

# **FLORA OF BANGLADESH**

**NO. 81**

## **STERCULIACEAE**

EDITOR

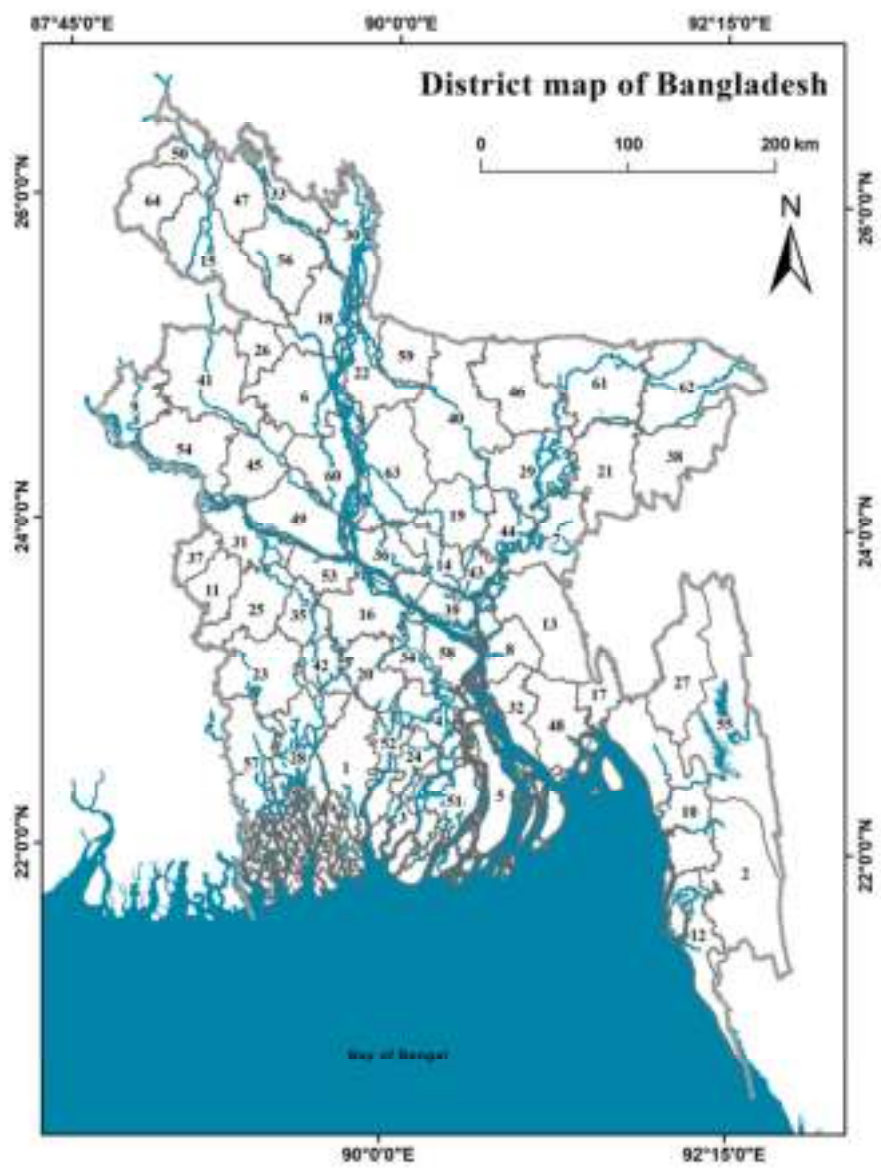
**SARDER NASIR UDDIN**

June 2022

By

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**BANGLADESH NATIONAL HERBARIUM**  
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH



### **List of Districts**

The serial numbers correspond to those given in the map.

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

## LIST OF FAMILIES PUBLISHED

	Fl. No.		Fl. No.		Fl. No.
Acoraceae	67	Dichapetalaceae	23	Phytolaccaceae	1
Aizoaceae	34	Dilleniaceae	56	Plumbaginaceae	42
Alangiaceae	68	Dipterocarpaceae	25	Polemoniaceae	2
Annonaceae	52	Elatinaceae	39	Pontederiaceae	24
Araceae	75	Flagellariaceae	3	Potamogetonaceae	40
Aristolochiaceae	78	Fumariaceae	3	Punicaceae	22
Asclepiadaceae	48	Gesneriaceae	65	Rhamnaceae	61
Averrhoaceae	18	Haloragaceae	8	Rhizophoraceae	7
Avicenniaceae	31	Hydrocharitaceae	28	Ruppiaceae	19
Basellaceae	2	Hydrocotylaceae	44	Rutaceae	80
Bignoniaceae	70	Hydrophyllaceae	1	Sabiaceae	62
Bixaceae	35	Juncaceae	29	Salicaceae	20
Boraginaceae	77	Lamiaceae	58	Sapindaceae	59
Bromeliaceae	74	Linaceae	26	Solanaceae	53
Buddlejaceae	13	Lecythidaceae	60	Sonneratiaceae	12
Burmanniaceae	38	Loranthaceae	33	Sphenocleaceae	5
Burseraceae	36	Martyniaceae	1	Stemonaceae	41
Butomaceae	2	Malvaceae	54	Sterculiaceae	81
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Cassythaceae	43	Molluginaceae	17	Tropaeolaceae	3
Casuarinaceae	1	Moringaceae	2	Turneraceae	3
Celastraceae	79	Nymphaeaceae	9	Typhaceae	69
Ceratophyllaceae	10	Ochnaceae	3	Urticaceae	66
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Costaceae	45	Pedaliaceae	2	Zygophyllaceae	16
Cuscutaceae	55	Periplocaceae	47		

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## STERCULIACEAE Bartling

**Mahbuba Sultana, Mohammad Sayedur Rahman and Ahmed Saqee**

Trees or shrubs, sometimes climbing or lianas or herbs, usually with stellate hairs or scales, inner bark fibrous, wood soft, mucilaginous. Leaves alternate, simple, palmate or digitately compound, alternate or spirally arranged; stipules mostly caducous, rarely absent. Flowers unisexual or bisexual or polygamous, 3-5 merous, actinomorphic or rarely zygomorphic. Sepals 3-5, valvate, partly connate below or rarely free. Petals 5 or absent, contorted or imbricate in bud, free or sometimes adnate below to staminal column, often persistent. Stamens many, free or connate in a column or narrow tube, sometimes with staminodes; anthers 2-locular, longitudinally dehiscent, rarely by terminal pores. Carpels usually 5, few or up to 12, syncarpous or sometimes partly to completely apocarpous; ovary superior, sessile or stipitate, locule as many as carpels; ovules 2-many in each locule; styles and stigmas one or as many as carpels. Fruit a capsule or follicle, dehiscent or indehiscent, winged or wingless, fleshy to leathery or even woody, often separating into mericarps. Seeds sometimes arillate, winged or not, albumen fleshy or scanty or absent, embryo curved or straight, endosperm starchy or oily.

About 68 genera and c. 1100 species distributed in tropics and subtropics of both hemispheres, a few in temperate regions also (Ya *et al.*, 2007). In Bangladesh, the family is represented by 16 genera and 34 species.

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**Abbreviations used in the text**

ASSAM=Botanical Survey of India, Eastern Regional Centre, Shillong

BM = British Museum Herbarium

BCSIR= Bangladesh Council of Scientific and Industrial Research Herbarium

BFRI = Bangladesh Forest Research Institute Herbarium

CAL = Central National Herbarium, Kolkata

CUH= Chittagong University Herbarium

DACB = Bangladesh National Herbarium

DUSH = Dhaka University Salar Khan Herbarium

E = The Royal Botanic Garden, Edinburgh

JUH = Jahangirnagar University Herbarium

K = The Royal Botanic Gardens Kew



**KEY TO THE GENERA**

1.	Plants lianas or climbers	<b>Byttneria</b>
+	Plants erect	<b>2</b>
2.	Flowers unisexual or polygamous; petals absent	<b>3</b>
+	Flowers bisexual; petals present	<b>10</b>
3.	Leaves with scaly beneth; fruit samara	<b>Heritiera</b>
+	Leaves without scaly beneth; fruit follicular	<b>4</b>
4.	Follicles opening long before maturity	<b>Firmiana</b>
+	Follicles not opening before maturity	<b>5</b>
5.	Follicles membranous; usually one-seeded	<b>Scaphium</b>
+	Follicles coriaceous or woody; many-seeded	<b>6</b>
6.	Seeds winged	<b>Pterygota</b>
+	Seeds not winged	<b>Sterculia</b>
7.	Ovary on androgynophore	<b>8</b>
+	Ovary sessile	<b>10</b>
8.	Seeds winged	<b>Pterospermum</b>
+	Seeds not winged	<b>9</b>
9.	Capsule membranous, inflated; each locule 1-2 ovuled	<b>Kleinhovia</b>
+	Capsule more or less woody, never membranous, not inflated; each locule many ovuled	<b>Helicteres</b>
10.	Flowers with staminodes	<b>11</b>
+	Flowers without staminodes	<b>15</b>
11.	Fruit flashy, indehiscent	<b>Theobroma</b>
+	Fruit not fleshy, dehiscent	<b>12</b>
12.	Capsule 5-winged	<b>Abroma</b>
+	Capsule without wing	<b>13</b>
13.	Petals with hooded claw	<b>Guazuma</b>
+	Petals without hooded claw	<b>14</b>
14.	Herbs; flowers usually solitary; capsule globose-subglobose	<b>Pentapetes</b>
+	Trees or shrubs; flowers rarely solitary; capsule ovate-oblong	<b>Dombeya</b>
15.	Capsule 5-celled; styles 5; stigma slightly thickened	<b>Melochia</b>
+	Capsule 1-celled; style 1; stigma fimbriate	<b>Waltheria</b>

**Abroma** Jacq., Hort. Vind. 3: t. 1. 1776.

Type species: *Abroma fastuosum* N.J. Jaquin, *nom. Illg.* [*Abroma augusta* (L.) L.f.]

Shrubs or small trees, usually stellate hairy. Leaves simple, cordate, lobed, sometimes angled, margin slightly serrate to entire. Flowers bisexual, few-flowered cymes, opposite to leaves. Sepals 5, free or connate at base. Petals 5, purplish, free, concave below, prolonged above into a large spoon shaped lamina. Stamens 10, 5 groups of anthers alternating with staminodes, fertile filaments opposite to petals, shorter than staminodes; anthers 2-lobed, extrorse. Ovary sessile, pyramidal, 5-locular, each locule with many ovules; styles simple; stigmas 5-lobed. Fruit a capsule, membranous, 5-angled, longitudinally 5-winged, truncate at apex, valves villous at edges. Seeds numerous, endospermous, wingless.

**Abroma augusta** (L.) L.f., Suppl. Pl. 341. 1782; M.J. Mast. in Hook.f., Fl. Brit. India 1(2): 375. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 190. 1903 (Indian reprint 1963); Brandis, Indian Trees: 89. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 409. 1993; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 156. 1934; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 329. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 65. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 406. 2018. *Abroma alatum* Blanco, Fl. Filip. [F.M. Blanco] 605. 1837. *Abroma angulatum* Lam., Encycl. 1(1): 126. 1783. *Abroma angulosum* Poir., Encycl. Suppl. 1. 322. 1810. *Abroma communis* Blanco, Fl. Filip. 606. 1837. *Abroma denticulatum* Miq., Pl. Jungh. 3: 288. 1854. *Abroma elongata* Lam., Encycl. 1: 127. 1783. *Abroma fastuosa* R. Br., Hortus Kew. 4: 409. 1812. *Abroma javanica* Miq., Fl. Ned. Ind. 1(2): 183. 1859. *Abroma mariae* Mart., Denkschr. Königl.-Baier. Bot. Ges. Regensburg 3: 297. 1841. *Abroma mollis* DC., Prodr. 1: 485. 1824. *Abroma sinuosa* G. Nicholson, Dict. Gard. 4: 482. 1888. *Abroma wheleri* Retz., Observ. Bot. 5: 27. 1788. *Ambroma augustum* (L.) L.f., Suppl. Pl. 341. 1781. *Theobroma augusta* L., Sys. Veg. ed.13, 2: 570. 1783. *Theobroma augustum* L., Syst. Nat., ed. 12, 3: 233. 1768. **Fig. 1.**

Bengali: *Gach chola* (Chakma), *Tambol*, *Ulatkambal* English: Devil's Cotton

Shrubs to small trees, up to 5 m high. Stems with downy branch, densely stellate velutinous when young. Leaves spirally arranged or distichous; blades palmately 3-5-lobed or simple lanceolate, 10-25 × 08-20 cm, repand-denticulate, base 3-7 nerved, cordate, upper leaves smaller, narrower, entire, glabrescent above, tomentose beneath, tip acute or acuminate; petioles 5.0-7.5 cm long; stipules linear, deciduous, as long as the petioles. Inflorescence leaf-opposed or terminal 1(-4)-flowered cymes; peduncle and pedicel up to 3.5 cm long; small bract; bracteoles 2. Flowers bisexual, 5-merous, 3-6 cm

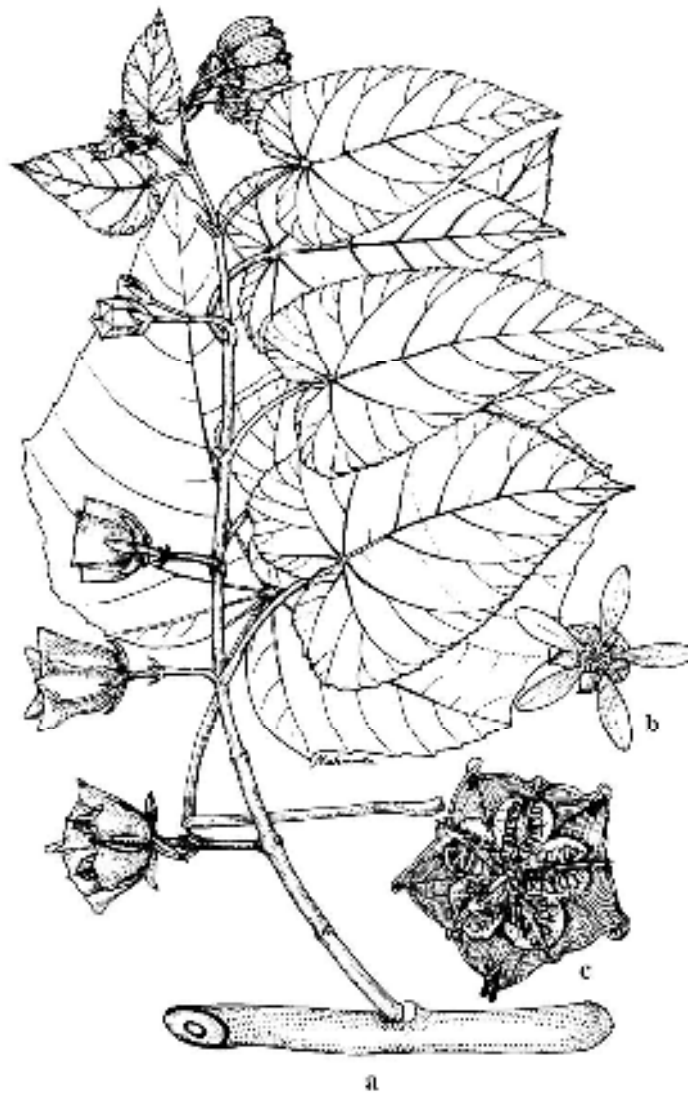


Figure 1: *Abroma augusta* (L.) L.f.: a) Fertile shoot; b) flower; and c) fruit.

in diameter, dark red, pendulous. Sepals 5, lobes triangular, 2-3 cm long, entire, green. Petals 5, imbricate, spoon-shaped, 2.0-3.5 cm long, base concave, white, dark purple, red or yellow, margin ciliate, caducous. Stamens connate in a cupular column, staminodes 5, petal-like, opposite to sepals, hairy, fertile filaments with 2-lobbed diverging anthers. Ovary sessile, slightly hairy, 5-loculed with many ovules in each locule. Fruit obconical, membranous capsules, about 4-5 × 3-4 cm, base rounded, top truncate, 5-winged and angled, sometimes beaked and enveloped by slightly enlarged, densely prickly calyx, stellate hairy, dehiscing septically. Seeds numerous, blackish, small, cylindrical to

obovoid, 3-4 × c. 2 mm, without wings or aril, enveloped in light cottony wool. 2n = 16, 20, 22 (Fedorov, 1969). *Fl. & fr.*: 6-12. *Grows in all type of soil condition, prefers hot and moist climate.*

**Chapainawbganj:** Rahanpur on river bank, 02 ix 2002, *Rezia et al.*, 3705 (DACB 31143). **Chattogram:** Specific locality & date unknown, *J.M. Cowan*, 179 (E); Rangapani, 30 x 1978, *Huq et al.*, H-4005 (DACB 25799); Betbunia, 8 viii 1989, *Huq et al.*, H-9320 (DACB 14284); Kalapani chora, Hazarikhil, 20 viii 2014, *S.N.Uddin*, N-5493 (DACB 42462); Kumari Khal, Sarkerhat, Hathazari, 23 xi 2016, *Tajul et al.*, TOK-2035 (DACB 54985); Mithaichara, Hathazari, 24 xi 2016, *Tajul et al.*, TOK-2194 (DACB 49693); Khoiyachara, Mirsharai, 25 x 2017, *Moniruzzaman et al.*, MAK-6202 (DACB 54973); Mithaichara, Hathazari, 09 v 2017, *Tajul et al.*, TAK-4698 (DACB 54986); Fatehpur, Hathazari, 10 v 2017, *Tajul et al.*, TAK-4831 (DACB 61144); Mithaichara, Fatehpur, 01 iii 2017, *A. Arif*, AA-350 (DACB); Khoiyachara, Mirshorai, 20 xii 2017, *Moniruzzaman et al.*, MAK-6986 (DACB 54977); Hazarikhil, Fatikchari, 03 iii 2017, *M. Mannan*, M-003 (DACB 54982); Mithaichara, Fatehpur, 14 xi 2017, *Moniruzzaman et al.*, MAK-6367 (DACB 54980); Hazarikhil, Fatikchari, 07 xi 2017, *Moniruzzaman et al.*, MAK-6261 (54981); Kumarikhal, Sarker Haat, 17 iii 2017, *Elias*, E-483 (DACB 54976); Kalapani chora, Hazarikhil, Fatikchari, 22 v 2017, *Tajul et al.*, TAK-5117 (DACB 54979); Hazarikhil, 02 iv 2017, KR- 227 (DACB 53890); BCSIR Lab Campus, 01 vi 2002, *M Yusuf*, 1509 (BCSIR); Baluchhar, Hathazari, 22 viii 1999, *M.A. Rahman et al.*, 5283 (CUH); Mithachara, Hathazari, 02 ix 1999, *M.A. Rahman et al.*, 5470 (CUH); Narenchari, Sangachari, Kotoali, 13 vii 1997, *M.A. Rahman & A. Khisha*, 1540; Gondhamara, Dhopachari, 24 vii 1999, *M.A. Rahman et al.*, 5137 (CUH). **Cox's Bazar:** Rajarkul Botanical Garden, Ramu, 17 i 2017, *Niyamul et al.*, NK-2471 (DACB 54978); Thakurpara, Gurkhghata, 10 ix 1992, *E. Rahman & M.A. Rahman*, 063 (CUH). **Dhaka:** Green Road, 12 xi 1981, *Mia et al.*, M-680 (DACB 14165); Baduar Bazar, 20 vii 1977, *M. Rahman* 587 (DACB 14168); BNH Campus, 20 i 2004, *B.M. Rezia Khatun*, 4644 (DACB 30999). **Dinajpur:** Jagathdal, Birganj, 27 viii 1998, *Mia et al.*, M-4380 (DACB 28798). **Faridpur:** Gualanda Ghat, 01 vii 1973, *A.M. Huq*, H-982 (DACB 16167); Near Gualanda Ghat, 01 vii 1973, *A.M. Huq*, H-982 (DACB 14166). **Jamalpur:** Tulsipur, 18 xi 2019, *K. Fatema*, (DACB 55783). **Khagrachhari:** Khagrapur Chora, Khagrachhari Sadar, 30 viii 2016, *Kowser et al.*, 188 (DACB 54975); Dighinala, 13 viii 2008, *Bushra*, B-1003 (DACB 34287). **Kishoreganj:** Akhra Bari, 13 i 1979, *M. Halim*, 340 (DACB 14163); Gojadia, Karimganj Upazila, 12 xi 1993, *S.R. Basak.*, 0845 (BFRIH). **Manikganj:** Taraghat Village, 06 vi 1978, *D.D Soejarto & M. Rahman*, 4976 (DACB 14164). **Moulvibazar:** Madhabkunda Eco Park, 28 iii 2016, *N. Rahman*, 129 (DACB 46381). **Natore:** Khandi Bhita, 08 x 1990, *M.K. Guha*, 6804 (BFRIH). **Pabna:** Madhupur, 27 iii 1978, *M.H. Rahman*, 013 (DACB 14169).

**Rangamati:** Pharus Reserve Forest, Bilaichari, 15 x 2008, *S.N. Uddin et al.*, 3096 (DACB 33269); Kaptai Mukhbit Reserve Forest, 04 x 2016, *Joyanta et al.*, JKS-788 (DACB 54972); Rampahar, Kaptai, 20 v 2000, *M.A. Rahman*, 6114 (CUH); Kenghrachhari, Kaptai, 04 ix 1999, *M.A. Rahman et al.*, 5609 (CUH). **Sirajganj:** Chwodicona, Raiganj, 20 iv 1994, *S.R. Basak et al.*, 0749 (BFRIH). **Sylhet:** Specific locality & date unknown, Wall., 1142 (K).

Africa, Australia, Belgium, Bhutan, Brazil, Cameroon, China, Congo, French Polynesia, India, Indonesia, Jamaica, Malaysia, Nigeria, Nepal, Pacific islands, Pakistan, Palau, Papua New Guinea, Philippines, Spain, Solomon Island, Thailand, United States of America and Vietnam.

