins entire, thickly papery or leathery, glabrous, abaxially gray-brown, adaxially generally pale green when dry, midvein prominent on both surfaces, lateral nerves 5-8 pairs, slender, curved, prominent on both surfaces; petioles 5-10 mm long, channelled. Inflorescence axillary or on branch axis, simple or thrice dichotomously branched, glomerate cymes, 7-15-flowered, 1.0-2.5 cm long; peduncles 3-6 mm long; pedicels very short; bracts 3-8 mm long, bracteoles deltoid, 0.5 × 0.5 mm. Flowers 5-merous, subsessile, greenish-white or yellowish. Calyx lobes suborbicular to reniform, 1.0-1.7 × 1.0-1.5 mm, free, imbricate, margin erosely toothed, teeth dark brown. Petals elliptic or oblong, 2.0-3.5 × 1.0-1.5 mm, fleshy, imbricate, distinctly keeled inside, the inner one or two usually slipper-shaped. Disk annular. Stamens 1.5-2.5 mm long, filaments subulate, slightly dilated, united at the base, 1 mm long, anthers oblong-ellipsoid, 0.7 mm long, dorso-basifixed, extrorse, apiculate. Ovary elliptic-ovate, 1.0-1.5 mm long, slightly wrinkled, slightly swollen at the base, style very short, stigmas obscurely 4-lobed or obtuse. Fruits ellipsoid or ovoid, 10-15 × 7-10 mm, surface with thin, longitudinal costa formed by small wartlike elevations. Seed 1 per locule, ellipsoid, stipitate, red, persistent on pedicel after capsule valves have fallen. *Fl. & fr.* 9-3. *Evergreen and deciduous forests; between 300-1000 m altitude.*

**Sylhet:** Khasia Hill (Altitude 4000 ft !), 26 ix 1850, *J.D. Hooker* s.n. (K000033643).

Bhutan, Cambodia, China, India, Laos, Myanmar, Malaysia, Thailand and Vietnam.

The wood is hard and durable and is used in making furniture, other household utensils and also used as fuel.

**Siphonodon** Griff., *Calcutta J. Nat. Hist.* 4: 247, t. 14. 1844.

Type species: *Siphonodon celastrineus* Griff.

Evergreen, tall trees, glabrous. Leaves spiral or alternate, margin crenate-serrate, stipules minute. Inflorescence axillary cymes, 3 to 4-flowered, sometimes only one flowered, peduncles short. Flowers 5-merous, bisexual, cream-colored. Calyx 5 clefts, unequally lobed, imbricate. Petals 5, spreading, imbricate. Disk not distinct from the base of the calyx. Stamens 5, connivent round the pistil in lower half or at base, filaments flattened, short and broad, united at the base, anthers with distinct and broad connective, opening latrorse. Pistil half

immersed, adnate to the disk, upper half hollow, ovary multi-locular, style columnar, ovule 1 in each locule, ascending and pendulous. Fruits drupaceous, globose, hard or fleshy, enclosing many 1-seeded stones. Seeds flat.

**Siphonodon celastrineus** Griff., Calcutta J. Nat. Hist. 4: 247, t. 14. 1844. M.A. Lawson in Hook.f., Fl. Brit. India 1: 629. 1875; M.B.Raizada, Indian Forester 67(5): 247. 1941; K.Ramamurthy in N.P. Singh *et al.*, Fl. India 5: 137. 2000; S.N.Uddin in Z.U.Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 7: 199. 2008; M.K.Alam & S.N.Uddin in S.N.Uddin & M.A.Hassan, Vas. Fl. Chittagong & CHT. 2: 1004. 2018. *Capusia annamensis* Lecomte, Bull. Mus. Natl. Hist. Nat. 32: 96. 1926. *Siphonodon annamensis* (Lecomte) Merr., J. Arnold Arbor. 21(1): 108-109. 1940.

Bengali: *Kath bel*

Lofty, evergreen trees, up to 20 m tall. Branchlets glabrous, bark greyish. Leaves alternate, elliptic-lanceolate to ovate-oblong, 7-15 × 2-9 cm, base cuneate to rounded, obtuse, apex acute to acuminate, margins crenulate-serrate, sometimes obscurely so, rarely entire, chartaceous or coriaceous, olivaceous or grey-greenish when dry, lateral nerves 6-10 pairs; petioles up to 2 cm long; stipules minute, deciduous. Inflorescence ramiflorous or axillary cymes, mostly (1-) few (many) flowered, usually from the old branches; peduncles 5-8 mm long, sometimes solitary on pedicels; pedicels 5-10 mm long. Flowers 5-merous, yellowish or creamy white. Calyx lobes 5, reniform or rounded, 1-2 × 1.5 mm. Petals 5, spreading, oblong-ovate, 2.0-3.5 × 1.7-2.5 mm, obtuse. Disk not distinct from the base of the calyx. Stamens 5, c. 1 mm long, inserted on the outer margin of the disk, filaments flat, 1 mm long, united in the lower half or near the base, anthers usually perpendicularly bent inward in bud. Pistil 1 mm long, partly immersed, ovary semi-globose, or conical. Fruits drupaceous, broadly pyriform or globose, sometimes obovoid, 2.5-5.0 × 2.0-4.5 cm, green or yellowish green. Seeds many, oblong-elliptic, 6-9 × 4-6 mm, flattened, obtuse at both ends. *Fl. & fr.*: 1-12. *Evergreen forests, Dipterocarp forests, rocky deciduous forests, along streams; up to 500 m altitude.*