Leaves, stem and root barks of this plant have shown antibacterial activity. The juice of leaves and stem bark is used in dysentery, weakness, burning urination and gonorrhoea. Fresh juice from root bark is useful in bronchitis, broncho-pneumonia, amenorrhoea, carbuncles, poisonous boils, sores and dysmenorrhoea. It regulates menstrual flow and acts as a uterine tonic. Homoeopathic medicine is also prepared from root bark of this plant (Ghani, 2003). The fibre is utilized for clothing, making bags, hunting-nets and rope.

**Byttneria** Loefl., *Iter. Hisp.*: 313. 1758.

Type species: *Byttneria scabra* L.

Usually climbers or herbs or shrubs, prickly. Leaves simple, alternate, lobed or entire, dented or serrate, petiolate. Flowers bisexual, minute, in much branched axillary or terminal umbellate cymes. Sepals 5, free or connate at base. Petals 5, hooded, with a narrow claw at base, limb long, more or less adnate to staminode, strap-shaped, appendages 2-fid. Stamens 5, free above, connate below into a membranous tube, opposite to petals, staminodes 5, opposite to sepals; anthers 2-3 locular, reniform, extrorse. Ovary small, sessile, 5-locular, each locule with 2 ovules; styles simple or 5-lobed. Capsules globose, spiny, or prickly, septicidally 5-valved, valves breaking away from central column. Seeds wingless, solitary, exalbuminous; cotyledons folded.

#### KEY TO THE SPECIES

- |   |                  |
|---|------------------|
| 1. Leaves entire, glabrescent above and puberulous on nerves beneath; capsule prickly | <b>B. aspera</b> |
| + Leaves serrate-dentate, puberulous on both surfaces; capsule bristly                | <b>B. pilosa</b> |

**Byttneria aspera** Collebr. ex Wall., Fl. Ind. 2: 383. 1824. M.J. Mast. in Hook.f., Fl. Brit. India 1(2): 377. 1874 (Reprint 1961) as '*Buettneria*'; Prain, Beng. Pl. 1: 191. 1903 (Indian reprint 1963); Brandis, Indian Trees: 89. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 160. 1934. Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 330. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 66. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 407. 2018. *Byttneria grandifolia* DC., Prodr. [A. P. de Candolle] 1: 486. 1824; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 410. 1993. *Byttneria integrifolia* Lace, Bull. Misc. Inform. Kew 1915, 9: 396. 1915. *Byttneria nepalensis* Turcz., Bull. Soc. Imp. Naturalistes Moscou 31(1): 207. 1858. *Byttneria siamensis* Craib, Bull. Misc. Inform. Kew 1920, 9: 300. 1920. *Commersonia aspera* G.Don, Gen. Hist. 1: 523. 1831. **Fig. 2.**

Bengali: *Grandilata*, *Nilbhutta* (Tanchangya), *Uddum bet* English: Climbing Byttneria

Woody climbers or scandent shrubs. Stem longitudinally or spirally close furrowed, sparsely stellate hairy when young. Leaves simple, suborbicular or broadly ovate-oblong or cordate, 10-18 × 5-15 cm, base cordate, apex cuspidate or abruptly acuminate, margin entire, glabrescent and shining above, puberulous on nerves beneath, 5-7 nerved at base; petioles 5-13 cm long, grooved, puberulous; stipules 8-12 mm long, linear-lanceolate, early caducous. Inflorescence much-branched axillary umbellate cymes; pedicels slender; bracts and bracteoles subulate. Flowers reddish, minute, 4-6 mm across. Sepals 5, lanceolate, 4-5 mm long, connate below, hairy on both surfaces. Petals 5, 4-5 mm long, claw concave, limb 2-fid. Stamens and staminodes united at base by a cup-like membrane, anthers 2-lobed, extrorse. Ovary sessile, 5-locular; styles entire or 5-fid; ovules 2 in each locule. Fruit a capsule, woody, globose, 2-4 cm diameter, armed, septically 5-valved, with persistent central column. Seeds black, ovate-oblong, triangular, c. 5 × 3 mm, one in each chamber. *Fl. & fr.*: 4-12. *Evergreen and mixed evergreen forests and thickets.*

**Bandarban:** Thanapara, Ruma, 10 v 2018, *K.K. Islam*, KKI-2785 (DACB 47349); Maurchara, Poly Forest Range, Ruma, 25 i 2017, *KKI-1013* (DACB 47248). **Chattogram:** Chunati W.L. Sanctuary, Napora, Lohagara Upazila, 30 xii 1989, *Khan et al.*, K-8183 (BFRIH); BCSIR Campus, Baluchara, 21 iv 1987, *M. Yusuf*, 5797 (BFRIH); Kalapani, Hazarikhil Wildlife Sanctuary, 19 viii 2014, *S.N.Uddin*, N-5468 (DACB 42386); Chunati Wildlife Sanctuary, Noapara, 30 xii 1989, *Khan et al.*, K-8188 (12462); South West of Hazarikhil, 31 xi 1978, *Huq et al.*, H-4115 (DACB 24102); Samachari, Dupachari, Rangunia, 04 vi 1998, *M.A. Rahman et al.*, 3081 (DACB 28961); Samchhari, Dhopachhari, 07 x 1998, *M.S. Khan et al.*, K-3505 (CUH). **Cox's Bazar:** Bomeriaghona Eidgaon, 16 v 1999, *M.A. Rahman et al.*, 4904 (CUH); Tulabagan,

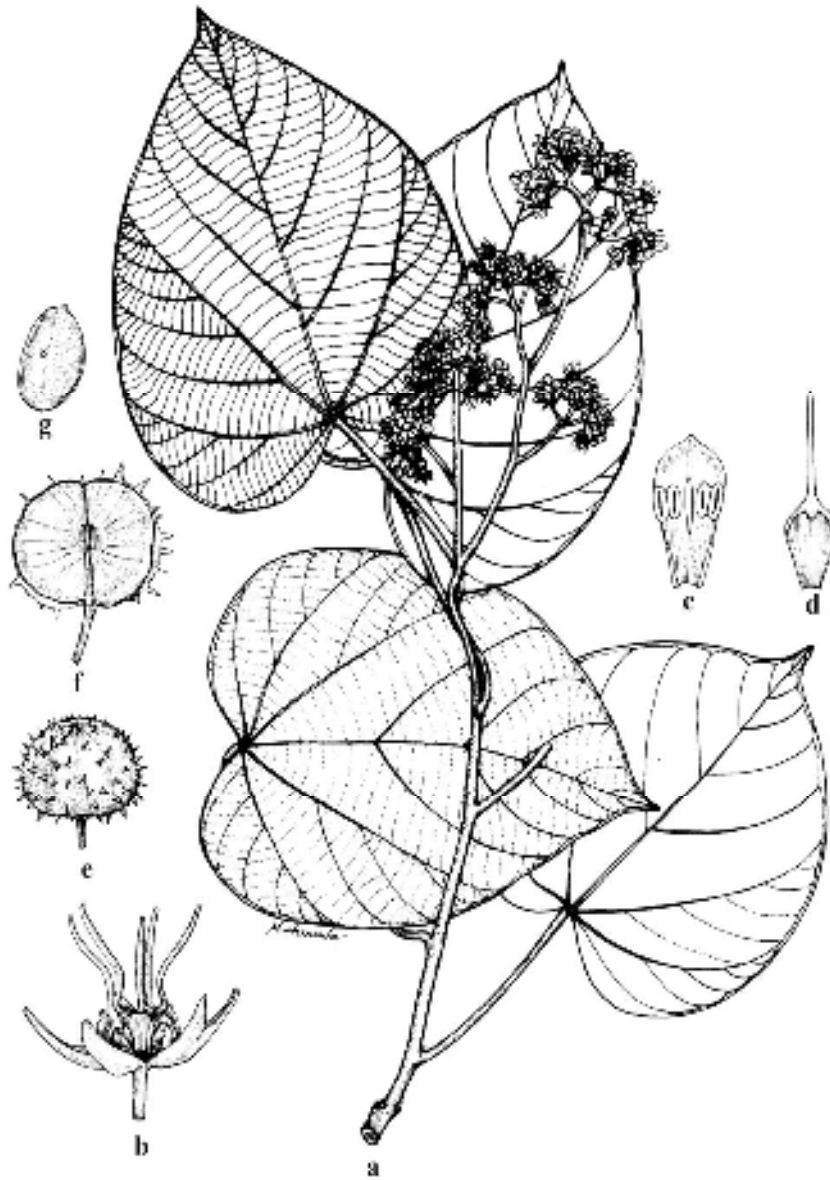


Figure 2. *Byttneria aspera* Collebr. ex Wall.: a) Flowering shoot; b) flower; c) stamens & staminodes; d) petal; e) fruit; f) LS of fruit; and g) seed.

Panerchhara, 30 i 1999, *M.K. Huda et al.*, 269 (CUH); Thaing Khali, Ukhia, 04 v 2017, *Niyamul et al.*, NK-4254 (DACB 60215). **Khagrachhari:** Kassalong Reserve Forest, Bagaichari, 01 v 2017, *Kowser et al.*, KH-4662 (DACB 54933). **Moulvibazar:** Dalua Chara, Admapur, Rajkandi Range, Kamalganj, 12 ix 2012, *S.N. Uddin*, N-5027 (DACB 45591); Adampur, Kamalganj, 19 v 2014, *S.N. Uddin*, N-5197 (DACB 43520). **Rangamati:** Sitapahar, Kaptai, 03 ix 1999, *M.A. Rahman et al.*, 5592 (CUH); Jaingachara, Choto Horina, Barkal, 09 xii 2015, *K.K. Islam*, KKI-1928 (DACB 46278).

Bhutan, Cambodia, China, India, Indonesia, Laos, Nepal, Thailand and Vietnam.

Macerated young parts and barks are used by ethnic women to wash hair (Kanjilal *et al.*, 1934). A paste made with the leaves, stems and root of the plant is applied to the forehead to treatment of fever, headache, boils, cut & wounds. Sap of stem is used in stomatitis.

**Byttneria pilosa** Roxb., Fl. Ind. 2: 381. 1824. M.J.Mast. in Hook.f., Fl. Brit. India 1: 377. 1874 (Reprint 1961) as '*Buettneria*'; Prain, Beng. Pl. 1: 192. 1903 (Indian reprint 1963); Brandis, Indian Trees: 89. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 160. 1934; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 414. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 331. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 66. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 408. 2018. *Byttneria elegans* Ridl., J. Straits Branch Roy. Asiat. Soc. 57: 25. 1911. *Chaetaea pilosa* (Roxb.) Adelb., in Backer, Beknopte Fl. Java, Afl. ivb. Fam. 107, 11. 1944, in clavi. *Commersonia pilosa* G.Don, Gen. Hist. 2: 524. 1832. *Byttneria pilosa* var. *pellita* Gagnep., Fl. Indo-Chine 1: 517. 1910. **Fig. 3.**

Bengali: *Dumuchuk*, *Harbanga lata*, *Harjora lata*, *Jumi*, *Ludisola* (Chakma)

Large woody climbers or scandent shrubs. Branchlets dark brown when dry, grooved, hispid with spreading hairs or sparsely stellate-hairs. Leaves simple; leaf blade orbicular or cordate, usually palmately 3-5-lobed, 8-18 × 5-12 cm, base cordate, apex obtuse or acute, margin serrulate, yellowish brown stellate-pilose on both surfaces, 5-7 main nerves from leaf base; petioles 12-18 cm long, shaggy tomentose; stipules linear, c. 14 mm, caducous. Inflorescence in much-branched axillary umbellate cymes; pedicels slender; bracts and bracteoles subulate. Flowers pale yellow, minute, 4-6 mm across. Sepals 5, calyx cup-shaped, c. 3 mm long, connate below, abaxially hairy, adaxially glabrous. Petals 4-lobed, lobes obtuse, 4-5 × 1-2 mm, yellow, incurved, claw concave and long strap-like, limb 2-fid. Stamens and staminodes united at base by a cup-like



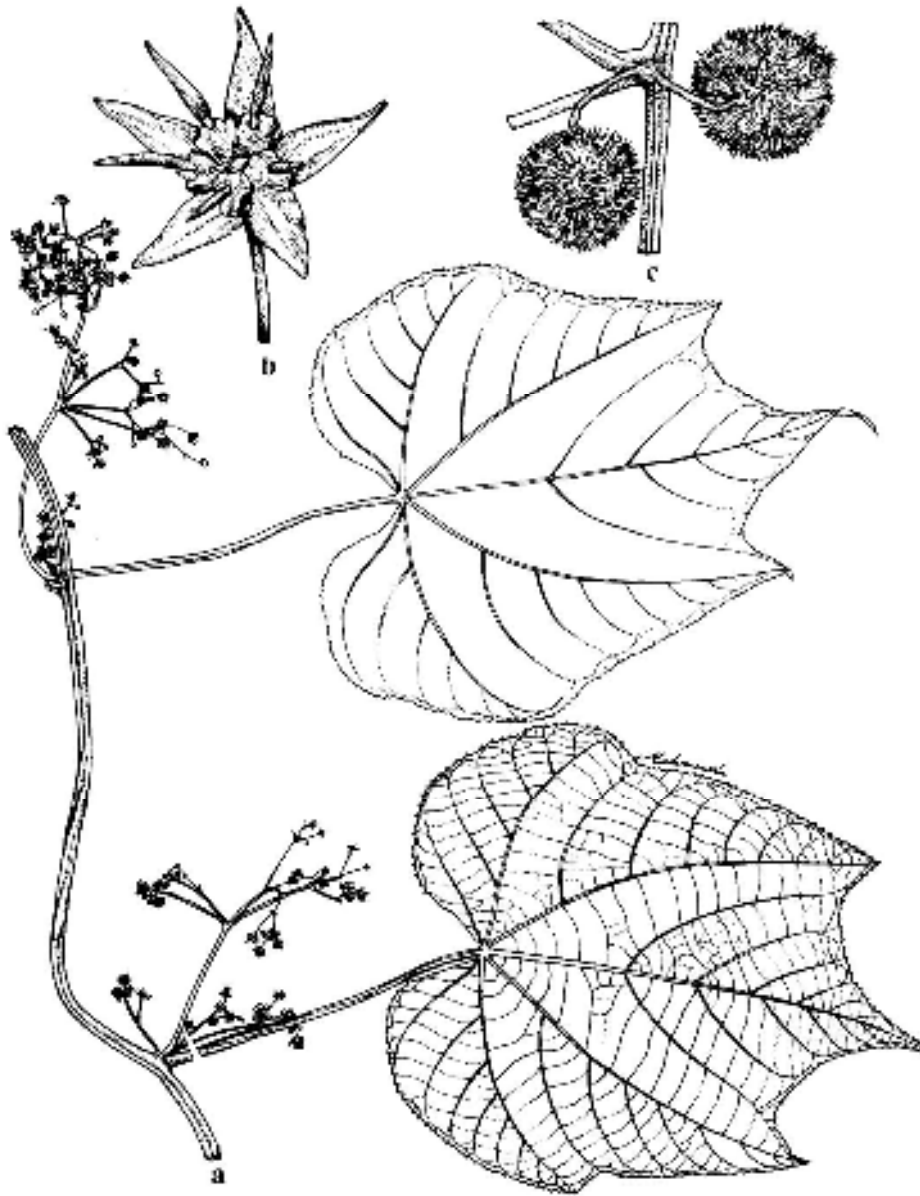


Figure 3. *Byttneria pilosa* Roxb.: a) Flowering shoot; b) flower; and c) fruits.

membrane, anthers 2-lobed, lobes extrorse. Ovary globose, 5-locular, verrucose, styles entire or 5-fid, ovules 2 in each locule, stigma 8-12 lobed, revolute. Fruit a globose capsule, 2.0-2.5 cm across, woody, septicidally 5-valved, with persistent central column, densely spiny, spines branched and soft, 4-6 mm long. Seeds yellow with brown mottling, ellipsoid to ovoid, 5-6 × 2-3 mm. *Fl. & fr.*: 9-3. *Evergreen and mixed forest margins and thickets; up to 1000 m altitude.*

**Bandarban:** Specific locality unknown, 29 ii 1868, *C.B. Clarke*, 6591 (K); Thanapara, Ruma, 24 i 2017, *K.K. Islam*, *KKI-846* (DACB 47266); Chimbuk hills, 26 xi 1983, *Khan et al.*, K-6465 (DACB 13174); Chimbuk hills, 08 ix 1999, *M.A. Rahman et al.*, 5767 (CUH); Youngcha, Lama, 29 ix 2017, *U.A. Marma*, UAM-38 (DACB 54916); Mourchara, Ruma, 14 xi 2017, *K.K. Islam*, *KKI-1711* (DACB 47679); Ruma Bazar, 28 x 1984, *Khan et al.*, K-6723 (DACB 14180); Lama, 04 xii 1997, *M.A. Rahman et al.*, 2429 (CUH). **Chattogram:** Specific locality unknown, 1886, Dr. King's collector, 254 (CAL 60349); Jaldi Range, 13 x 1920, *J.M. Cowan*, 112 (E); Jaldi Range, 10 xii 1920, *J.M. Cowan*, 1672 (E); Barharcherry, 4 ii 1873, *C.B. Clarke*, 19584 A (BM); Jaldi Range, Jaldi Reserve, 31 xii 1989, *Khan et al.*, K-8243 (BFRIH); Pahartali Lake, 27 x 1967, SK Das, (BFRIH); Sitakundu, 12 iii 1968, *M.A.R. Laskar*, 88 (DUSH); Islam Tae state, 20 x 1969, *Mohammad*, 245 (BCSIR); Hazarikhil, Sitakund, 24 i 1968, *M.A. Hossain*, 96 (DUSH); Potia, 30 x 1975, *Taher et al.*, 127 (BFRI); Chunati Beat, 27 xii 1988, *Khan et al.*, K-8009 (BCSIR); Khaiyachara, Mirsorai, 05 i 2017, *Kowser et al.*, KH-2627 (DACB 49896); Bariadhala to Hazarikhil, 28 x 1978, *Huq et al.*, H-3897 (DACB 13176); Chunati W.L. Sanctuary, 07 x 1989, *Khan et al.*, K-8073 (DACB 14185); Chunati, 13 x 1998, *M.A. Rahman et al.*, 3717 (CUH); Pritilata Hall, CU Campus, 07 i 2011, *M.A. Rahman et al.*, 7746 (CUH); Khorer Haat, Mirsharai, 06 i 2017, *Kowser et al.*, KH-2758 (DACB 54926); Khaiyachara, Mirsharai, 29 xii 2017, MAK-6952 (DACB 54927); Haidgaong, Potia, 25 xii 2017, *Moniruzzaman et al.*, MAK-7036 (DACB 54951); Brohmma Para, Dopacharai, Chandanaish, 08 i 2018, *Moniruzzaman et al.*, MAK-7069 (DACB 54924); Bhujpur, Hazarikhil, Fatikchari, 22 i 2018, *Moniruzzaman et al.*, MAK-7300 (DACB 54923); Hazarikhil, Fatikchari, 07 ii 2017, *Moniruzzaman et al.*, MAK-6255 (DACB 54934); Dudhpukuria, Rangunia, 08 i 2017, *Tajul et al.*, TOK-2851 (DACB 54928); Komolachari, Rangunia, 09 i 2017, *Tajul et al.*, TOK-2923 (DACB 54921); Hazarikhil, Fatikchari, 25 xii 2016, *Tajul et al.*, TOK-2460, (DACB 54919); Kumari Khal, Sarkarhat, Haathazari, 23 xi, 2016, TOK-2014 (DACB 54920); Baganbazar, Fatikchari, 14 iii 2017, TOK-4043 (DACB 54918); Chunati Beat, 27 xii 1988, *Khan et al.*, K-8009 (DACB 14179); Chunati, Lohagara, 14 x 2011, *M.A. Rahman et al.*, 9459 (CUH); Bashkhali Eco Park, Anowara, 29 i 2018, *Moniruzzaman et al.*, MAK-7398 (DACB 54912); Jaliashia Pahar, Dhopachari, Chandanaish, 18 iii 2018, *Moniruzzaman et al.*, MAK-7983 (DACB 54911); Baraiyadhala, Shitakundo, 05 ii 2018,

*Moniruzzaman et al.*, MAK-7482 (DACB 54913); Kumira, Sitakundo, 31 i 2017, *Tajul et al.*, TOK-3587 (DACB 54917); Chanranath Hill, Sitakunda, 15 xi 1998, *C.K. Dey et al.*, (DACB 29312); Bariyadhala, Hazarikhil, 30 xi 1999, *Khan et al.*, K-10128 (DACB 30403); Karerhaat Range, Tulatuli, 05 x 1970, *Khan & Huq*, K-1975 (DACB 14173); Chandranth Hill, Sitakunda, 23 x 1985, *Khan & Mia*, K-7248 (DACB 14184); Bariyadhala, Hazarikhil, 29 x 1987, *Huq & Mia*, H-8579 (DACB 14189); Hazarikhil, 02 x 1995, *M.A. Rahman et al.*, 127 (CUH); Jaldi Range, Jaldi R. Forest, 31 xii 1989, *Khan et al.*, K-8243 (DACB 14192); Chamachari, Dopachhari, 07 x 1998, *M.A. Rahman et al.*, 3491 (CUH); Fatehpur, Hathazari, 24 xi 2017, *Moniruzzaman et al.*, MAK-6490 (DACB 54938); Dhupachari, Chandanaish, 08 ii 2017, *Kowser et al.*, KH-3340 (DACB 54939); Foyes Lake, 24 i 1973, *Khan & Huq*, K-2706 (DACB 14182); Andharmanik, Rawjan, 04 x 2017, *Kowser et al.*, KH-5876 (DACB 54937); Hazarikhil, 30 x 1987, *Huq & Mia*, H-8593 (DACB 14190); Chnadranarth Hill, Sitakundo, 23 x 1985, *Khan & Mia*, K-7248 (DACB 14191); Chittagong University Campus, 19 i 1989, *Huq et al.*, H-8976 (DACB 14188); Barab Kundu, 27 x 1997, *M.A. Rahman et al.*, 2258 (CUH); Garampaina, Sitakundo, 05 xii 1999, *M.A. Rahman et al.*, 5979 (CUH); Bariyadhala, Sitakundo, 27 xi 2017, *Kowser et al.*, KH-6588 (DACB 54931); Mohamaya, Mirsora, 27 ii 2017, *Kowser et al.*, KH-3807 (DACB 54930); Haidong, Potiya, 15 ii 2017, *Kowser et al.*, KH-3671 (DACB 54929). **Nichinta Pur**, 12 ii 1984, *S.K. Das* (BFRI). **Cox's Bazar**: Specific locality unknown, 22 x 1943, *J.Sinclair*, 3300 (CAL); Jadi Pahar, 28 xi 1957, *M.S. Khan*, K-289 (DUSH); Bangdeba, Joarinala, 10 i 2017, *Niyamul et al.*, NK-2282 (DACB 60214); Barbakia, Pekua, 09 ii 2017, *Kabir & Hasan*, 2755 (DACB 59672); Fasiakhali, Chakoria, 21 xi 2017, *Niyamul et al.*, NK-6444 (DACB 58609); Roikhong, Teknaf, 09 x 2017, *Niyamul et al.*, NK-5913 (DACB 58607); Baro Inani, 22 xii 1996, *Mia et al.*, M-3601 (DACB 38903). **Habiganj**: Satchori Forest, 27 v 1999, *Huq & Harun*, H-10614 (DACB 31004); Shayestagnj, 07 x 1979, *Khan & Mia*, K-5654 (DACB 14182); Satchari National Park, 04 xii 2009, *Kamrul*, 260 (DUSH). **Khagrachhari**: Nakaba, Ramgarh, 31 xii 1985, *Huq & Mia*, H-7329 (DACB 13178); Picachara, Hatimura, 28 x 1997, *M.A. Rahman et al.*, 2330 (CUH); Jugalchari R. Forest, Panchari, 19 ii 2017, *Kowser et al.*, KH-3717 (DACB 54922); Gomoti, Panchari, 23 iv 2011, *S.N. Uddin*, N-4585 (DACB 39952); Hazachara, Ramgarh, 14 xi 2016, *Kowser et al.*, KH-1815 (DACB 54943); Soduapara, Guimara, 23 xi 2016, *Kowser et al.*, KH-2498 (DACB 54947); Machalong R. Forest, Bagaihat, Bagaichari, 06 iv 2017, *Shuvo Chakma*, 5442 (DACB 54945). **Moulvibazar**: Lawachara National Park, 19 i 1963, *M.S. Khan*, K-467 (DUSH); Adampur Beat, Kamalganj, *S.N. Uddin*, N-4487 (DACB 35889). **Mymensingh**: Rougtia forest, 29 x 1972, *A.M. Huq*, H-449 (DACB 14171). **Rangamati**: Raikhali, 23 iii 1990, *S.K. Das*, 6292 (BFRIH); Sitapahar, Kaptai, 08 i 1996, *M. Huq*, 7383 (BFRIH); Kaptai, Tinconia road, 25 ix 1934, *Parkinson*, 4298 (K); Rampahar, Kaptai, 14 i 2001, *M A Rahman*, 6368 (CUH); Barkal Reserve Forest, 5 xii

2015, *K.K. Islam*, KKI-1840 (DACB 46346); Pharu R. Forest, 16 i 2019, *Bushra & Nasir*, B-1201 (DACB 33992); Sitapahar, Kaptai, 20 xii 2014, *S.N. Uddin*, N-2662 (DACB 37056); Baluchari, Rampahar, Kaptai, 18 x 2003, *S.N. Uddin*, 2109 (DACB 33406); Uluchhari Forest, Bilaichari, 09 x 2017, *Joyanta et al.*, JCR-6700 (DACB 54915); Jaingchara, Choto Horina, Barkal, 09 xii 2015, *K.K. Islam*, KKI- 1913 (DACB 46281); Jomchuk hill, Rangamati Sadar, 17 ii 2017, *K. Chakma*, 122 (DACB 54941). **Sherpur:** Gajni forest, 27 iv 1986, *Huq & Mia*, 7692 (DACB 14183). **Sylhet:** Specific locality & date unknown, *Wall.*, 1145 (K); Specific locality unknown, 9 x 1872, *C.B. Clarke*, 17422A (BM); Sylhet, October 1935, *C. S. Purkayastha*, 12433 (ASSAM).

Bhutan, China, India, Indonesia, Laos, Malaysia, Mongolia, Myanmar, Thailand, and Vietnam.

Leaf extract is applied to fractured bones and tender stem tied around the limb for healing (Habib 2009). The plant is also used for treatment of rheumatism, snake bite, syphilis, scabies and boils stop to bleeding.

**Dombeya** Cav., Diss. 3:121. 1787.

Type species: *Dombeya palmata* Cav.

Small trees or shrubs. Leaves simple, cordate, usually palmately lobed, spirally arranged, dented or serrate. Inflorescence axillary or terminal umbellate or helicoid cymes. Flowers 5-merous, bisexual, actinomorphic, crowded; bract 3, deciduous or absent. Sepals 5, free, united at base. Petals 5, persistent, free. Stamens 10-20, free or shortly united near base, strap-shaped staminodes 5, twice as long as stamens. Carpels 2-5, ovary sessile, ovoid, hairy, 2-5 loculed, each locule with 2-3 ovules; styles simple; stigmas with 3-5 segments. Fruit a capsule, loculicidally dehiscent, locules 1-2 seeded. Seeds endospermic.

#### KEY TO THE SPECIES

- |  |                     |
|--|---------------------|
| 1. Inflorescence hanging; peduncle more than 18 cm long; sepals linear-oblong; stigma exerted  | <b>D. wallichii</b> |
| + Inflorescence not hanging; peduncle less than 10 cm long; sepals lanceolate; stigma included | <b>D. burgesiae</b> |

**Dombeya burgesiae** Gerr. ex Harv. & Sond., Fl. Cap. (Harvey) 2: 590. 1862. *Dombeya mastersii* Hook.f., Bot. Mag. 93: t. 5639. 1867; Kanjilal *et al.*, Fl. Assam 1: 161. 1934; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. West Pakistan 99: 5. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 475. 1993; Habib in Ahmed *et al.*, Encycl. Fl.

Fauna Bangladesh 10: 332. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 67. 2012. *Assonia burgessiae* Kuntze, Revis. Gen. Pl. 1: 76. 1891. *Assonia calantha* Stuntz, Invent. Seeds U.S.D.A. Bur. Pl. Industr. 31: 85. 1914. *Assonia sparmannioides* Hiern, Cat. Afr. Pl. 1: 87. 1896. *Dombeya auriculata* K.Schum., Bot. Jahrb. Syst. 30(3-4): 352. 1901. *Dombeya burttii* Exell, J. Bot. 77: 165. 1939. *Dombeya calantha* K. Schum., Monogr. Afrik. Pflanzen-Fam. 5: 28. 1900. *Dombeya concinna* K.Schum., Monogr. Afrik. Pflanzen-Fam. 5: 29. 1900. *Dombeya dawei* Sprague, J. Linn. Soc., Bot. 37: 501. 1906. *Dombeya kindtiana* de Wild. *ex de Wild.* & T. Durand, Bull. Soc. Roy. Bot. Belgique 40: 14. 1901. *Dombeya velutina* de Wild. & Staner, Contr. Fl. Katanga Suppl. 4: 62. 1932. **Fig. 4.**

Bengali: *Domrupani, Sthalpadma*

English: Dombeya, Pink Wild Pear, Tropical Hydrangea

Shrubs or small trees, up to 8 m tall. Branches stout, longitudinally ridged with prominent leaf scars pubescent. Leaves broadly ovate, usually 3-5 lobed, 8-22 × 7-18 cm long, base deeply cordate, apex acute-acuminate, margins irregularly and unequally crenate to crenate-dentate, thinly pubescent above, velvety beneath, palmately 7-9 nerved; petioles 2-12 cm long, sparsely to densely pilose hairy; stipules broadly ovate-acuminate, narrowly oblong or lanceolate, 10-16 × 3-8 mm, base subcordate, pubescent to glabrescent. Inflorescence axillary, umbellate-cyme, 2-several-flowered; peduncles 5-14 cm long, densely patent hairy; pedicels up to 3 cm long; bracts 3, caducous, oblong to ovate-subcordate, 9-15 × 3-8 mm, pubescent or tomentose. Flowers white, pink to rose colour, c. 2.5 cm across. Calyx lobed almost to base, lobes 5, lanceolate, 10-14 mm long, valvate, acuminate, dorsally pubescent, reflexed in flowers, persistent. Petals 5, oblique, obovate, 15-20 × 12-18 mm, imbricate. Stamens united at base, filaments 4-5 mm long; anthers 3-4 mm long; staminodes 10-13 cm long. Ovary oblong, 4-6 × 4-6 mm, densely villose, 5-celled with 6-8 ovules in each cell, stellate-tomentose; style 8-14 mm long, glabrous or stellate-tomentose. Fruit a capsule, oblong, 7-10 × 6-8 mm, stellate-tomentose, 5-celled with papery valves. Seeds rugose. 2n = 54 (Seyani, 1991). *Fl. & fr.*: 12-3. *Forest edges, open forests, early stages of forest regrowth, semi-evergreen bushlands on rocky sites, riverine vegetation; up to 750 m altitude.*

**Dhaka:** Dhaka University Botanic Garden, 15 iii 1943, Collector & Collection no unknown, (DUSH); Ramna Park, 31 xii 1962, *S.K. Dutta*, 61 (DUSH); 19 ii 1980, *M. Begum*, 196 (DACB); Balda Garden, Wary, 20 i 1966, *S.K. Dutta*, 76 (DUSH); 15 i 1975, *Ferdousara*, (DACB); BNH Campus, Mirpur, 19 xii 2021, *M. Sultana*, DMS-4419 (DACB).

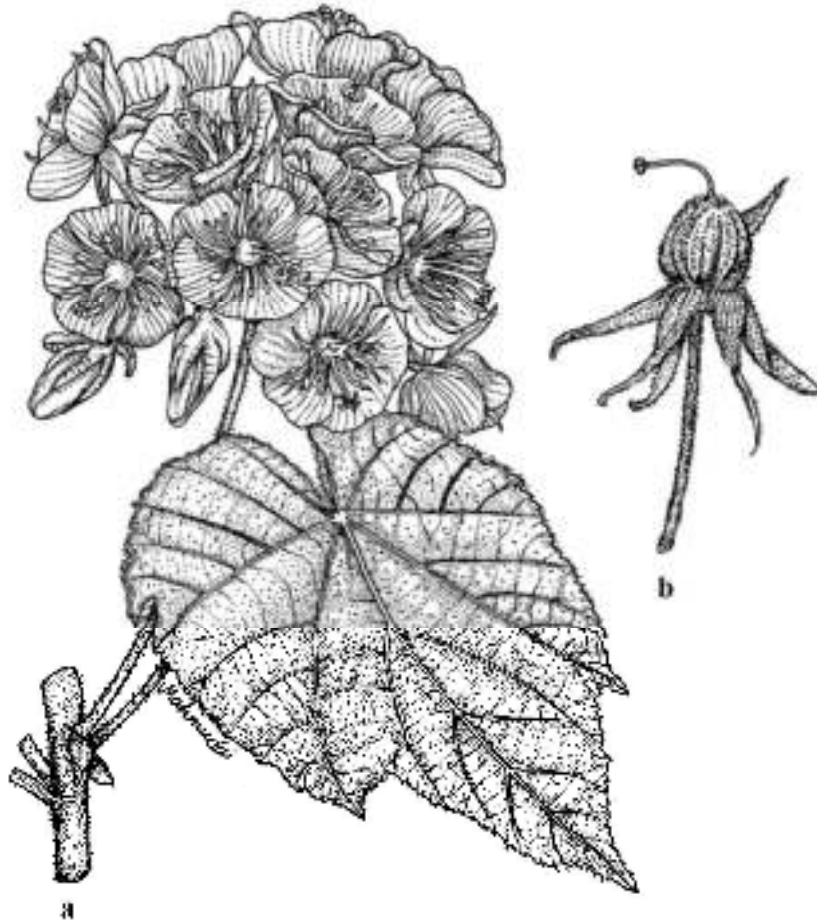


Figure 4. *Dombeya burgessiae* Gerr. ex Harv. & Sond.: a) Flowering shoot; and b) fruit.

Angola, Argentina, Australia, Belgium, Brazil, Colombia, Eswatini, Ethiopia, Hong Kong, India, Kenya, Malawi, Mozambique, New Zealand, Pakistan, Rwanda, Spain, South Africa, Tanzania, Uganda, United States of America and Zimbabwe.

Plant is sometimes used as an ornamental. Baskets are made from stem bark. Black rhinos eat bark and leaves. The pith is boiled and eaten as a side dish. Bark is chewed as an aphrodisiac. An infusion of the roots is taken to cure stomachache. Decoction of leaves is drunk and leaf-paste is applied to leprosy sores.

**Dombeya wallichii** (Lindl.) Benth. & Hook.f., Gen. Pl. 1: 221. 1867; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 476. 1993; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 3. 1976; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 67. 2012. *Assonia wallichii* Kuntze, Revis. Gen. Pl. 1: 76. 1891. *Astrapaea penduliflora* DC., Mém. Soc. Phys. Genève 4: 90. 1828. *Astrapaea wallichii* Lindl., Coll. Bot. t. 14. 1821. *Dombeya penduliflora* (DC.) M.Gómez, Anales Soc. Esp. Hist. Nat. 19: 216. 1890. **Fig. 5.**

Bengali: *Ball dombyea*

English: Pink Ball Flower, Pink Ball Tree

Evergreen shrubs or small trees; up to 10 m tall. Stems rufous with multiradiate stellate hairs. Leaves simple, unlobed or sometimes palmately 3-lobed, alternate; leaf-blades orbicular to ovate, 10-30 × 8-25 cm, often obscurely 3-lobed, base cordate, apex acute-acuminate, margin serrate to finely serrate, both surface sparsely to densely pubescent, palmately 7-9 nerved at base; petioles 5-15 cm long, glabrate or pubescent hairy; stipules caducous or persistent, narrowly ovate to ovate, 2.5-4.0 × 1.2-2.3 cm, apex acute to acuminate, light green sometimes with pink-tinge, pubescent. Inflorescence axillary, drooping, many-flowered umbellate cyme, 12-15 cm across; peduncle 20-40 cm long, glabrous or densely pubescent; bracts 3, caducous, ovate, 30-45 × 15-25 mm, apex acute to acuminate, densely pubescent; pedicel 2-4 cm long, whitish-green, pubescent hairy. Flowers deep pink to red colour, c 1.5 cm across. Sepals 5, linear-oblong, 1.5-2.0 cm × 3-4 mm, apex acute, white, sometimes with pink-tinge, densely patent hairy outside, valvate. Petals 5, oblique, elliptic to obovate or oblong, 25-35 × 6-14 mm, red, imbricate. Staminal tube 20-32 mm long, staminodes oblanceolate, 5-10 mm long, apex acuminate, fertile stamens free or in fascicles of 2-4; filaments free above staminal tube; anthers 3-4 mm long. Ovary ovoid with 5 angular lobes, 2-5 × 2.5-4.0 mm, stellate hairy; 2 ovules per locule; style 30-40 mm long, glabrous to moderately pubescent; stigma 5-lobed, c.1 mm long. Capsule pentagonal, ovate-oblong, 5-10 × 7-10 mm, densely beset with rusty hairs, with 2 cm long persistent style. 2n = 54 (Seyani, 1991). *Fl. & fr.*: 12-4. *Planted in the gardens.*

**Dhaka:** Specific locality unknown, 10 ii 1947, *Sukdeo*, s.n. (DUSH); Dr.Kanago's garden, 10 ii 1947, *Sukdeo*, s.n. (DUSH); C & B Nursery, 18 ii 1966, *S.K. Dutta*, 111 (DUSH); Dhaka, January 1942, *A.K. Acharja*, s.n. (DUSH).

Indigenous to Madagascar, introduced elsewhere; Argentina, Brazil, China, Costa Rica, El Salvador, Guatemala, Honduras, India, Madagascar, Mexico, Portugal and United States of America.

Usually planted in gardens for its beautiful drooping clusters of pink flowers.



Figure 5. *Dombeya wallichii* (Lindl.) Benth. & Hook.f.: a) Flowering shoot; and b) flower.



**Firmiana** Marsigli in Saggi, Sci. Lett. Accad. Padova 1: 114, 116. 1786.

Type species: *Firmiana platanifolia* (L.f.) Schott & Endl.

Trees. Leaves simple, lobed and often cordate at base, acute or shortly acuminate at apex, margin entire or undulate, glabrous or stellate-hairy on upper surface, often pubescent beneath, petioles long. Inflorescence cymes or panicles, with few to many flowers, terminal and axillary. Bracts c. 1.2 cm long, caducous. Flowers unisexual or bisexual. Calyx tubular-funnel shaped, sepals 5, hairy on both surfaces. Petals absent. Stamens 15-25, in groups on a column enclosing pistil; anthers 2-lobed, extrorse. Ovary superior, 5-locular, with 2-4 ovules; styles 5, free, short. Fruits capsules membranous follicles, oblong dehiscent into papery valves. Seeds 2-4, ovoid, smooth, wrinkled when dry, borne at margins of carpels, which open long before maturity.

**Firmiana colorata** (Roxb.) R.Br. in Bennet & R.Br., Pl. Jav. Rar.: 235. 1844; Abedin & Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 22. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 420. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceylon 9: 437. 1995; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 333. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 67. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 409. 2018. *Sterculia colorata* Roxb., Pl. Corom. 1: 26, t. 25. 1795; M.J. Mast. in Hook.f., Fl. Brit. India 1: 359. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963). Brandis, Indian Trees: 84. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 151. 1934; Das & Alam, Trees of Bangladesh: 154. 2001. *Erythropsis colorata* (Roxb.) Burkill, Gard. Bull. Straits Settlem. 5: 231. 1931. *Erythropsis roxburghiana* Schott & Endl., Melet. Bot. 33. 1832, *nom. illeg.* *Firmiana rubriflora* Kosterm., Reinwardtia 6: 293. 1962. *Karaka colorata* Raf., Sylva Tellur. 72. 1838. **Fig. 6.**

Bengali: *Bol ajun* (Garo), *Deo udal*, *Faisa udal*, *Krasangban* (Magh), *Naichicha udal*, *Pata-gota*, *Pisi*, *Samarri*, *Tey udal* (Chakma), *Ujal*, *Uzaru*

English: The Coloured Sterculia

Medium-sized, deciduous trees, up to 20 m tall. Young shoots covered with grey stellate hairs, trunk erect, lenticelled, bark smooth, blackish-grey or ashy, blaze whitish, very fibrous. Leaves crowded at end of branchlets, simple, alternate; leaf-blades broadly cordate, 17-25 × 15-22 cm, palmately 3-5 lobed or sometimes unlobed, lobes triangular, base deeply cordate, apex acuminate, palmately 5-7 veined at base, coriaceous, both surfaces sparsely yellowish stellate puberulent, lateral nerves prominently raised on both surfaces, nearly parallel; petioles 7-15 cm long; stipules lanceolate. Inflorescences solitary or in clusters of 2-3 short cymose-panicles from axils of fallen leaves, up to 7 cm

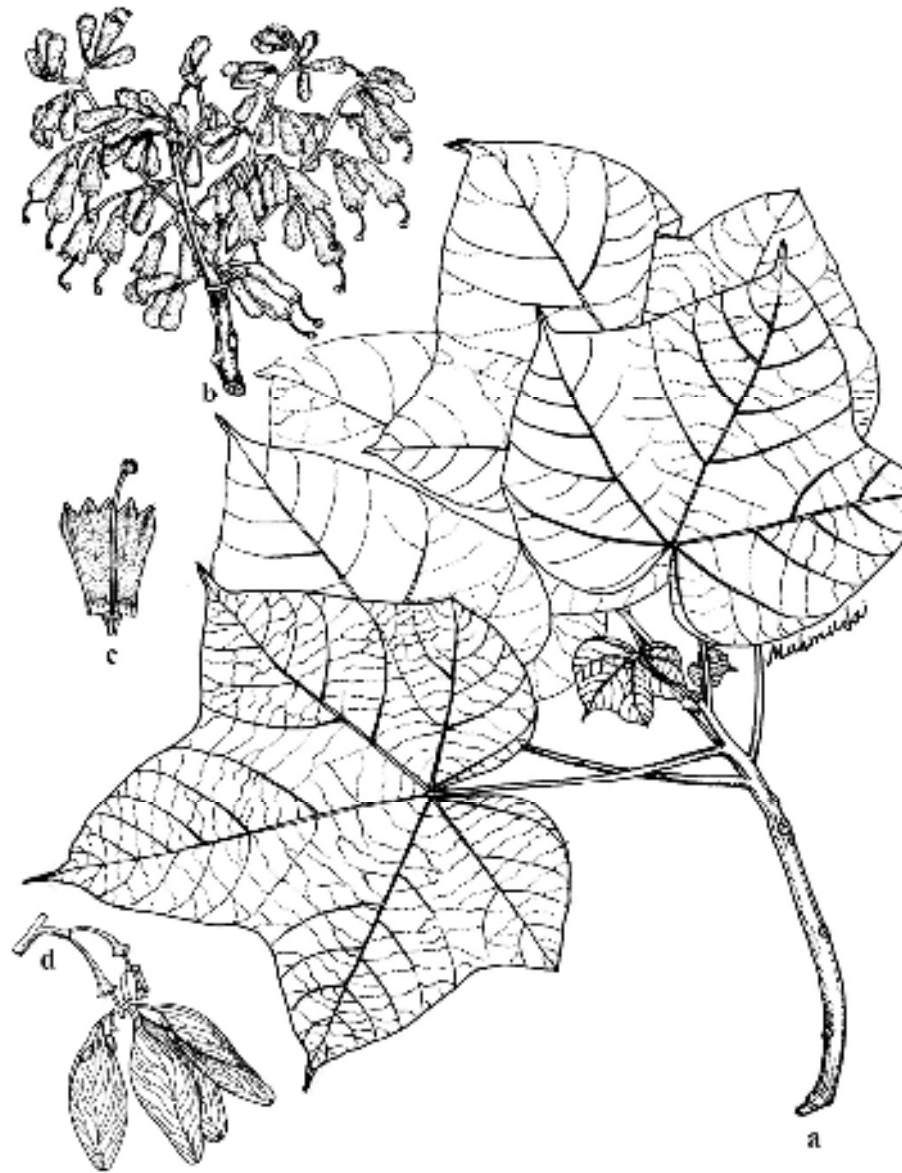


Figure 6. *Firmiana colorata* (Roxb.) R. Br.: a) Vegetative shoot; b) inflorescence; c) open flower; and d) fruit.