**East Bengal:** Locality & date unknown, 1861-62, *W. Griffith*, 1995 (K000687035). **Rangamati:** Rampahar, Kaptai National Park, Kaptai, 20 iv 2006, *S.N. Uddin*, N-2824 (DACB 34024); 18 x 2003, *S.N. Uddin*, N-2114 (DACB 33486); Mainimukh, Kasalong Reserve, 14 xi 1934, C.E. Parkinson, 4259 (CAL).

Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand and Vietnam.

The wood is used for making boxes, furniture, agricultural tools and other household utensils. It is also used as firewood. Wildlife eats fruits.

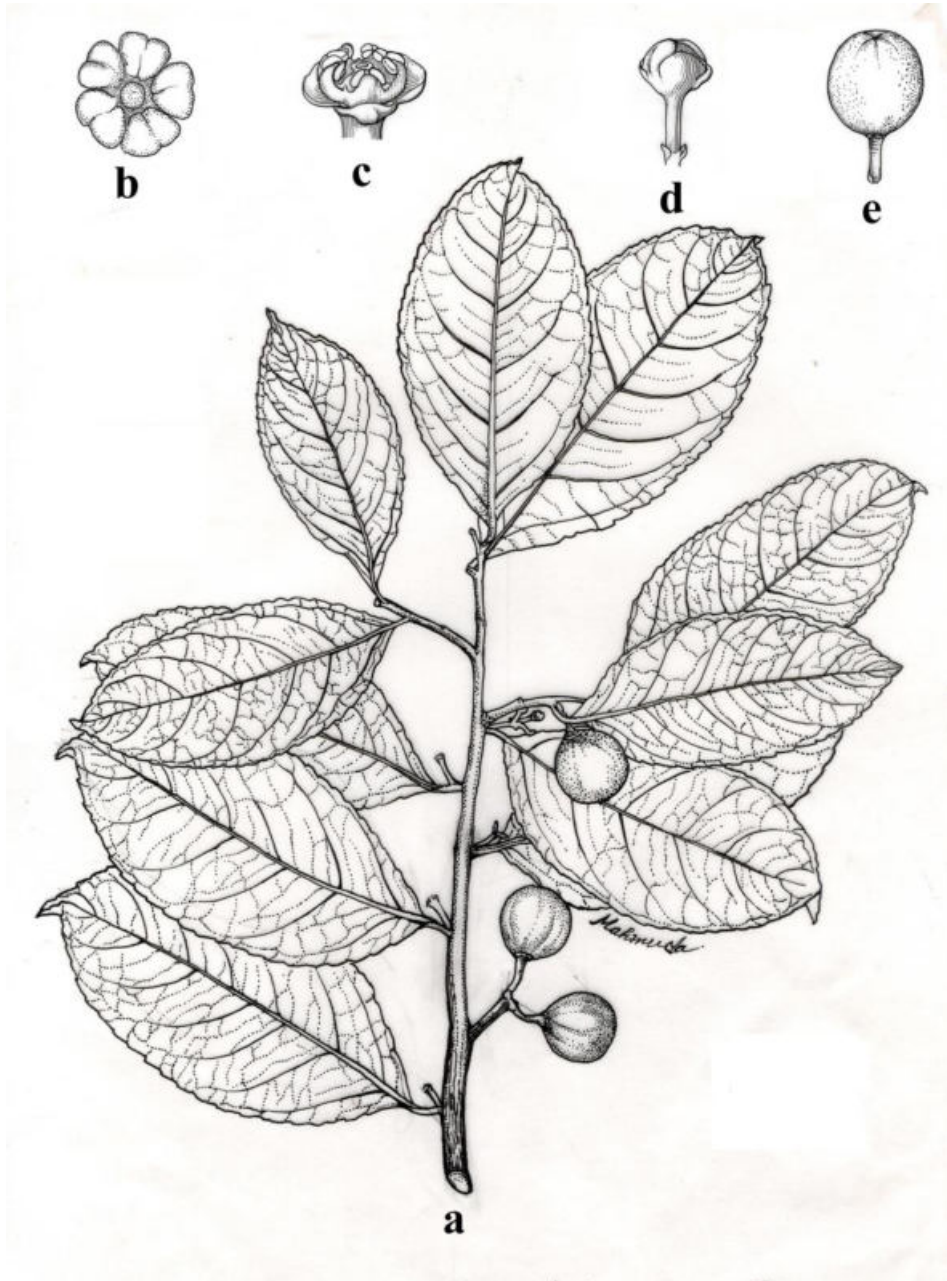


Figure 20: *Siphonodon celastrineus* Griff.: a) Fruiting shoot; b) flower; c) open flower; d) flowering bud; and e) fruit.

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