long, densely covered with orange-red or dark brown stellate hairs. Flowers polygamous, scarlet or orange-red, covered with coral-like pubescence, appearing before leaves; pedicel 4-6 mm long, puberulent. Calyx broadly tubular or funnel-shaped, 2-3 cm × 7-8 mm, abaxially densely stellate puberulent with orange hairs, adaxially densely puberulent, lobes 5, ovate-triangular, 3-4 mm long, apex acute. Petals absent. Male flower: androgynophore 10-12 mm, exserted, red, filaments short, anthers 10-30, sessile, yellow, locules curved, stellate puberulent. Female flower: ovary superior, 5-locular, nearly separated, flask-shaped, glabrous; styles 5, recurved, short; stigma curved outward. Fruit a follicle, red or purple when mature, foliaceous, tongue-shaped, 5-8 × 3-5 cm, 2-4-seeded, with apparent venation, apex acute, glabrous, strongly veined, stipitate. Seeds 2, yellow, wrinkled or smooth, globose or ovoid, 5-7 mm diameter.  $2n = 40$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 9-5. *Evergreen and deciduous forests, hillslopes; between 700-1000 m altitude.*

**Bandarban:** Darjiling para, Keokradong, 27 iii 2019, *K.K. Islam*, KKI-3582 (DACB 47961). **Chattogram:** Specific locality unknown, April 1886, Dr. King's collector, 446 (CAL 57983); Jaldi, Napura, 3 iv 1921, *J.M. Cowan*, 1281 (E); Sitakund, 10 i 1851, *Hooker & Thomson* (K); Chunati wildlife Sanctuary, Lohagara, *Moniruzzaman and Kowser*, MK-8063 (DACB 54969). **Cox's Bazar:** Bangabondhu Safari Park, Dulahajra, Chakaria, 20 i 2017, *Niyamul et al.*, NK-3207 (DACB 60217); Bangabondhu Safari Park, Dulahajra, Chakaria, 31 x 2017, *Niyamul et al.*, NK-6153 (DACB 60216); Garakhaghat, Kalmadia, Moheshkhali, 07 iii 1978, *Khan et al.*, K-4854 (DACB 14196). **Khagrachhari:** Ramgarh, 09 v 2005, *Rafiqul Islam*, 50 (DUSH). **Mymensingh:** Majrakura, Karaitala, Sal Forest, 24 v 1989, *Mia et al.*, M-2073 (DACB 14276). **Rangamati:** Kasalong Reserve Forest, Baghaichari, 20 ix 2017, *Kowser et al.*, KH-6592 (DACB). **Sherpur:** Gajni Forest, Gandhigaon, 05 v 1982, *Mia et al.*, M-695 (DACB 14198). **Sylhet:** Specific locality & date unknown, *Wall.*, 1119 (K). **Tangail:** Modhupur, 29 iii 1988, *A.M. Huq*, H-78 A (DACB 25696); Modhupur, 29 iii 1988, *A.M. Huq*, H-78 (DACB 25697); Valuka to Modhupur, 13 iv 1997, *A. M. Huq*, H-10462 (DACB 30943); Modhupur Forest, 08 iv 1976, *Huq & Mia*, H-2339 (DACB 14197).

Bhutan, Brazil, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

Fresh young seeds are edible and taste like almond. The bark yields cordage used to tie cattle and also use to make straps of bamboo baskets called *turung*, which the tribal people of Chittagong Hill Tracts carry on their forehead (Das and Alam 2001). An ornamental plant with scarlet or deep orange flowers looking like a mass of coral on the bare branches. Hindus and Ceylonese regard it as a sacred plant.

**Guazuma** Mill., Gard. Dict. Abr. (ed. 4) 2: 68. 1754.

Type species: *Guazuma ulmifolia* Lam.

Trees. Leaves alternate, simple, tomentose, ovate to lanceolate, serrate, 3-7-costate; stipule deciduous. Inflorescence usually axillary cymes, many-flowered. Flowers bisexual. Sepals 5, calyx spathaceous. Petals 5, concave at base, lamina divided into two narrow strap-shaped parts. Stamens connate in a tubular column, with 5 staminodes opposite sepals alternating with bundles each of 3 fertile stamens, anthers 2-lobed, lobes diverging, often confluent, sessile, exserted. Ovary sessile, 5-locular, ovules in each cell numerous; styles 5, more or less connate, thickened and stigmatose above. Fruits capsule, woody, oblong, tubercled. Seeds small, tuberculate, numerous, albumen abundant, embryo curved.

**Guazuma ulmifolia** Lam., Encycl. Math. Bot. 3(1): 52. 1789; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 10. 1976; Malick in Sharma *et al.*, Fl. India 3: 424. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceylon 9: 421. 1995; Mia *et al.*, Bangladesh J. Plant Taxon. 18(2): 154. 2011; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 68. 2012. *Bubroma guazuma* Willd., Sp. Pl. ed. 4 [Willd.] 3(2): 1423. 1802. *Bubroma invira* Willd., Enum. Pl. [Willd.] 2: 806. 1809. *Bubroma polybotryum* Willd., Enum. Pl. [Willd.] 2: 806. 1809. *Bubroma tomentosum* Spreng., Syst. Veg., ed. 16, [Spreng.] 3: 332. 1826. *Bubroma ulmifolia* (Lam.) Oken, Allg. Naturgesch. iii. (2) 1204. 1841. *Diuroglossum rufescens* Turcz., Bull. Soc. Imp. Naturalistes Moscou 25(2): 157. 1852. *Guazuma blumei* G. Don, Gen. Hist. 1: 523. 1831. *Guazuma burbroma* Tussac, Fl. Antill. 4: 69. 1827. *Guazuma coriacea* Rusby, Bull. New York Bot. Gard. 4: 332. 1907. *Guazuma invira* (Willd.) G. Don, Gen. Hist. 1: 523. 1831. *Guazuma parvifolia* A. Rich., Hist. Fis. Cuba, Bot. 10: 190. 1845. *Guazuma polybotrya* Cav., Icon. 3: 51. 1795. *Guazuma tomentosa* Kunth, Nov. Gen. Sp. 5: 32. 1821; M.J. Mast. in Hook. f., Fl. Brit. India 1: 375. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 191. 1903 (Indian reprint 1963). *Guazuma utilis* Poepp., Nov. Gen. Sp. Pl. 3: 72. 1845. *Theobroma guazuma* L., Sp. Pl. 782. 1753. *Theobroma tomentosum* (Kunth) M. Gómez, Anales Soc. Esp. Hist. Nat. 19: 217. 1890. *Guazuma ulmifolia* var. *glabra* K. Schum., Fl. Bras. (Martius) 12(3): 81. 1886. *Guazuma ulmifolia* var. *tomentella* K. Schum., Fl. Bras. (Martius) 12(3): 81, fig. 35. 1886. *Guazuma ulmifolia* var. *tomentosa* K. Schum., Fl. Bras. (Martius) 12(3): 81. 1886. *Guazuma ulmifolia* var.  *trianae* K. Schum., Fl. Bras. (Martius) 12(3): 82. 1886. **Fig. 7.**

Bengali: *Juma*, *Nipaltunth*

English: Bay Cedar, Musket Tree, Pigeon Wood, Pricklenut, The Bastard Cedar, West Indian Elm

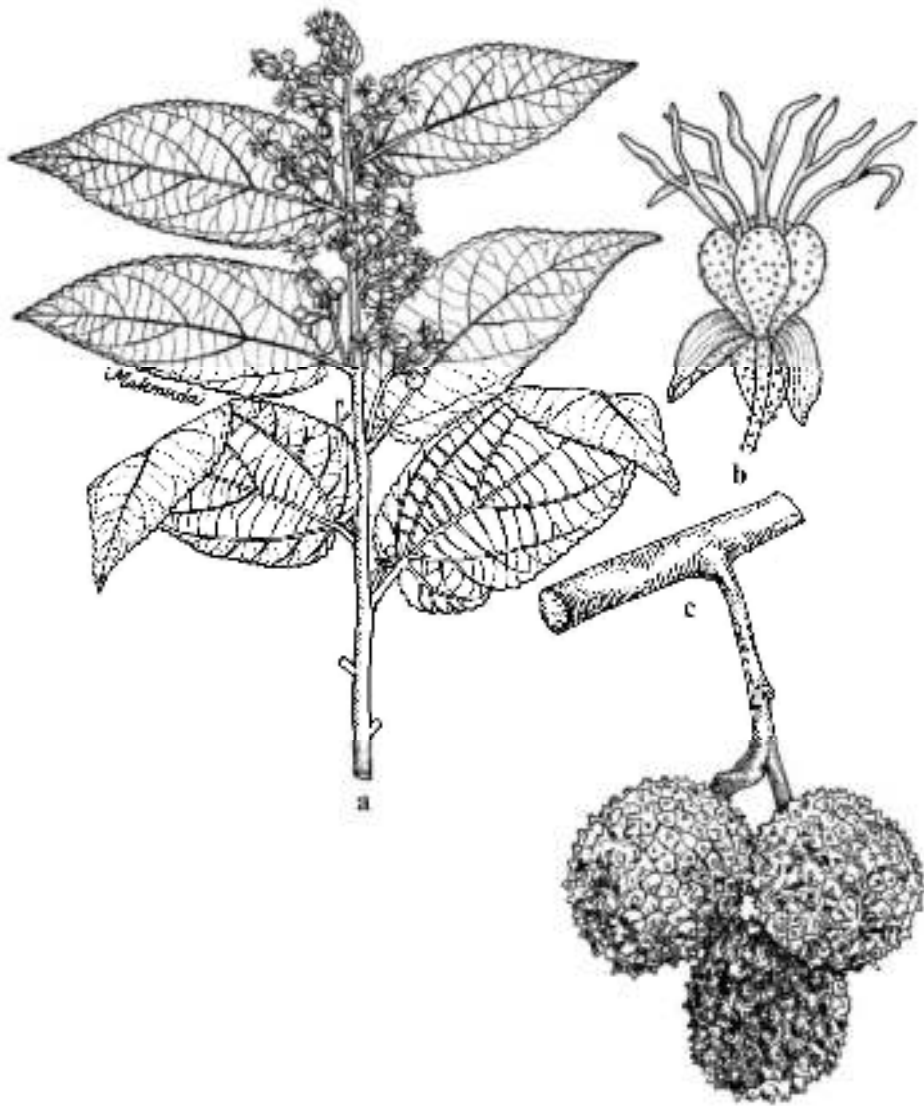


Figure 7. *Guazuma ulmifolia* Lam.: a) Flowering shoot; b) flower; and c) fruits.

Medium sized trees, up to 20 m tall. Young twigs covered with rusty-brown or light grey stellate hairs. Leaves simple, tomentose, ovate-oblong, lanceolate, 5-13 × 3-6 cm, base obliquely cordate, apex acuminate, margin serrate, 3-5 nerved at base, upper surface scabrid or glabrescent, lower surface velvety; petiole 0.5-2.0 cm long, slender, covered with stellate hairs. Inflorescence axillary or terminal many-flowered, thyriform cyme or panicles. Flowers bisexual, 6-8 mm across, yellow, flower buds globose; pedicel 3-6 mm long. Calyx campanulate, 2-3 × 1-2 mm, tomentose outside, glabrous within, 5-lobed, elliptic-lanceolate or ovate, lobes reflexed, connate below middle, stellately hairy. Corolla 5-lobed, base concave, 3-4 × c. 2 mm, puberulous outside. Stamens 10, staminodes 5, concealed in cucullate petals, 2.0-2.5 mm long, anthers orange or reddish; anthers 2-lobed, lobes divergent, concealed in hood of petals. Ovary 5-locular, c. 1 mm long, ovules many in each locule; style more or less connate. Capsules globose or oblong-ellipsoid, 1-2 × 1.0-1.5 cm, woody, obtuse, septicidally 5-valved, black, tuberculate. Seeds albuminous. *Fl. & fr.*: 3-10. *Secondary forests, growing in alluvial and clay soils.*

**Dhaka:** Govt. Nursery, 30 iv 1945, *S.K. Sen* (DUSH). **Jashore:** Specific locality unknown, 23 ii 1969, *L. Nessa*, 28 (DUSH). **Noakhali:** 30 x 1873, *C.B. Clarke*, 19931 (BM).

A native of tropical America and Java. Argentina, Brazil, Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Honduras, India, Indonesia, Mexico, Myanmar, Nicaragua, Pakistan, Panama, Paraguay, Peru, Puerto Rico, Sri Lanka, Suriname and Venezuela.

Planted as an ornamental tree everywhere. Fruits are edible and used for fattening cattles. The fruits are used as beads in rudraaksh maala worn by Hindu Sadhus. Green fruits is used to make a beverage and to flavour other foods. Fruits are used to cure elephantiasis, haemorrhage, diarrhoea and uterine pain. Leaves are used as antibacterial, antimicrobial, antiulcer, anticancer, astringent, diaphoretic agents. Root is used in easy childbirth and stem bark to treat diarrhoea (Kumar & Gurunani, 2019). Mucilaginous sap of inner bark is used for clearing sugar. Bark is used in treatment of elephantiasis, skin and chest diseases. Bark yields a good fibre for rope making.

**Helicteres** L., Sp. Pl.: 963. 1753.

Type species: *Helicteres isora* L.

Shrubs or small trees. Leaves simple, alternate. Inflorescence axillary or in fascicles or in long or short spikes, rarely terminal. Flowers bisexual, small. Sepals 5, united at base, often irregular. Petals 5, free, clawed, equal or unequal, entire or somewhat 2-lipped, claws often with ear-shaped appendages. Staminal column adnate to gynophore; anthers 2-celled, in groups at top of column between its teeth, locule divergent. Ovary at top of gynophore, 5-lobed, 5-locular, each locule with many ovules; styles slender, awl-shaped, simple, more or less united. Fruits capsule oblong or cylindrical, woody, nerves indistinct, valves spirally twisted or straight, stiff hairy or glabrous, dehiscent. Seeds globose, many, wingless, endosperm scanty, cotyledons leafy.

#### KEY TO THE SPECIES

- |   |                    |
|---|--------------------|
| 1. Fruits spirally twisted                                      | <b>H. isora</b>    |
| + Fruits straight, not twisted                                  | <b>2</b>           |
| 2. Inflorescence as long as or longer than leaves               | <b>H. elongata</b> |
| + Inflorescence shorter than leaves                             | <b>3</b>           |
| 3. Calyx funnel shaped; petals white or yellow; ovary glabrous  | <b>H. viscida</b>  |
| + Calyx bell-shaped, curved; petals red-purple; ovary verrucose | <b>H. hirsuta</b>  |

**Helicteres elongata** Wall. ex Boj. in Hort. Maurit.: 35. 1837; Mast. in Hook.f., Fl. Brit. India 1: 365. 1874 (Reprint 1961); Kurz, Fl. Brit. Burma 1: 144. 1877; Brandis, Indian Trees: 89. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 425. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 334. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 68. 2012. *Helicteres plebeja* Kurz, J. Asiat. Soc. Beng. 39(2): 67. 1870; M.J. Mast. in Hook.f., Fl. Brit. India 1: 366. 1874 (Reprint 1961); Malick in Sharma & Sanjappa (eds.), Fl. India 3: 427. 1993. *Helicteres glabriuscula* Wall. ex M.J. Mast. in Fl. Brit. India 1: 366. 1874 (Reprint 1961); Brandis, Indian Trees: 89. 1906. *Helicteres cavaleriei* H.Lév., Repert. Spec. Nov. Regni Veg. 12: 534. 1913. *Helicteres spinulosa* Wall., Numer. List [Wall.] n. 1847. 1829. **Fig. 8.**

Bengali: *Jankagota*



Figure 8. *Helicteres elongata* Wall. ex Boj.: a) Fertile shoot; and b) fruit.



Spreading shrubs, up to 1 m tall. Branchlets slender, stellate puberulent. Leaves oblong-lanceolate to oblong-ovate, 5-11 × 2.5-3.5 cm, base obliquely rounded, apex acuminate, margin irregularly dentate, stellate puberulent and villous abaxially, sparsely stellate adaxially; petioles 0.6-1.3 cm long; stipules linear, 3-5 mm long, caducous. Inflorescence in axillary or terminal many-flowered racemose or cymose, 2-5 cm long; bracteoles setaceous, campanulate, 5-lobed, lobes deltoid-lanceolate, pubescent. Flowers bisexual. Epicalyx lobes linear. Calyx tubular, campanulate, c. 5 mm long, 5-lobed, lobes often triangular, persistent, puberulent unequal. Corolla with 5 petals, entire or somewhat lipped or clawed, yellow, one petal with auriculate appendix and central line of hairs. Stamens 10, staminal column adnate to gynophore, slightly curved towards apex, anthers 2-celled. Ovary 5-locular, hairy; ovules c. 10 in each locule. Follicles cylindrical, 2.5-3.8 cm long, beaked, densely gray-yellow shaggy outside. *Fl. & Fr.*: 6-10. *Dry grasslands, and roadsides; between 200-1000 m altitude.*

Hooker (1874) reported this species from Eastern Bengal. Habib (2009) and Rahman *et al.* (2012) also reported the occurrence of this species from Bangladesh without citing any specific locality.

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

The bark yields fibre used as binding materials.

**Helicteres hirsuta** Lour., Fl. Cochinch. 530. 1790. Brandis, Indian Trees: 89. 1906; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 412. 2018. *Alicteres hispida* C. Presl, Reliq. Haenk. 2(2): 140. 1835. *Camaion hirsuta* Raf., Sylva Tellur. 75. 1838. *Helicteres hispida* C. Presl, Reliq. Haenk. 2: 140. 1835. *Helicteres hispida* (C. Presl) Walp., Repert. Bot. Syst. 1(2): 334. 1842. *Helicteres oblonga* G. Don, Gen. Hist. 1: 508. 1831. *Helicteres spicata* Colebr. ex G. Don, Gen. Hist. 1: 507. 1831; M.J. Mast. in Hook. f., Fl. Brit. India 1: 366. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 188. 1903 (Indian reprint 1963); Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925. *Helicteres spicata* var. *hainanensis* Hance, J. Bot. 23: 322. 1885. *Helicteres spicata* var. *lanigera* M.J. Mast., Fl. Brit. India 1(2): 366. 1874. *Helicteres vinosa* Craib, Bull. Misc. Inform. Kew 1924: 90. 1924. *Methorium spicatum* (Colebr. ex G. Don) F. Muell., Syst. Census Austral. Pl. 15. 1883. *Orthohegium hirsutum* (Lour.) Hassk., Cat. Hort. Bot. Bogor. 202. 1844. *Oudemansia hirsuta* (Lour.) Miq. Pl. Jungh. 297. 1854. **Fig. 9.**

Straggling shrubs, up to 3 m tall. Branchlets densely covered with stellate hairs. Leaves lanceolate to elliptical, ovate-oblong to oblong-lanceolate, 5-20 × 3-8 cm, base obliquely subcordate or truncate, apex acuminate or acute, margin unequally serrate,



Figure 9. *Helicteres hirsuta* Lour.: a) Fertile shoot; b) flower; c) smaller petal; d) larger petal; e) fruit; and f) open fruit.

stellate hairy above, downy beneath; petioles 1.5-2.0 cm long, densely tomentose; stipules setaceous, 1.2-1.5 cm long. Inflorescence axillary, elongate, spiciform to racemose, 6 cm long, several-flowered. Flowers bisexual, bearing a large, sessile red-purple gland at base; pedicels shorter than flowers, articulate, with caducous epicalyx lobes at base. Calyx tubular or bell-shaped, 1.0-1.5 cm long, curved, 4-5-lobed, distended at base, downy. Petals red-purple, 2.0-2.5 cm long. Androgynophore glabrous; stamens 10, staminodes 5, as long as filaments. Gynandrophore 1-2 cm long; ovary verrucose; ovules 20-30 in each locule; style as long as ovary. Fruit composed of 5 follicles, cylindric, 3.5-4.0 × 1.1-1.2 cm, exserted stalk, oblong-lanceolate, apex beaked, densely covered with stellate-villous hairs. Seeds numerous, 1-2 mm in diam., surface rugose. *Fl. & fr.*: 4-9. *Deciduous and dry evergreen forests, open forests, bushlands.*

Prain, 1903a and Heinig, 1925 reported the occurrence of this species as *Helicteres spicata* from present Chattogram. Alam (2018) reported the occurrence of this species from Chunati under Chattogram without citing any specimen.

Australia, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Vietnam.

The bark yields fibre used as binding materials.

**Helicteres isora** L., Sp. Pl.: 963. 1753; M.J. Mast. in Hook.f., Fl. Brit. India 1: 365. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 188. 1903 (Indian reprint 1963); Brandis, Indian Trees: 88. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 10. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 426. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 335. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 69. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 411. 2018. *Helicteres baruensis* var. *ovata* DC., Prodr. 1: 476. 1824. *Helicteres grewiifolia* DC. Prodr. 1: 476. 1824. *Helicteres isora* var. *glabrescens* M.J. Mast. in Hook. f., Fl. Brit. India 1: 365. 1874. *Helicteres isora* var. *microphylla* Hassk., Flor. (B.Z.) 514. 1856. *Isora versicolor* Hassk., Tijdschr. Natuurl. Gesch. Physiol. 10: 135. 1843, *nom. illeg.* *Isora grewiifolia* Schott & Endl., Mélanges Bot.: 31. 1832. *Helicteres roxburghii* G. Don, Gen. Hist. 1: 506. 1831. **Fig. 10.**

Bengali: *Alkomra, Atmachra, Atmora, Janka phal, Mura*

English: East Indian Screw-tree

Large shrubs or small trees, 3-8 m tall. Bark pale greyish, finely wrinkled; young shoots stellate-tomentose. Leaves simple, alternate, obovate to suborbicular, broadly



Figure 10. **Helicteres isora** L.: a) Flowering shoot; b) open flower; c) androgynophore; and d) fruit.

elliptic or elliptic-obovate, 10-22 × 7-17 cm, scabrous on upper surface, stellate-tomentose on lower surface, base cordate, apex acute or acuminate, margin irregularly crenate-serrate, 3-5-nerved at base, scabrous above and stellately tomentose below; petioles 1.0-1.5 cm long, pubescent; stipules up to 1 cm long, subulate, caducous. Inflorescence axillary, solitary or in few-flowered cymes; bracts 2-3 mm long, linear, 2 brown glands present in axil of bracts. Flowers 4-5 cm long, hairy on all parts; pedicel to 6 mm long. Calyx tubular, 2 cm long, covered with dense stellate hairs, splitting in to 5 irregular lobes, lobes 5 unequal, slightly yellow. Petals 5, obovate, 2.0-2.5 cm long, unequal, orange-red with black dots on inner part, fading to pale blue, reflexed, 2 lower petals shorter and broader than 3 upper ones, claws winged. Staminal column 3-3.5 cm long, cylindrical; stamens 10, staminodes 5, on a glabrous horn-like column, exerted, 3-4 cm long, abruptly reflexed, anthers ovate, arranged in a ring around the ovary. Ovary ovoid and slightly curved to one side, 2.0-2.5 mm long, 5-lobed, 5-celled, seated at tip of gynophore; styles 5; stigma subulate. Follicles 5, 4-6 × 1 cm, spirally twisted, stellate-tomentose, beaked. Seeds many, 2-3 mm long, angular, black, wrinkled, tomentose. 2n = 18, 24 (Kumar and Subramaniam, 1986). *Fl. & fr.*: 4-1. *Mixed deciduous forests, scrub jungles, forest clearings.*

**Chattogram:** Banshkhali Upazila, Jaldi Beat, 14 v 1990, *Khan et al.*, K-8351 (DACB 14202). **Dhaka:** Near Nayerhat, 10 vi 1982, *Md. Yusuf*, 001 (DACB 14201); Near Savar Cantonment, 18 viii 1977, *Khan & Huq*, K-4513 (DACB 14199); Near Jahangirnagar University Campus, Savar, 21 viii 2020, *M. Sultana*, DMS-3216 (DACB). **Gazipur:** Mouchak Forest Beat, Kaliakoir, 28 i 1977, *Khan et al.*, K-4470 (DACB 25732). **Khagrachhari:** Gomoti, Panchari, 23 iv 2011, *S.N. Uddin*, N-4588 (DACB 39956). **Tangail:** Gorai Village, 19 viii 1973, *A.M. Huq* H-1061 (DACB 25731); Gorai Village, 05 viii 1976, *Khan et al.*, K- 4182 (DACB 25331).

Australia, Belgium, Bhutan, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Timor-Leste and Vietnam.

The bark is used to treat diarrhoea and dysentery. Leaf juice is applied on cuts and wounds. Fruit powder is used against intestinal worms and on scabies. Bark fibre is used as binding materials.

**Helicteres viscida** Blume, Bijdr. Fl. Ned. Ind. 2: 79. 1825; Kurz, Fl. Brit. Burma 1: 143. 1877; Mia *et al.*, Bangladesh J. Plant Taxon. 18(2): 154. 2011; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 69. 2012. *Helicteres hirsuta* var. *viscida* (Blume) Kuntze, Revis. Gen. Pl. 1: 79. 1891. *Helicteres pulchella* Wall. ex Bojer, Hortus Maurit. 35. 1837. *Orthotheceium viscidum* (Blume) Hassk., Cat. Hort. Bot. Bogor. 202. 1844. *Oudemansia viscida* (Blume) Miq., Pl. Jungh.: 297. 1853. **Fig. 11.**



Figure 11. **Helicteres viscida** Blume: a) Fruiting shoot; b) flower; c) fruit; and d) gynoecium.

Shrubs, 1-3 m tall. Branchlets puberulent when young, glabrescent with stellate hairs. Leaves ovate, ovate-oblong to lanceolate, 6-15 × 4-9 cm, base cordate or cuneate or oblique, apex acute to cuspidate, usually shallowly lobed from middle, margin irregularly dentate, subcoriaceous, sparsely stellate adaxially, densely whitish stellate tomentose, basal veins 5-7, secondary nerves 3-5 pairs; petiole 0.4-1.0 cm long, hairy. Inflorescence axillary, solitary or cymose, up to 3.5 cm long. Flowers bisexual, white or yellow; pedicels articulate. Calyx funnel shaped, 1.4-1.8 cm long, velvety outside, 5-lobed, lobes unequal, acute. Corolla 2.5-3.2 cm long, 5-lobed, white, unequal, spatulate, obtuse or retuse. Stamens 10; staminodes 5; filaments glabrous; anthers 2-celled. Ovary 5-locular, verrucose, hairy, each locule with c. 8 ovules, ovules ovoid to oblong, surrounded by ring of stamens; styles slender; stigma divided into 5 pin-like teeth. Fruit a capsule, oblong or cylindrical, 2.5-4.0 × 1.0-1.2 cm, beaked, covered with up to 4 mm long shaggy hairs. Seeds many, globose to rhomboid, c. 2 × 1 mm, with tiny longitudinal grooves. *Fl. & fr.*: 7-12. *Along the edge of evergreen forest and bushlands; between 300-900 m altitude.*

**Chattogram:** Jaldi Range, Boilchori, 2 xi 1920, *J.M. Cowan*, 1618 (E); Chunati Wildlife Sanctuary, 05 x 2017, *A.A.Mamun* (DACB 41770). **Cox's Bazar:** Chainda, Himchari NP, 29 viii 1996, *Rahman & Uddin*, 414 (CUH).

China, Laos, Malaysia, Malay Peninsula, Thailand and Vietnam.

The bark yields fibre used as binding materials.

**Heritiera** Ait., Hort. Kew. 3: 456. 1789.

Type species: *Heritiera littoralis* Ait.

Trees. Leaves simple or digitate compound, alternate or spiral, petioles thickened at both ends, stipules caducous. Inflorescence axillary or at upper leaf scars, penicel. Flowers small, unisexual, male and female similar but female slightly larger. Sepals 5, united at base, calyx campanulate or urceolate, stellate-pubescent. Petals absent. Male flowers with 8-10 stamens, on a globose head at end of a slender staminal column. Female flowers with 4-6 locular ovary, each locule with one ovule; styles short and straight; stigmas 4-5, free. Fruit a samara, indehiscent, winged or keeled.

#### KEY TO THE SPECIES

- |   |   |
|---|---|
| 1. Leaves with faint secondary nerves and veins; samara with a longitudinal ridge | 2 |
| + Leaves with prominent secondary nerves and veins; samara winged or wing-like    | 3 |

- |  |                       |
|--|-----------------------|
| 2. Epicarp dull; pistil and stamens on a slender column with parallel sides; fruit up to 2 × 1 cm              | <b>H. fomes</b>       |
| + Epicarp shining; pistil and stamens on a based column, narrowed in the distal half; fruit more than 5 × 3 cm | <b>H. littoralis</b>  |
| 3. Leaves with 8-11 pairs of lateral nerves; anthers irregularly clumped on androgynophores                    | <b>H. macrophylla</b> |
| + Leaves with 4-5 pairs of lateral nerves; anthers in regular rings on androgynophores                         | <b>H. papilio</b>     |

**Heritiera fomes** Buch.-Ham., Embassy ed. 2, 3: 319.1800; M.J.Mast. in Hook.f., Fl. Brit. India 1: 363. 1874 (Reprint 1961); Brandis, Indian Trees: 86. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 428. 1993; Das & Alam, Trees of Bangladesh: 169. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 336. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 70. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 413. 2018. *Heritiera minor* Roxb., Hort. Bengal. 50.1814; Prain, Beng. Pl. 1: 188. 1903 (Indian reprint 1963); Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Sinclair, J. Bull. Bot. Soc. Beng. 9(2): 88.1955. J. M. Cowan, Fl. Chakaria Sundarbans, 207. 1926. *Amygdalus minor* Kuntze, Revis. Gen. Pl. 1: 75. 1891. *Balanopteris minor* Gaertn., Fruct. Sem. Pl. 2: 94. 1790. *Fometica punctata* Raf., Sylva Tellur.: 75. 1838. **Fig. 12.**

Bengali: *Sonduri, Sunder, Sundori, Sundri*

English: The Sundri Tree

Medium-sized evergreen trees, 15-18 m tall. Branchlets lepidote, bark grey. Leaves simple, alternate, elliptic-lanceolate, 10-17 × 3-6 cm, base tapering to rounded, apex acute or rounded and mucronate, glabrous above, adpressed scaly beneath; petioles up to 2 cm long. Inflorescence a lax panicle, up to 8 cm long, axillary or in upper leaf scars. Flowers small, unisexual. Calyx campanulate, 5 or rarely 4-6 toothed, yellowish stellate-hairy inside. Petals absent. Male flowers with 5-10 stamens, united in a column with a ring of 2-celled anthers at apex. Female flowers with 4-6 carpels, almost free, styles short, stigmas 5, thick; ovary with 4-5 ellipsoid locules, ovule solitary in each locule. Fruit a cluster of woody samaras, ellipsoid or globular, glabrous, indehiscent, keeled or winged ripe carpel; epicarp dull. Seed solitary without vivipary but can float on the tidal water. 2n=38 (Das *et al.*, 2001). *Fl. & fr.*: 9-12. *Moderate saline zone on well-drained soil inundated by tidal water.*





Figure 12. *Heritiera fomes* Buch.-Ham.: a) Flowering shoot; b) female flower; c) male flower; and d) fruits.

**Bagerhat:** Kotka, Sundarbans, 22 i 1995, *M.A. Hassan* 1224 (DUSH); Kotka, Sundarbans, 20 v 2011, *S.N. Uddin*, N-4677 (DACB 40069); Sundarbans, 06 v 1984, *F.R. Milton* 33 (DACB); Sarankhola range, Shapla, 18 v 2014, *M.S. Rahamn*, 2846 (JUH); Supati, 18 vi 2021, *M.S. Rahamn*, 4460 (DACB); Sundari khal, Kotka, 23 vi 2021, *M.S. Rahamn*, 4614 (DACB). **Borguna:** Pathorghata, 20 iii 1989, *Huq et al.*, H-9187 (DACB 14204); Tangragiri Wildlife Sanctuary, Taltoli, 15 x 2019, *M. Sultana*, DMS-3056 (DACB 60001). **Chattogram:** Chattogram Univ. Campus, 29 viii 2016, *Kowser et al.*, KH-011 (DACB 49463). **Cox's Bazar:** Matamohuri River side, Chakaria, 1 iv 1920, *J.M. Cowan*, 780 (E); Bagkhali River, Khurushkul, 4 xii 1944, *J. Sinclair*, 3836 (E); Fasiakhali, Chakaria, 07 ii 2018, *Kabir & Hasan*, 6967 (DACB 59671); Chakaria Sundarban, 25 v 1997, *Mia et al.*, M-3820 (DACB 42089); Chakaria Sundarban, 12 vi 1979, *Khan et al.*, K-5595 (DACB 14211); Chakaria Sundarban, 27 iv 2014, *S. Ahmed*, 50 (CUH). **Khulna:** Sundarbans, 31 i 1895, *Heinig* (BM); Sundarban Tidal Forest, 20 vi 1966, *Ismail & Bhowmik*, 180 (DUSH); Sundarban, Bhadra, 23 iii 1970, *M.S. Khan*, K-1919 (DUSH); 12 xii 1888, *C.B. Clarke*, 24893 (K); Sundarbans, 15 x 1881, *J.S. Gamble*, 10097 (E); Sundarbans, 06 vii 1890, *R. Quinnell* (E); Sundarban Forest, 10 x 2019, *S. Sarker* (DACB 54665); Karamjol, Sundarban, 04 v 2017, *I.H. Nayan*, 55820 (DACB 55820); Jongra, Sundarban, 05 xi 2001, *Uddin & Deodatus*, 1151 (DACB 30887); Khalishganj, 12 ii 2007, *Bushra et al.*, 096 (DACB 31492); Hiron Point, 03 ii 1987, *Huq & Mia*, H-8128 (DACB 14206); Sundarbans, 26 ix 1973, *A.M. Huq*, H-968 (DACB 14212); Sundarban, Khulna range, Adachai, 24 vi 2014, *M.S. Rahamn*, 2230 (JUH); Sundarbans, Khulna range, Bhomorkhali, 23 xii 2019, *M.S. Rahamn*, 3809 (DACB), Mongla, Biddarbahon, 27 xii 2019, *M.S. Rahamn*, 4018 (DACB). **Patuakhali:** Kuakata, Kalapara, 23 vii 1998, *M. Sultana*, DMS-83 (DUSH); Kalapara, Gongamoti, 07 i 2006, *M. Sultana*, 991 (DUSH); Galachipa, Ranghabali, 24 iii 2006, *M. Sultana*, 1202 (DUSH). **Satkhira:** Burigualini, Munsiganj, Sundarban, 11 xii 1989, *Huq et al.*, H-9368 (DACB 14205); Notabeki, Sundarban, 20 viii 2002, *S.N. Uddin*, N-1360 (DACB 37377); Satkhira range, Kalagachia, 18 viii 2011, *M.S. Rahamn*, 13 (JUH).

The species is found in almost all the tropical swamp forests of the world including India, Madagascar, Myanmar, Sri Lanka, Thailand, and Trinidad & Tobago.

The wood is very hard, heavy, elastic and durable. It is used for construction of electric and telephone poles, bodies of buses, launches and trucks, anchor logs, scaffolding, pilings, house posts, tool handles, fuel wood for cooking and burning bricks, flooring and paneling. Good charcoal is made from the wood. It checks soil erosion in the tidal forests and loosely consolidated silted soil. Tannin free seeds of the plant are eaten (Malick, 1993). Seed oil is used for treatment of piles.

**Heritiera littoralis** Aiton, Hort. Kew. ed.1, 3: 546. 1789; M.J. Mast. in Hook.f., Fl. Brit. India 1: 363. 1874 (Reprint 1961); Brandis, Indian Trees: 85. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 429. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 337. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 70. 2012. Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 414. 2018. *Amygdalus littoralis* (Aiton) Kuntze, Revis. Gen. Pl. 1: 75. 1891. *Balanopteris tothila* Gaertn., Fruct. Sem. Pl. 2: 94. 1790. *Samadera littoralis* (Aiton) Oken, Allg. Naturgesch. 3(2): 1205. 1841. *Sutherlandia littoralis* (Aiton) J.F. Gmel., Syst. Nat. 1027. 1792. **Fig. 13.**

Bengali: *Aina*, *Sundri* English: Looking-glass Tree, Looking-glass Mangrove

Medium-sized evergreen trees, up to 25 m tall. Bark pinkish-grey, vertically and superficially fissured, branchlets lepidote; twigs slender and terete, usually with prominent leaf scars. Leaves simple, alternate, obovate, oblong, elliptic-oblong to ovate-elliptic, 10-18 × 5-10 cm, rounded or subcordate, base rounded, subcordate or oblique, apex mucronate to obtusely acute, margin entire, coriaceous, glabrous above, minute, silvery adpressed scaly beneath; petioles up to 2.5 cm long; stipules free, lateral, caudaceous. Inflorescence axillary or in upper leaf scars, drooping, tomentose panicles, up to 15 cm long; peduncle lepidote. Flowers small, unisexual, greenish-pink; pedicels up to 1 mm long, articulate. Calyx campanulate, 5-6 mm long, divided to one third of length, lobes 5-6, yellowish, stellate-hairy. Petals absent. Male flowers: androgynophore slender, bearing in a ring of 5-10 adnate anthers, sessile, with around a sterile ovary. Female flowers: carpels 5-6 celled, superior, almost free, glabrous, styles short, stigmas 5, thick, ovule solitary in each locule. Fruit a samara, ellipsoid, woody, 3-6 × 2-5 cm, glabrous, with a pale brown, with a broad keel on one side, smooth, shining. Seed one, 4-6 × 3-5 cm, elliptical, woody. 2n = 20, 38 (Kumar and Subramaniam, 1986). *Fl. & fr.*: 7-3. *Coastal areas and mangrove forests.*

Specific locality & date unknown, P. Maheshwary, 13 ix 1949, s.n. (DUSH).

Australia, Cambodia, China, El Salvador, French Polynesia, Hong Kong, India, Indonesia, Japan, Madagascar, Mayotte, New Caledonia, Pacific Islands up to Hawaii, Papua New Guinea, Philippines, Reunion, Singapore, Sri Lanka, Thailand, Timor-Leste, Tonga, United States of America, Vanuatu and Vietnam.

The timber is mainly used as firewood, having high heat-producing capacity. The wood is suitable for the production of wrapping, writing, and printing papers. The bark contains tannin and is used for toughening fishing nets. An extract from the seed is used as medicine in diarrhoea and dysentery (Soerianegara and Lemmens, 1994). Seeds are occasionally eaten and the roots are used as fish poison.



Figure 13. *Heritiera littoralis* Aiton: a) Flowering shoot; b) male flower; c) female flower; d) fruits; and e) seed.

***Heritiera macrophylla*** Wall. ex Kurz, J. Asiat. Soc. Beng., Pt. 2, Nat. Hist. 42(2): 61 1873; Brandis, Indian Trees: 86. 1906; Kanjilal *et al.*, Fl. Assam 1: 155. 1934; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 430. 1993; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 70. 2012. *Amygdalus macrophylla* (Wall.) Kuntze, Revis. Gen. Pl. 1: 75. 1891. *Trochetia contracta* Wall., Numer. List: no. 1162. 1829. **Fig. 14.**

Medium sized, evergreen trees, up to 25 m tall, crown umbrella-shaped. Bole of old trees becomes widely buttressed when old, up to 2 m high from ground; bark brown to black, almost smooth; twigs slender, covered with adpressed minute yellowish scales.

Leaves simple, alternate or slightly spirally arranged; leaf blade elliptic, ovate-elliptic, oblong or lanceolate, 8-10 × 4-18 cm, rounded, truncate, base often oblique, apex acute or acuminate, margin entire, chartaceous, glabrous above, densely silvery adpressed fimbriate scaly beneath, lateral nerves 8-11 pairs, prominent below, pseudopeltate; petioles 2-5 cm long, stout, scaly or hairy. Inflorescences from axils of upper leaf scars, pyramidal panicles, 5-12 cm long, hairy. Flowers small, unisexual, brownish, globular when bud. Calyx campanulate, 4-6 mm long, 6-lobed, divided one third to a half of their length, stellate pubescent. Male flowers: slightly smaller than female flowers, stamens 6-8, anther thecae globose, irregularly clumped on androgynophore topped by sterile ovary; androgynophore 1 mm long, white glandular at base. Female flowers: ovaries 4-6, c. 2 mm long, conglutinate, lepidote, sterile anther thecae in few groups present at base of ovaries. Samaras subglobose, 2.0-3.5 × 1.5-2.0 cm, base oblique, apical beak or fish-tail wing up to 1.6 cm long, covered with brown indumentum. *Fl. & fr.*: 5-12. *Open forests in mangrove and hilly areas.*

**Khulna:** Sundarbans, 13 ix 1949, P. Maheswary, s.n. (DUSH); Sundarbans (22°10' N and 89°35' E), 15 iv 1984, J.M. Sandom 15 (K); Sundarbans (22°10' N & 89°25' E), 15 vi 1984; F.F.R. Miller 33 (K); Sundarbans (22°25' & 89°25'), 15 iv 1984, J.H. Sandom 36(K). **Sylhet:** Jaintiapur, 7 xi 1946, G.K. Deva 16205 (Assam).

Cambodia, China, France, India, Laos, Myanmar, Thailand and Vietnam

The wood is hard and valued for its timber. It takes a fine. Polish and used for posts.

**Heritiera papilio** Bedd., Fl. Sylv. S. India t. 218. 1872; M.J. Mast. in Hook.f., Fl. Brit. India 1: 363. 1874 (Reprint 1961); Brandis, Indian Trees: 86. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 430. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 338. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 71. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 414. 2018. *Heritiera acuminata* Wall. ex Kurz, J. Bot. 12: 65. 1874; Kanjilal *et al.*, Fl. Assam 1: 155. 1934. *Heritiera vespertilio* Bedd. ex Kurz, J. Bot. 12: 65. 1874. *Amygdalus papilio* Kuntze, Revis. Gen. Pl. 1: 75. 1891. **Fig. 15.**

Bengali: *Papilio Sundori*

Evergreen trees, 15-25 m tall. Bole is buttressed; bark greyish-brown with scurfy small warts; blaze pink with white streaks; young parts covered with golden brown soft tomentum. Leaves simple, alternate, spiral, clustered at branch ends; blades ovate or ovate-lanceolate, or oblong-elliptic, 7-20 × 2-10 cm, base rounded-subcordate, apex acute to narrowly acuminate, margin entire, coriaceous, upper surface closely scaly when

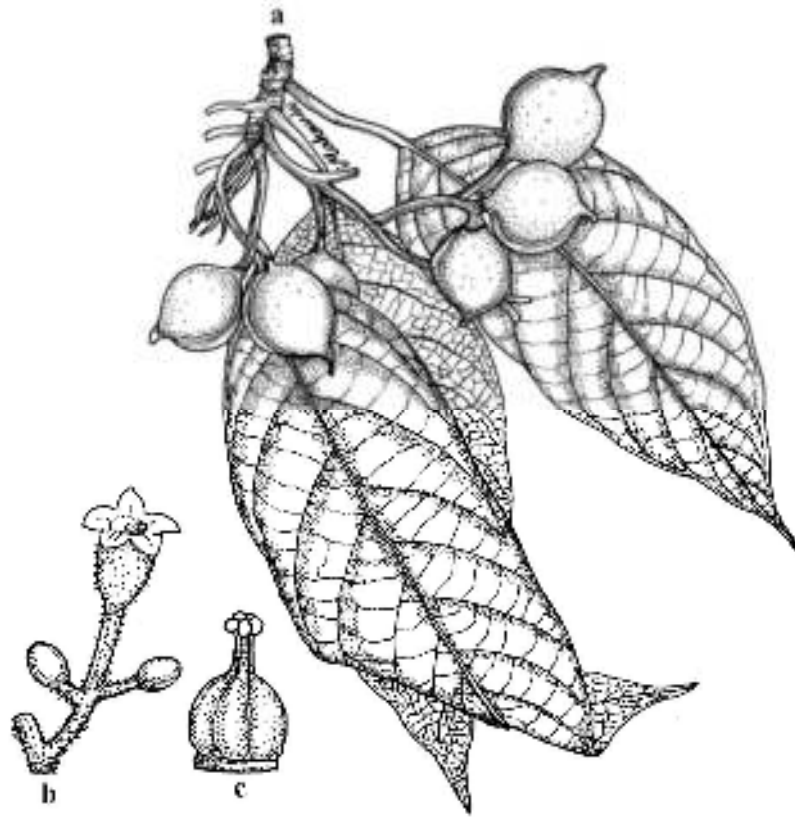


Figure 14. *Heritiera macrophylla* Wall. ex Kurz.: a) Fruiting shoot; b) flowers and c) gynoecium.

young, glabrous when old, densely silvery lepidote scaly beneath, tri-nerved at base, lateral nerves 2-7 pairs, pinnate; petioles 1-3 cm long, stout, peltate scaly, swollen at both ends; stipules scaly, lanceolate or subulate, 2-3 mm long, caducous and leaving scar. Inflorescence axillary panicles, densely covered with stellate tomentose scales. Flowers small, bisexual or unisexual, cream coloured. Calyx campanulate, 5-toothed. Petals absent. Male flowers: adnate anthers in a regular ring on an androgynophore topped by sterile ovary. Female flowers: carpels 5, subdistinct, superior, alternating at base with pair of staminodes, ovules 1-2 in each carpel, stellate scaly; styles short; stigmas 5. Fruit of 1-6 samaroid carpels, 5-7 cm long, glabrous, red, wing membranous, 1-seeded. *Fl. & fr.*: 4-12. *Wet & evergreen hilly forests; between 400-1000 m altitude.*



Figure 15. **Heritiera papilio** Bedd.: a) Fruiting shoot; b) open male flower; c) open female flower; and d) fruit.

**Khagrachari:** Jugholchori Reserve Forest, Panchari, 08 v 2017, *Kowser et al.* KH-4820 (DACB). **Rangamati:** Machalong Reserve Forest, Bagaichari, 16 v 2017, *Kowser et al.* KH-4977 (DACB). **Sylhet:** Wall. Cat. no. 7836 (K); Longai Reserve, 27 xii 1914, *U.N. Kanjilal* 4934 (ASSAM).

India and Myanmar.

Timber is hard and takes a fine polish. It is used for temporary construction work as poles and posts and for making agricultural implements (Purkayastha, 1996).

**Kleinhovia** L., Sp. Pl., ed. 2, 2: 1365. 1763.

Type species: *Kleinhovia hospita* L.

Trees. Leaves ovate, entire, basally palmately 3-7-veined. Inflorescence terminal, cymose, forming a lax panicle. Flowers bisexual, zygomorphic. Epicalyx lobes minute, lanceolate. Sepals 5, free. Petals 5, unequal. Stamens 15; filaments connate into a staminal tube, completely adnate to ovary stipe to form androgynophore, upper part of staminal tube enlarged and urceolate, enclosing pistil; anthers in 5 groups of 3, 2-celled; staminodes reduced to small teeth alternating with anther fascicles. Ovary on top of androgynophore, 5-loculed, 5-lobed; ovules 5 in each locule; style slender; stigma 5-lobed. Capsule membranous, inflated, loculicidal. Seeds 1-2 in each locule, globose, verrucose.

**Kleinhovia hospita** L., Sp. Pl., ed. 2, 2: 1365. 1763; M.J.Mast. in Hook.f., Fl. Brit. India 1: 364. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 962. 1903 (Indian reprint 1963); Gagnep. in Fl. Gen. I.-C. 1: 497. 1911; Abedin and Ghafoorin Nasir & Ali (eds.), Fl. W. Pakistan 99: 15. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 434. 1993; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 71. 2012. *Cattimarus hospitus* Kuntze, Revis.Gen. Pl. 1: 77. 1891. *Grewia meyeniana* Walp., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 311. 1843. **Fig. 16.**

Bengali: *Bholla*, *Bola*      English: Bataria Teak, Common Sterculia, Guest Tree

Evergreen trees, usually growing 6-10 m tall, but up to 20 m tall in secondary forest. Bark grey. Leaves simple, broadly ovate, 6-18 × 5-16 cm, base cordate or subcordate, apex acuminate or acute, margin entire or sparsely dentate in upper part, stiff, leathery, abaxially puberulent when young, adaxially glabrous; petiole 2-5 cm long. Inflorescence terminal panicles or thyse, 20-40 cm long, densely flowered, hairy. Flowers small, pink, 6-8 mm long. Calyx cup shaped, sepals pink, petaloid, c. 6 mm long. Petal pink, shorter than sepals, 1-cucullate, apex yellow, shorter than others. Androgynophore long, hairy. Ovary globose, hairy, usually only 1 ovule developed in each locule; style glabrous. Fruit a thin-walled, inflated capsule, broadly pyriform, 5-angled, 1-2 cm long, apex rounded, shiny-brown to purplish, greenish pink when mature, pendulous. Seeds globose, 1.5-2.0 mm diameter, black or dark brown.  $2n = 20$  (Wilkins & Chappill 2002). *Fl. & fr.*: 11-2. *Well-drained moist soils of coastal forests or riverine, grass lands, secondary forests; up to 500 m altitude.*



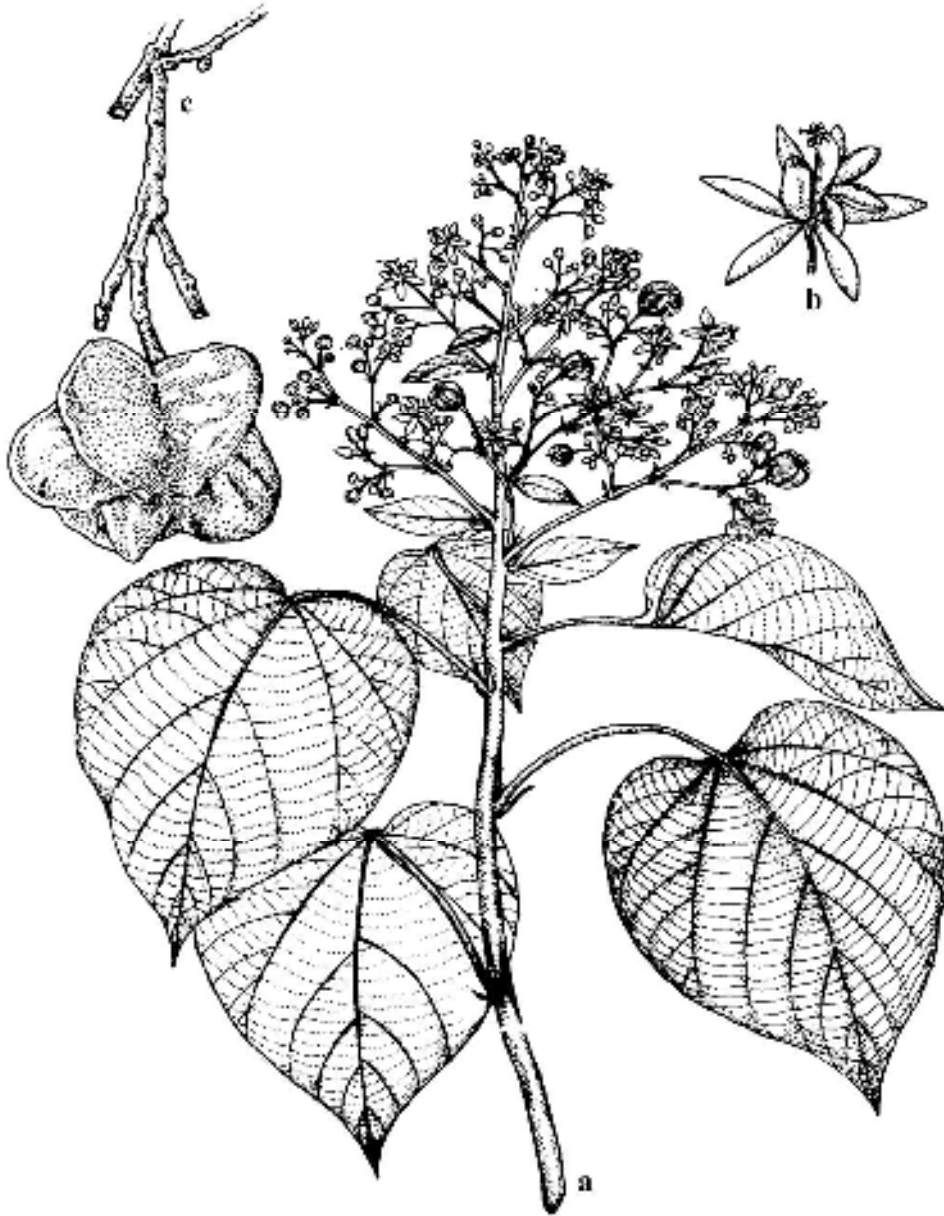


Figure 16. *Kleinhovia hospita* L.: a) Fertile shoot; b) flower; and c) fruit.

**Dhaka:** Specific locality unknown, 26 xi 1945, Sukdeo, s.n. (DUSH); Sadarghat, 26 xii 1943, Atul, s.n. (DUSH); Sadarghat, 26 xii 1943, S.K. Sen, s.n. (DUSH).  
**Rangamati:** Chondroghona, Kaptai, 15 i 1988, s.n. (DACB).

Australia, China, Honduras, India, Indonesia, Madagascar, Malaysia, Papua New Guinea, Panama, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

The species is planted in gardens and as an avenue tree. Branches are often twisted and favoured for ornamental pieces such as knife handles. Straight branches are used for house rafters. Young leaves and shoots are eaten as vegetables. Leaf and bark extract is used as hair wash to kill lice, treat scabies. Timber used for making agricultural instrument and fuel. The bast fiber is durable and widely used for tying bundles. It is also made into rope and for making halters.

**Melochia** L., Sp. Pl.: 674. 1753.

Lectotype species: *Melochia corchorifolia* L.

Herbs, shrubs or small trees. Leaves simple, alternate and petiolate. Flowers bisexual, 5-merous, small, in axillary or terminal clusters. Sepals 5, connate at base. Petals 5, free, deciduous or very inconspicuous. Stamens 5, opposite to the petals, united towards the base, anthers extrorse. Ovary sessile, 5-loculed, each locule with 2 ovules, styles 5, free, subulate. Fruit a capsule, globose or ellipsoid, loculicidally 5-valved. Seed 1 in each locule, triangular, stony, winged, endospermous, embryo straight and cotyledons flat.

**Melochia corchorifolia** L., Sp. Pl.: 675. 1753; M.J. Mast. in Hook.f., Fl. Brit. India 1: 374. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 190. 1903 (Indian reprint 1963); Malick in Sharma & Sanjappa (eds.), Fl. India 3: 441. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceyl. 9: 414. 1995; Heinig, List Pl. Chitt. Coll. & HT.:7. 1925; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 338. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 71. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 415. 2018. *Geruma subtriloba* Blanco, Fl. Filip. [F.M. Blanco] 182. 1837. *Hibiscus donii* Walp., Repert. Bot. Syst. (Walp.) 1: 304. 1842. *Hibiscus endlicheri* Walp., Repert. Bot. Syst. 1: 304. 1842. *Lochemia corchorifolia* Arn., Ann. Sci. Nat., Bot., sér. 2, 11: 172. 1839. *Melochia affinis* Wall., Numer. List [Wall.] n. 1198. 1829. *Melochia burmanni* Zoll. & Moritzi, Syst. Verz. 27. 1846. *Melochia concatenata* L., Sp. Pl. 2: 675. 1753. *Melochia erecta* Burm.f., Fl. Indica 143. 1768. *Mougeotia corchorifolia* (L.) Kunth, Nov. Gen. & Sp. 5: 326. 1823. *Riedlea concatenata* DC., Prodr. [A. P. de Candolle] 1: 492. 1824. *Riedlea corchorifolia* DC., Prodr. [A. P. de Candolle] 1: 491.

1824. *Polychlaena ramosa* G. Don, Gen. Hist. 1: 488. 1831. *Sida cuneifolia* Roxb. Fl. Ind., ed. 1832, 3: 170. 1832. *Visenia corchorifolia* (L.) Spreng., Syst. Veg. 3: 30. 1826. **Fig. 17.**

Bengali: *Bish karali* (Marma), *Jarbo maresh* (Chakma), *Tiki-okka*

English: Chocolate-weed.

Annual, erect or decumbent herbs, up to 1 m tall. Young parts sparsely hairy, later becomes glabrescent. Leaves ovate, ovate-lanceolate, oblong-ovate or suborbicular, 3-10 × 1-4 cm, base obtuse to truncate, apex acute, margin irregularly serrate, chartaceous, sparsely hairy then glabrescent on both surfaces, 5-nerved at base; petioles 1.0-1.5 cm long, hairy; stipules linear, 2-4 mm long. Inflorescence terminal or axillary, dense cyme. Epicalyx lobes 4, linear, hairy. Sepals 5, united at the base, cup-shaped, hairy outside. Petals 5, free, oblanceolate, opposite of calyx segments, white to pinkish. Stamens 5, free, inserted at base of petals, anthers extrorse. Ovary sessile, ovoid, with 5 longitudinal lobes, hairy, styles 5, long, ovules 2 in each locule. Fruit a capsule, globose or subglobose, 3-5 mm across, loculicidally 5-valved, villous. Seeds brown, ovoid, slightly triangular, 2 mm long, one in each locule.  $2n = 36, 46$  (Wilkins & Chappill 2002). *Fl. & fr.*: 1-12. *Mostly found in sunny or slightly shaded, humid localities such as river banks, lake shores and alluvial plains.*

**Chattogram:** Chittagong University Campus, 29 viii 2016, *Kowser et al.*, KH101 (DACB 53893); Location Unknown, 09 ix 2001, *Harun & Rahman*, 604 (DACB 39911); CU Botanical Garden, 22 ix 2011, *M.M. Islam*, 9155 (CUH). **Cox's Bazar:** Kochchhapia, Near Kolahata, Chakaria, 20 viii 1981, *Mia et al.*, M-620 (DACB 14230); Moheshkhali, 31 viii 1981, *Mia et al.*, M-671 (DACB 14232); Teknaf Thana, 28 x 1996, *Khan & Mia*, K-9702 (DACB 38925); St. Martin Island, 29 x 1963, *M.S. Khan*, K-654 (DUSH). **Cumilla:** Rajeshpur near Tripura border, 13 xi 1970, *Khan & Huq*, K-2189 (DACB 14229). **Dhaka:** Posta, 25 ix 1945, *Chattergy & Khan* (DUSH); Gulshan, 29 xi 1964, *M. Baksha*, 85 (DUSH); 21 viii 1940, *P. Maheshwari* (DUSH); Monipur, 23 xii 1940 *R. Khan* (DUSH); High Court compound, 28 ix 1963 *A. Gani* (DUSH); Abdul Gani Road, 20 vi 1968 *H. Hasan*, 113 (DUSH); Tejgaon, 24 ix 1942, *S.K. Sen* (DUSH); Azimpur, 15 viii 1969, *S. Jahan*, 134 (DUSH); Ayubnagar, 19 x 1968, *Panna*, 056 (DUSH); Mowchak, 17 x 1969, *Asiya*, 202 (DUSH); Savar, 07 08 1969, *H. Jahan*, 163 (DUSH); Rokeya Hall, 18 ix 1969, *A. Mansur*, 118 (DUSH); Agargaon, 07 iv 1995, *S. Sabnam*, 24 (DUSH); Savar, 21 vii 1995 (DUSH); Uttara, 1 i 1995, *Z. Islam*, 080 (DUSH); Jahangirnagar Univ. Campus, Savar, 31 x 1999, *R. Khanam*, 2010 (DACB 31074).



Figure 17. *Melochia corchorifolia* L.: a) Fertile shoot; b) flower; and c) fruit.

**Faridpur:** Roypur, 22 x 1961, *A.A. Khan*, 020 (DUSH). **Gazipur:** Jaydebpur-Sripur Sal Forest, 22 x 1977, *Khan et al.*, K-4718 (DACB 14245). **Jamalpur:** Jamalpur sadar, 8 vi 1977, *Huq & Rahman*, H-3430 (DACB 14244). **Khagrachhari:** Mohalchari, 15 vi 1983, *Huq et al.*, 5867 (DACB 14231). **Moulvibazar:** Sreemangal Tea Research Station, 10 x 1973, *Khan & Huq*, K-3136 (DACB); Juri, 20 x 1973, *Haque & Paul*, H-153 (DUSH); Kalenji, Adampur Beat, Rajkandi Forest, 23 ix 2019, *A. Saeed*, ASQ-040 (DACB 62322). **Natore:** Chalanbeel, Gurudashpur, 20 ix 1996, *Khan & Rashid*, K-9598 (DACB). **Noakhali:** Maijdi, 01 xi 1963, *D. Mohammad*, 034 (DUSH). **Patuakhali:** Kolapara, Kuakata, 13 x 2019, *M. Sultana*, DMS-2887 (DACB 59999). **Rajshahi:** Nowahati, 13 xii 1972, *A.M. Huq*, 705 (DACB 12234). **Rangamati:** Location Unknown, 06 vi 1969, *M.S. Khan*, K-1764 (DUSH); Rampahar, Kaptai, 02 x 2011, *M. M. Islam*, 9256 (CUH); Pablakhali, 26 ix 1977, *Khan et al.*, K-4676 (DACB 14233). **Sylhet:** Shalutikar, 27 iv 1968, *Sudhangshu*, 097 (DUSH).

Australia, Benin, Borneo, Brazil, Chad, China, Congo, Gabon, Gambia, India, Japan, Java, Kenya, Korea, Madagascar, Malawi, Malaysia, Mozambique, Myanmar, Papua New Guinea, Panama, Philippines, Polynesia, Sarawak, Senegal, Solomon Island, South Africa, Sumatra, Sri Lanka, Taiwan, Thailand, Togo, United States of America and Vietnam.

Root extract is used in dysentery. Leaf paste is applied to swelling. The aerial parts, boiled in oil, is used as an efficacious remedy for preventing bad consequences of water snake bite (*Kirtikar et al.*, 2012).

**Pentapetes** L., Sp. Pl. 2: 698. 1753.

Type Species: *Pentapetes phoenicea* L.

Annual herbs or undershrubs. Leaves simple, alternate, narrowly lanceolate, crenate-dentate. Flowers bisexual, solitary, axillary, pedicellate. Sepals 5, connate at base. Petals 5. Stamens 15, connate at base, arranged in 5 groups of 3 each, each group alternate with a staminode. Ovary sessile, 5-locular, each locule with many ovules; styles simple, entire, elongated, often twisted; stigmas 5-lobed, minute. Fruit a capsule, ovoid, woody, loculicidally dehiscent, 5-valved. Seeds 8-12, triangular, wingless.

**Pentapetes phoenicea** L., Sp. Pl. 2: 698. 1753. M.J. Mast. in Hook. f., Fl. Brit. India 1: 371. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 190. 1903 (Indian reprint 1963); Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 443. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceyl. 9: 412. 1995; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 339. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 72. 2012; Alam in Uddin & Hassan, Vas. Fl.

Chittagong & CHT. 2: 416. 2018. *Blattaria phoenicea* (L.) Kuntze, Revis. Gen. Pl. 1: 76. 1891. *Brotera phoenicea* (L.) Cav., Anales Hist. Nat. 1(1): 34. 1799. *Cavanilla phoenicea* J. F. Gmel., Syst.Nat., ed. 13[bis]. 2(2): 1038. 1792. *Dombeya phoenicea* Cav., Diss. 3, Tertia Diss. Bot. 129. 1787. *Eriorhapha phoenicea* (L.) Bamps, Bull. Jard. Bot. État Bruxelles 32: 170. 1962. *Eriorhapha punicea* Miq., Pl. Jungh. [Miquel] 3: 289. 1854. **Fig. 18.**

Bengali: *Baduli, Bandhuli, Dibissa phul (Chakma), Dupurmoni, Kailata, Kupuria, Surjamoni*

English: Copper Cup, Mid Day Flower, Noon Flower, Scarlet Mallow.

Annual herbs, 1-2 m tall. Stem much branched, glabrescent; bark smooth, greenish-brown, with a few scattered stellate hairs. Leaves simple, alternate, linear-lanceolate, 5-15 × 0.5-1.5 cm, base obtuse or cuneate, apex acute, margin serrate, glabrous above, stellate-hairy on veins beneath; petioles 1-10 mm long, hairy; stipules linear, 5-10 mm long. Inflorescence axillary fascicles of 1-3-flowers. Flowers red, open around noon and close following dawn. Sepals 5, up to 1 cm long, free, connate at base, stellate-hairy mixed with simple bristles outside. Petals 5, obovate, c. 1 cm long, round or truncate at apex, free. Stamens in 5 groups of 3 stamens, alternating with 5 staminodes, staminodes linear-spathulate, c. 1 cm long. Ovary ovoid, 5-locular, hairy, ovules many in each locule; styles slender, 1.0-1.5 cm long, often twisted; stigmas 5. Fruit a capsule, subglobose, 5-valved, loculicidally dehiscent. Seeds 8-12, elliptic, stony and wingless.  $2n = 76$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 8-1. *Moist places in crop fields and gardens.*

**Dhaka:** Specific locality, date and collector unknown. 7703 (CAL 59535). **Dinajpur:** Jagathdhal, Birganj, 27 viii 1998, *Mia et al.*, M-4378 (DACB 28797). **Narayanganj:** Fatullah, 14 ix 1973, *A.M. Huq*, H-1088 (DACB 21120). **Natore:** Datmara Graveyard, 17 ix 1996, *Khan & Rashid*, K-9529 (DACB 58924). **Rajshahi:** Rajshahi Univ. Campus, 11 xi 1985, *Khan & Mia*, K-7341 (DACB 14247). **Rangamati:** Amtoli, Pablakhali, 26 ix 1977, *Khan et al.*, K-4682 (DACB 14248). **Tangail:** Garatta, Kadamtali, Ghatail, 20 viii 2015, *K.K. Islam*, KKI-137 (DACB 42179).

Australia, Belize, China, Colombia, Cuba, India, Japan, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Puerto Rico, Sri Lanka, Thailand, United States of America and Vietnam.

Usually planted as an ornamental plant in gardens. Fruit extract contains emollient properties. Mucilaginous fruits are used to treat digestive problems. Roots are astringent, antibilious, reduces gas formation and used to treat fevers.

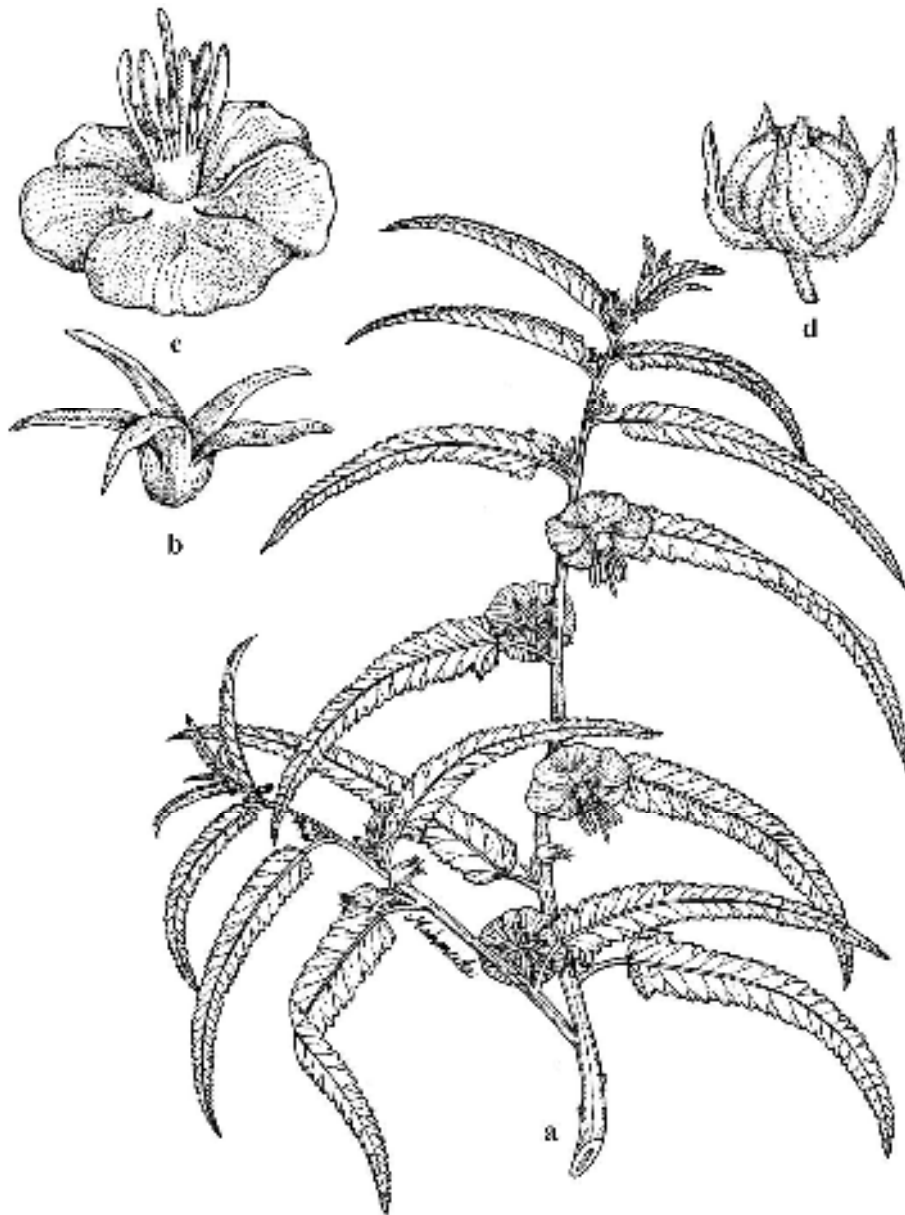


Figure 18. *Pentapetes phoenicea* L.: a) Flowering shoot; b) calyx; c) flower; and d) fruit.

**Pterospermum** Schreber, Gen. 2: 461. 1791.

Type species: *Pterospermum suberifolium* (L.) Willd.

Trees or shrubs, stellate tomentose. Leaves simple, alternate or spirally arranged, oblong, oblong-lanceolate or obovate, often oblique at base, sometimes peltate or subpeltate, acuminate or obtuse or lobed at apex, entire or serrate, petiolet, stipules pinnate palmately lacinate or absent. Flowers bisexual, solitary, regular, large, axillary, rarely terminal, bracteoles persistent or caducous or absent. Sepals 5, free or nearly so. Petals 5, obovate, oblong or linear, deciduous with calyx. Stamens 12-15, staminal column adnate to gynophore, bearing 5 groups of 3 stamens each, staminodes 5 on opposite sepals; anthers linear, erect, connective, apiculate. Ovary inserted at apex of the staminal column, 5-locular, each locule with many ovules, styles slender, stigmas furrowed. Fruit a capsule, woody, smooth or angled, loculicidally 5-valved. Seeds winged in upper part, attached to inner angles of locules in two rows; endosperm scanty or absent.

#### KEY TO THE SPECIES

- |  |                          |
|--|--------------------------|
| 1. Leaves peltate; petals glabrous on both surfaces; style glabrous; capsules angular  | <b>P. acerifolium</b>    |
| + Leaves not peltate; petals hairy on outer surface; styles hairy at least on lower half; capsules not angular                           | <b>3</b>                 |
| 2. Leaves with a slightly oblique base, sparsely hairy or glabrescent on lower surface; fruiting calyx caduceus; capsules elliptic-ovoid | <b>P. lanceifolium</b>   |
| + Leaves with strongly sagittate base, woolly on lower surface; fruiting calyx persistent; capsules cylindrical                          | <b>P. semisagittatum</b> |

**Pterospermum acerifolium** (L.) Willd., Sp. Pl. 3(1): 729. 1800; M.J. Mast. in Hook.f., Fl. Brit. India 1: 368. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 189. 1903 (Indian reprint 1963); Brandis, Indian Trees: 91. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 157. 1934; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 12. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 448. 1993; Das & Alam, Trees of Bangladesh, 237. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 340. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 72. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT.2: 417. 2018. *Cavanilla acerifolia* (L.) J.F. Gmel.: Syst. Nat. 1937 1792. *Dombeya acerifolia* Gaertn., Fruct. Sem. Pl. 2(2): 260. 1791. *Pentapetes acerifolia* L., Sp. Pl. 2: 698. 1753. *Pterospermadendron acerifolium* Kuntze, Revis. Gen. Pl. 1: 80. 1891. **Fig. 19.**



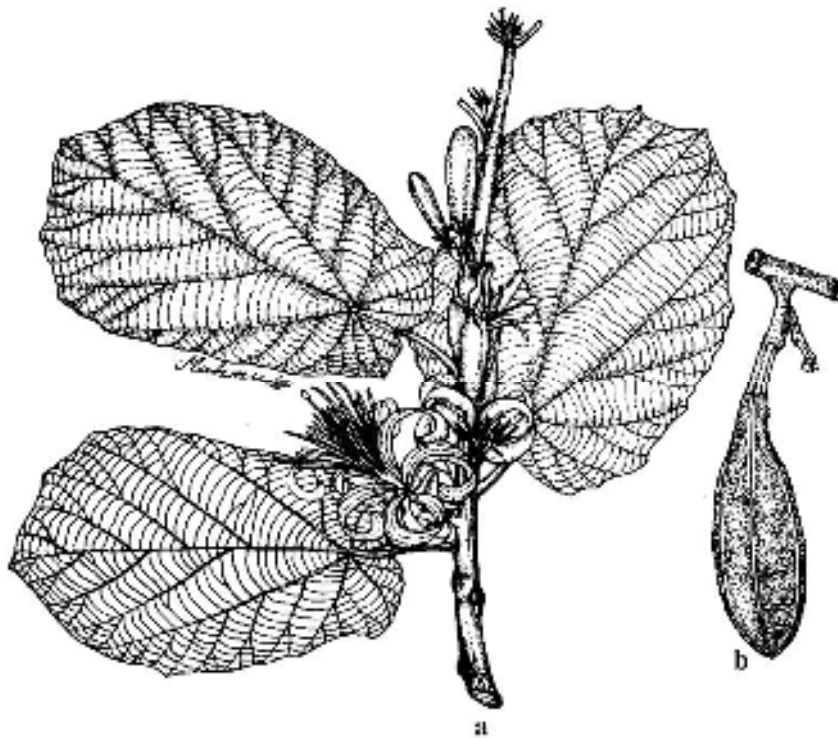


Figure 19. *Pterospermum acerifolium* (L.) Willd.: a) Flowering shoot; and b) fruit.

Bengali: *Kanak-champa*, *Kat champa*, *Moos*, *Muskanda*, *Muchakunda*, *Musganda*, *Muchani pata*, *Sohralum* (Chakma)

English: Dinnerplate Tree, Mapple-leaved Bayur.

Evergreen trees, up to 25 m tall. Bark smooth, grey; branchlets ferruginous-tomentose. Leaves simple, obovate to orbicular or oblong, 18-35 × 12-28 cm, base cordate, sometimes peltate, entire or sinuately lobed at apex, margin coarsely serrate, glabrous and deep green above, silvery or grey-tomentose beneath, palmately 8-10 veined; petioles 5-15 cm long, pinkish; stipules multifid, caducous. Inflorescence axillary, solitary or in 2-3 flowered cymes. Flowers large, white, fragrant, pedicels c 2 cm long; bracts semilunar, clawed; bracteoles palmately divided, caducous. Sepals 5, linear-lanceolate, 8-12 × 0.6-1.2 cm, united at base into short tube, thick, reflexed, obtuse, caducous, rusty pubescent outside, villous inside. Petals 5, linear-oblong or obovate, 6-12 × 0.8-1.2 cm, reflexed, obtuse, stellate-pubescent outside, white. Stamens 15, as long

as petals or shorter, staminodes 5, longer than stamens, clavate. Carpels 5, oblong, pentagonal, 5-loculed, densely rusty tomentose; ovules many in 2 rows; styles long; stigmas clavate. Capsules stalked, oblong, 6-14 cm long, woody, oblong, 5-angled, rusty-brown. Seeds obliquely-ovoid, many in 2 rows, ovate with a thin wing, brown, membranous, endosperm scanty, mucilaginous.  $2n = 38$  (Singhal & Gill, 1987). *Fl. & fr.*: 1-12. *Hill slopes, semievergreen forest and often planted as ornamental.*

**Bandarban:** Beside Sangu River, Ruma, 24 i 2017, *K.K. Islam*, KKI-928 (DACB 47278); Poly Forest Range, Ruma, 25 i 2017, *Imam et al.*, IH-3617 (DACB). **Chattogram:** Sitakund, 13 i 1851, *Hooker & Thomson*, 621 (K); Chunutai, 05 vii 1968, *D.K. Das et al.*, DL-39 (BFRIH); Chainda, 31 iii 1970, *Banik*, (BFRIH); Barkub, 28 iii 1876, *J.L. Lister*, 312 (CAL); Kalapani, Hazarikhil Wildlife Sanctuary, 18 viii 2014, *S.N. Uddin*, N-5447 (DACB 42373); Ichamoti, Ranir Haat, *Kowser et al.*, KH-1719 (DACB 59948); Chakinda, 31 iii 1970, *R.L. Basak*, 051 (BFRIH). **Cox's Bazar:** Nythong Hill, Teknaf, 30 iii 1978, *M. O. Ghani*, 2107 (BFRIH). **Dhaka:** S. Loc., 12 iii 1938, *N.K. Chatterji* (DUSH); Ramna, 10 ii 1954, *Shahjahan*, s.n. (DUSH); Balda Garden, 19 iii 1985, *B.M. R. Khatun*, R-5349 (BFRIH). **Habiganj:** Chunarughat, Tarap Hill, Kalenga Beat, 01 iv 1997, *Huq & Islam* H-(DACB 10410); Chanbari, Rema-Kalenga WS, 16 iii 1999, *M.Z. Uddin*, 587 (DUSH); Satchari National Park, 04. xii 2009, *Kamrul*, 178 (DUSH). **Khagrachhari:** Washong Mouza, Matiranga, 20 ii 1978, *M.K. Alam* 232 (BFRIH). **Khulna:** Near Railway Station, 16 vi 1982, *A.M. Huq*, H-5537 (DACB). **Moulvibazar:** Kamalganj, Rajkandi Forest Range, Adampur, 8 xii 2013, *K. Haque*, 1896 (JUH); Kamarchara, 8 xii 2013, *K. Haque*, 1897 (JUH); Kurma, 9 xii 2013, *K. Haque*, 1898 (JUH). **Kishoreganj:** Sultanpur, Kotiadi, 12 iii 1993, *S.R. Basak*, 474 (BFRIH). **Munshiganj:** Vikrampur, 30 x 1868, *C.B. Clarke*, 7937 (BM). **Naogaon:** Naogaon Park, 10 iii 1976, *M. Halim*, 122 (DACB 14252). **Rangamati:** Barkal, 28 iii 1876, *J. L. Lister*, 312 (CAL); Sitapahar, Kaptai, 18 vi 1995, *M.M. Haque*, 7461 (BFRIH); Damachhara, Kaptai, 09 iii 1961, *D.K. Das et al.*, 27 (BFRIH); Rampahar, Kaptai Reserve Forest, 25 iii 2010, *S.N. Uddin*, N-4197 (DACB 41409); Mainimukh Kalokuchia Forest, 28 xii 1981, *Huq et al.*, H-5452 (DACB 14249); Dhamaipara, Jurachhari, 25 ix 1998, *M.A. Rahman*, 3449 (CUH). **Sylhet:** Khadimnagar National Park, 10 v 2018, *M. Sultana*, DMS-2254 (DACB 58963). **Tangail:** Modhupur Sal Forest, 05 v 2017, *M.A. Rahim*, 1668 (JUH).

Australia, Belgium, Bhutan, Brazil, China, Guadeloupe, India, Indonesia, Jamaica, Japan, Laos, Madagascar, Malaysia, Myanmar, Pakistan, Philippines, Thailand and United States of America.

Flowers are used as a general tonic and as a cure for leucorrhoea, smallpox, gastralgia, blood diseases, tumours, ulcers, leprosy and inflammations. Tomentum of the leaves is employed as a haemostatic (Ghani, 2003). Flower paste is used as a cure for swellings of leg and killing hair lice. Dried flower is smoked as tobacco for relief of headache. Dried flowers are kept under the bed for repelling bed bugs. It is often planted in garden, roadside, park as an ornamental plant for its beautiful, fragrant blooms, large leaves, and the shade it provides.

**Pterospermum lanceifolium** Roxb., Fl. Ind., 3: 163. 1832; Brandis, Indian Trees: 92. 1906; Kanjilal *et al.*, Fl. Assam 1: 158. 1934; M.J.Mast. in Hook.f., Fl. Brit. India 1: 368. 1874 (Reprint 1961); Malick in Sharma & Sanjappa (eds.), Fl. India 3: 450. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 341. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 73. 2012. *Pterospermum jackianum* Wall. ex M.J. Mast. in Hook.f., Fl. Brit. India 1: 367. 1874. *Pterospermum pierrei* Hance. J. Bot. 15: 329. 1877. *Pterospermum insulare* Pierre, Fl. For. Cochinch.: t. 180. 1888. **Fig. 20.**

Bengali: *Bankula*, *Ban-baguri*, *Motanahor*

Small or medium-sized tree, occasionally up to 30 m tall. Bark yellow-brown or gray, striate; branchlets yellow-brown velutinous when young. Leaves alternate, lanceolate-oblong or obovate-oblong, 4-10 × 2-4 cm, base slightly oblique or auriculate, apex acuminate or acute, margin serrate on the upper half, abaxially densely yellow-brown or yellow-white velutinous, adaxially glabrous; petioles 5-12 mm long; stipules 2-3-fimbriate, velutinous, longer than petiole, subulate, caducous. Inflorescence axillary, solitary. Flowers solitary, pale white, fragrant, 5-6 cm across; pedicels 3-5 cm long, articulate, velutinous; epicalyx lobes at middle of pedicel, 4- or 5-fimbriate or linear, 6-8 mm long. Sepals 5, free, linear to lanceolate, 1.5-2.0 × 0.2-0.4 cm, brown hairy outside, villous inside. Petals 5, oblanceolate or spatulate, 1.5-1.8 × 0.2-0.3 cm, white, free, sweet scented, hairy outside, apex obtuse. Stamens 15, c 1.5 cm long, staminodes 5, filiform, 1.8-2.0 cm long, basally villous. Ovary ovoid or ellipsoid, c 1.0 × 1.5 cm, hairy, 5-loculed, each locule with many ovules, puberulent; styles slender, hairy; stigmas 5, twisted. Capsules cylindrical-ovoid, 4-5 × 1.6-2.2 cm, woody, loculicidally 5-celled, yellow-brown tomentose, base tapering into slender, 3-5 cm stipe, apex obtuse. Seeds 2-4 per locule, 2-3 cm long including wing, compressed, oblong, papery, brown. 2n=38 (Pal, 1973). *Fl. & fr.*: 4-10. *Fringes of deciduous and scrub forests; between 800-900 m altitude.*

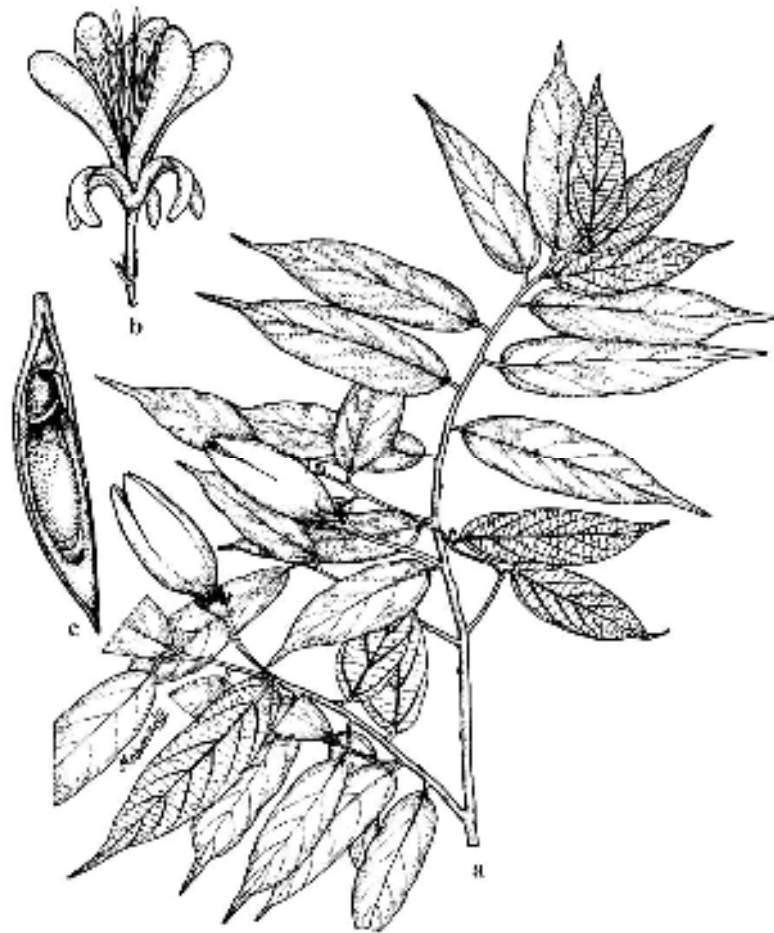


Figure 20. *Pterospermum lanceifolium* Roxb.: a) Fructing shoot; b) flower; and c) open fruit.

**Moulvibazar:** Lawachara National Park, Kamalganj, 10 x 2010, *S.N. Uddin*, N-4454 (35496). **Sylhet:** *Wailich*, 1172 (K, BM); Sylhet Station, 24 ix 1872, *C.B. Clarke*, 17955 (BM); Specific location unknown, 15 i 1905, *S. Abu Hussain*, 90 (CAL); Jafflong, 30 iv 1981, *Huq et al.*, H-5121 (DACB 14258); Jafflong, 21 x 1986, *Huq & Mia*, H-7935 (DACB 14264); Naricha Lakhimamla, 03 iii 1886, *T. K. Gupta*, 2849 (ASSAM).

Belgium, China, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Papua New Guinea, Singapore, Thailand, Trinidad & Tobago and Vietnam.

Timber is moderately hard, strong and close-grained and used as firewood.

**Pterospermum semisagittatum** Buch.-Ham. *ex* Roxb., Fl. Ind. 3: 160. 1832. M.J.Mast. in Hook.f., Fl. Brit. India 1: 368. 1874 (Reprint 1961); Kurz, Fl. Brit. Burma 1: 146. 1877; Prain, Beng. Pl. 1: 189. 1903 (Indian reprint 1963); Brandis, Indian Trees: 91. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 453. 1993; Das & Alam, Trees of Bangladesh: 238. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 342. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 73. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 418. 2018. *Eriolaena roxburghii* Spreng., Syst. Veg. 3: 123. 1826. **Fig. 21.**

Bengali: *Bara assar, Dikranga asar (Chakma), Laona Assar, Lana, Laona*

Deciduous or evergreen trees, up to 20 m tall. Young parts tomentose, bark ash-coloured. Leaves simple, alternate, lanceolate, 11-18 × 3-4 cm, sessile, base unequal, one basal lobe rounded and other lobe longer triangular, apex acuminate, margin entire, glabrous above, hairy beneath, 5-7 nerved; petioles 3-6 mm long; stipules deeply segmented, yellowish, filiform. Inflorescence usually solitary, terminal or axillary on short drooping brownish tomentose peduncles. Flowers large, 11-15 cm across, white; bracteoles 3, 2-3 cm long, palmately long, conspicuous. Sepals 5, linear, 8-10 cm long, stellate-tomentose outside, velvety inside. Petals 5, obliquely obovate-cuneate, 4-5 cm long, fragrant. Stamens 15, up to 3 cm long, staminodes 5, 4-5 cm long. Ovary superior, c 4 mm in diameter, globose, 5-locular with many ovules in each locule, tomentose, styles hairy at base, stigmas 5, club-shaped. Capsules woody, cylindrical, rusty-tomentose, 4-7 cm long, 5-celled. Seeds many, compressed with a thin wing. *Fl. & fr.*: 1-12. *Evergreen forests, dry forests and secondary formations; between 100-900 m altitude.*

**Bandarban:** Maurchora, Poly Forest Range, Ruma, 25 i 2017, *K.K. Islam*, KKI-991 (DACB 47170); Kuhalong Para, Kualong, 24 iv 2017, *U.M. Marma*, UMN-120 (DACB); Gumdum, Naikhyongchari, 05 v 2017, *U. Chakma*, UC-242 (DACB). **Chattogram:** Chattogram sadar, 15 x 1885, *Badal Khan*, 235 (CAL); Paranjuran, Dhopachhari, 03 vi 1998, *M.A. Rahman et al.*, 3010 (CUH); V.C. Hill, CU Campus, 24 xii 2010, *M.M. Islam*, 7660 (CUH); Jaldi Range, Taballa Chera, 6 v 1921, *J.M. Cowan*, 399 (E); Gobania, 31v 1920, *J.M. Cowan*, 335 (E); Mirsora, 19 v 1920, *J.M. Cowan*, 126 (E); Sitakund 05 i 1851, *Hooker & Thomson*, 374 (K); Chunati Reseve Forest, 09 vi 1979, *Khan et al.*, K-5494 (DACB 14262); Cheval Reserve forest, 10 vi 1967, *Majumdar & Islam* 73A (K); Gagra, 30 iv 1980, *D.K. Das*, 3932 (BFRIH); Khoilampara, 19 xi 1980, *Khan et al.*, K-6056 (DACB 14260); Baluthila-Haikha, Ramghor Rd, 21 ix 1987, *Huq & Mia*, H-8527 (DACB 14266); Rangamatia, Fatikchori, 20 i 1989, *Haqet al.*, H-8982 (DACB 14267); Bariyadhala Range, Bariyadhala to Wards Hazarikhil, 23 vi 1993, *Mia et al.*, M-3266 (DACB 26415); Bariyadhala Range,



Figure 21. *Pterospermum semisagittatum* Buch.-Ham. ex Roxb.: a) Flowering shoot; b-c) flower; d) petal; e) stamens & staminodes; f) gynoecium; and g) T.S. of fruit.

Hazarikhil Chunati Game Reserve Forest, 22 iv 1994, *Huq & Mia*, H-10318 (DACB 26322); Harbhanga to Aziznagar, 13 vi 1979, *Khan et al.*, K-5609 (DACB 14261); Komolachari, Rangunia, 09 i 2017, *Tajul et al.*, TOK-2893 (DACB 54957); Mithachora, Fatehpur, , 04 iv 2017, *I. Mahmud*, IQ-684 (DACB); Dudhpukuria, Rangunia, 08 i 2017, *Tajul et al.*, TOK-2830 (DACB 54956); Banshkhali Eco Park, 22 v 2017, *Tajul et al.*, TAK-5205 (DACB 54954); Bariyadhala, Sitakundo, 28 xi 2017, *Moniruzzam et al.*, MAK-6640 (DACB 54950); Komaldoho, Mirsora, 26 ii 2018, *Moniruzzaman et al.*, MAK- 7808 (DACB 54959); Chakinda, 31 iii 1970, *R.L. Basak*, 051 (BFRIH); Chunati, 19 v 1966, *D.K. Das*, 73 (BFRIH); Datmara, 31 v 1972, *M. Jahid*, 093 (BFRIH); Uttar Gagra, Itchamati 30 iv 1980, *Das & Alam*, 3932 (BFRIH); Harbang, 14 v 1985, *Das & Alam*, 5223 (BFRIH); Chikanchhara, 30 i 1971, *D.K. Das*, 010 (BFRIH); Gaghra, Ichhamati, 30 v 1972, *M.K. Alam*, 082 (BFRIH). **Cox's Bazar:** Kelatali, 21 iii 1945, *J. Sinclair*, 4054 (E); Razu Reserved Range, 17 v 1920, *J.M. Cowan* (E); Harbang, Goalmaria block, Nalbaria, 26 xii 1988, *Khan et al.*, K- 7957 (DACB 27351); Near Jahajpura, 14 xii 1992, *Khan et al.*, K-8806 (DACB 24823); Bara Inani, 22 xii 1996, *Mia et al.*, M-3632 (DACB); Whykong Range, Harikhola, 02 vi 2000, *Khan et al.*, K-10253 (DACB); Dulahajra Safari Park, Chakaria, 16 iv 2004, *S.N. Uddin*, N-2269 (DACB 43390); Jilongha, Uttarn R/A, 27 ix 2016, *Niyamul et al.*, NK-440 (DACB 58614); Himchari, 15 xi 2016, *Niyamul et al.*, NK-1624 (DACB 58614); Domdomia Natural Park, Teknaf, 29 iii 2017, *Niyamul et al.*, NK-829 (DACB 58613); Soankhali, Inani, 17 iv 2017, *Niyamul et al.*, NK-3984 (DACB 60212); Dineshpur, Moheskhali, 02 v 2017, *Niyamul et al.*, NK-3653 (DACB 58616); Palongkhali, Ukhia, 04 iv 2017, *M. Uddin*, MU-100 (DACB); Whykeong, Teknaf, 29 iii 1998, *M.A. Rahman et al.*, 2650 (CUH); Fasiakhali Range, Dulahazra, 08 ii 1991, *Rahman & Sarker*, 7004 (BFRIH). **Dhaka:** Ramna Park, Shahbag, 15 v 2019, *M. Sultana*, DMS- 2842 (DACB 55819). **Habiganj:** Rema-Kalenga, WS, 6 iv 1998, *M.Z. Uddin*, 1072 (DUSH). **Khagrachhari:** Pankhayepara, 03.06.2000, *Yousuf et al.*, 1372 (BSIRH); Achalong reserve forest, Matiranga, 23 v 2017, *Kowser et al.*, KH-5097 (DACB 54960); Jugalchari R. Forest, Panchari, 16 iv 2017, *M. Mahfuj*, 5271 (DACB 54955); Bokripara, Gujjabil, Manikchari, 25 x 2016, *Kowser et al.*, KH-1470 (DACB); Anokchuri, Jugolchuri, 05 ix 2016, *Kowser et al.*, 421 (DACB); Merung Reserve Forest, Dighinala 14 xii 2017, *Kowser et al.*, KH-7945 (DACB); Logan forest, Panchari, 06 i 2017, *Kowser et al.*, KH-3121 (DACB); Shilachuri para, Lokhichuri, 18 x 2016, *Kowser et al.*, KH-1153 (DACB). **Rangamati:** Poranjuran, Dhupchari, 03 vi 1998, *Ullah et al.*, 3010 (DACB 28938); Rampahar, Kaptai, 15 xii 2004, *S.N. Uddin*, N-2546 (DACB); Karnafuli Sadar Beat, Kaptai, 10 v 2010, *S.N. Uddin*, N-4221 (DACB 45576); Jaingachara, Choto Harina, Barkal, 09 xii 2015, *K.K. Islam*, KKI-1948 (DACB 45972); Pablakhali, 2015, *Rahim et al.* (JUH). **Sylhet:** Tamabil, 29 iv 1981, *Huq et al.*, H-5078 (DACB 14265).



Brazil, China, Cambodia, India, Lao PDR, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.

Wood is heavy and is used for making agricultural implements, axe handles and is used as house pole (Das and Alam, 2001). The bark is used as a masticatory substituting *Areca* nuts. Bark fibres are used for cordage.

**Pterygota** Schott & Endl., Melet.: 32. 1832.

Type species: *Pterygota roxburghii* Schott & Endl. *nom. Illeg.*

Trees. Leaves simple, spirally arranged, undivided, margin entire. Flowers 5-merous, unisexual or polygamous. Inflorescence panicles in the axils of fallen leaves. Sepals deeply 5-partite. Petals absent. Stamens 5 or more, staminal column cylindrical, bearing 4-5 groups of about 4-5 anthers in each male flower. Carpels 5, free, ovary sessile, ovules many, styles short, recurved, stigmas globose, 2-lobed. Fruit a follicle, large, hard, woody. Seeds many, winged at apex, compressed.

**Pterygota alata** (Roxb.) R.Br., Pterocymbium 234. 1844; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 23. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 455. 1993; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Das & Alam, Trees of Bangladesh: 238. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 343. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 73. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 419. 2018. *Clompanus alata* Kuntze, Revis. Gen. Pl. 1: 78. 1891. *Erythropsis roxburghiana* Schott & Endl., Melet. Bot. 33. 1832. *Pterygota roxburghii* Schott & Endl., Melet. 32. 1832. *Sterculia alata* Roxb., Pl. Corom. 3: 84. 1820; M.J. Mast. in Hook.f., Fl. Brit. India 1: 360. 1874 (Reprint 1961); Kurz, Fl. Brit. Burma 1: 134. 1877; Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963); Brandis, Indian Trees: 83. 1906; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Kanjilal *et al.*, Fl. Assam 1: 153. 1934. **Fig. 22.**

Bengali: *Buddha-narikel*

English: The Buddha's Coconut Tree

Large deciduous trees, up to 40 m tall. Crown conical; young parts golden-pubescent; bark greyish-brown with horizontal wrinkles and shallow vertical fissures, blaze yellowish, bole often buttressed. Leaves simple, usually clustered at end of branchlets, broadly ovate with a cordate base, 10-25 × 7-15 cm, margin wavy, smooth, apex pointed or tapering, veins 5 or 7; petioles 4-10 cm long. Inflorescence small, few-flowered racemes, rusty-tomentose. Flowers brownish-yellow, 1.0-1.5 cm across, unisexual, male flowers or bisexual but functionally female flowers; pedicels 2-3 mm long. Calyx 5-6





Figure 22. ***Pterygota alata*** (Roxb.) R.Br.: a) Flowering shoot; b) flower; c) fruit; and d) seed.

lobed, linear-oblong, 10-15 × 3-4 mm, densely stellate-hairy outside, sparsely velvet-hairy and purple with red streaks within. Petals absent. Male flowers with staminal column half to three-fourth length of calyx bearing 4-6 groups of 4 anthers each. Female or bisexual flowers: sessile anthers are arranged in clusters of 4 or 5 in sinuses formed by carpels; carpels 5, ovary sessile, 2-3 mm long, pubescent; styles short, recurved; stigmas rounded. Follicles woody, obliquely globose, 7-12 cm in diameter. Seeds c. 40 per follicle, oblong, compressed, in 2 rows, winged.  $2n = 40$  (Singhal & Gill, 1987). *Fl.* & *fr.*: 9-4. *Highlands and open sunny drylands.*

**Bandarban:** Ruma, 28 ii 1988, *Alam & Mohiuddin*, 6007 (BFRIH). **Bogura:** RDA Campus, Dosmail, 08 xi 2020, *Z. Nasrin*, ZN-03 (DACB). **Chattogram:** Chunati Game Sanctuary, 24 iv 1994, *Huq & Mia*, H-10332 (DACB 26376). **Dhaka:** S. Loc., 24 ii 1947, *Sukdeo* (DUSH); Azimpur Army Recruiting office compound, 1 xi 1963, *A.F. Muhammad*, 34 (DUSH); Ramna, 3 ii 1947, *S.K. Sen* (DUSH); TSC, Univ. of Dhaka, 10 ix 1982, *A.M. Huq*, H-5688 (DACB 4254).

Bhutan, Brazil, Cameroon, Caribbean, China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, South Africa, Sri Lanka, Thailand, United States of America and Vietnam.

The seeds are used as a substitute for opium (Kirtikar *et al.*, 2012). Wood is white and has great potential for pulping because of long fibres. Seeds are eaten after roasting (Das and Alam, 2001).

**Scaphium** Schott & Endl., Melet.: 33. 1832.

Type species: *Scaphium wallichii* Schott & Endl.

Trees. Leaves simple, spirally arranged, entire, stipules caducous. Flowers unisexual, small, pale green, axillary or terminal panicles. Calyx 4-6 lobed, united at base, glabrous inside. Corolla absent. Male flowers with 8-10 stamens, on a globose head at end of a slender staminal column. Female flowers with 5 carpels, free, styles free, stigmas simple, pointed. Fruit a large follicle, leafy, boat-shaped, dilated at base, opening long before maturity, membranous. Seeds wingless, solitary, albuminous, radicle next the hilum.

**Scaphium scaphigerum** (Wall. ex G. Don) G.Planch., Hist. Nat. Drog. Simpl. ed. 7, 3: 653. 1876; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 344. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 74. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 420. 2018. *Clompanus scaphigera* (Wall. ex G. Don) Kuntze, Revis. Gen. Pl. 1: 78. 1891. *Sterculia scaphigera* Wall. ex G. Don, Gen. Hist. 1: 517. 1831. *Sterculia scaphigera* Wall. ex G. Don, Gen. Hist. 1: 517. 1831; M.J.Mast. in Hook.f., Fl. Brit. India 1(2): 361. 1874 (Reprint 1961); Brandis, Indian Trees: 84. 1906. **Fig. 23.**

Bengali: *Shampan, Pogan, Shogan, Sugan, Shagan*

English: Boat-fruited sterculia, Tropical nut bearing tree

Medium to large deciduous trees, up to 45 m tall. Branches glabrous; bole cylindrical, 80-100 cm in diameter, with buttresses up to 6 m high; bark greenish-brown.

Leaves ovate to ovate-oblong, 15-30 × 8-15 cm, strongly 3-veined at base, apex bluntly acute to acuminate, margin entire, coriaceous, glabrous; petioles 4-10 cm long; stipules

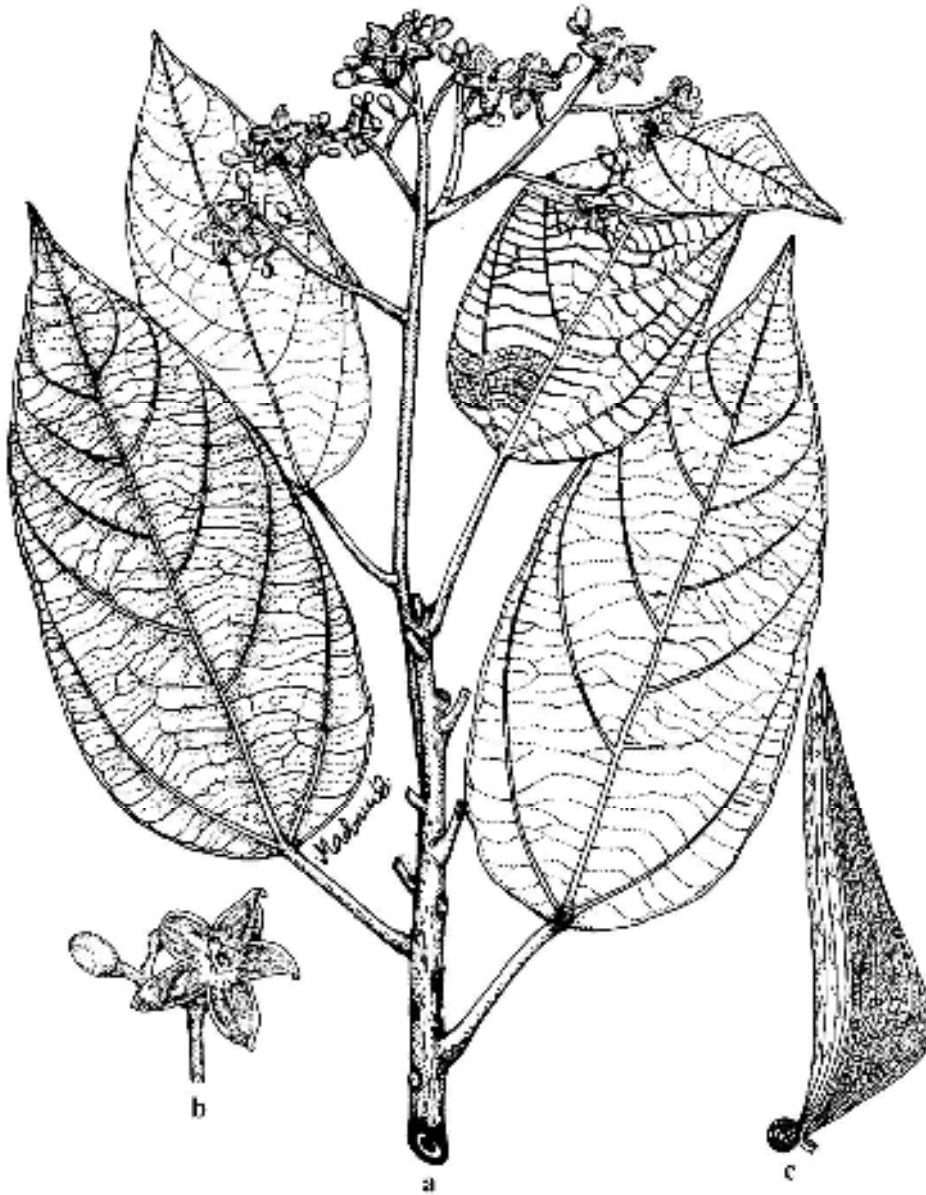


Figure 23. *Scaphium scaphigerum* (Wall. ex G.Don) G.Planch.: a) Flowering shoot; b) flower; and c) fruit.

caducous or persistent, rounded to triangular, glabrous or minutely hairy. Inflorescences terminal, robust, much branched panicles, puberulous; bracts caducous. Flowers 5-merous, 4-8 mm long, yellow with purple, drying brown; pedicel up to 2mm long, densely stellate hairy. Sepals 5, slightly united at base, oblong-lanceolate, outer surface sparsely stellate hairy, inner surface glabrous. Petals absent. Male flowers with 10-15 stamens, anthers pilose; staminodes 8-10; carpels rudimentary and sparsely hairy. Female flowers with developed 5 carpels, densely stellate, free. Follicles boat-shaped, 15-25 × 6-10 cm, membranous, 1-2 seeded. Seed 1 (rarely 2), basal, globose to elliptic, pubescent, wingless. *Fl. & fr.*: 3-10. *Evergreen lowland forest; up to 700 m altitude.*

**Bandarban:** Capaupara VCF, Sadar, 25 x 2014, *Alam & Latif*, 11387 (BFRI).

**Rangamati:** Kasalong, Bilaichhari, 1876, *J. L. Litser*, 386 (CAL 58104); Pharu R. Forest, Bilaichhari, 18 iv 2009, *S.N. Uddin.*, N-3493 (DACB 47096); Pharu R. Forest Monlovichara, 18 iv 2009, *Bushra et al.*, B-1458 (DACB 34895); Rangamati sadar, 04 iv 1934, Macalpine & W.J.L. Wenger 476 (K).

Cambodia, India, Indonesia, Malay Peninsula Malaysia, Thailand and Vietnam.

Wood is white, light, soft and suitable for veneering (Das and Alam, 2001). Seed is demulcent, febrifuge and stomachic. Seeds of this plant are used as herbal remedies of common cold, flu, laryngitis, diarrhoea and dysentery. Boiled pulp of the seed used as beverages.

**Sterculia** L., *Sp. Pl.*: 1007. 1753.

Type species: *Sterculia foetida* L.,

Trees or shrubs, bark usually whitish, warty or cracked. Leaves simple, entire or palmately lobed, rarely palmately compound, petioled. Inflorescence usually paniculate, rarely racemose, terminal or axillary. Flowers 5-merous, unisexual. Calyx 5-lobed, free or united at base, usually stellate-hairy outside, more densely inside. Petals absent. Male flowers: 10-15 stamens, anthers clustered at top of androgynophore, enclosing undeveloped carpels, staminodes as many as stamens. Female flowers: androgynophore very short, staminodes at top of androgynophore in whorl around base of carpels. Carpels 5; ovules 2 to many per carpel; styles free connate at base; stigmas as many as carpels, free. Fruit a group of follicles, usually leathery, less often woody, glabrous to hairy, dehiscent when mature. Seeds 1 to many per follicle, wingless, usually with endosperm.

## KEY TO THE SPECIES

- |    |  |                      |
|----|--|----------------------|
| 1. | Leaves digitate or palmately lobed   | 2                    |
| +  | Leaves not lobed   | 5                    |
| 2. | Leaves digitate  | 3                    |
| +  | Leaves palmately lobed   | 4                    |
| 3. | Leaflets up to 18-27 cm, whitish pubescent beneath; calyx lobes inflexed; staminal column c. 2 mm long; fruits covered with dark brown brittle hairs | <b>S. versicolor</b> |
| +  | Leaflets 7-15 cm, glabrous beneath when mature; calyx lobes spreading; staminal column c. 10 mm long; fruits almost glabrous                         | <b>S. foetida</b>    |
| 4. | Leaves deeply 5-7 lobed; lobes 3-fid, villous beneath; flowers large, c. 2 cm wide; follicles spreading  | <b>S. villosa</b>    |
| +  | Leaves shallowly 3-5-lobed, entire; softly thick velvety beneath; flowers small, less than 8 mm wide; follicles radiating                            | <b>S. urens</b>      |
| 5. | Calyx lobes broadly ovate, spreading   | 6                    |
| +  | Calyx lobes linear or linear-lanceolate, connivent at top  | 7                    |
| 6. | Leaves glabrous above, rusty-tomentose beneath, cordate or subcordate at base  | <b>S. guttata</b>    |
| +  | Leaves glabrous on both surfaces, more or less rounded at base   | <b>S. roxburghii</b> |
| 7. | Fruits lanceolate; staminal column 4-5 mm long   | <b>S. hamiltonii</b> |
| +  | Fruits ovate; staminal column less than 4 mm   | 8                    |
| 8. | Leaves glabrous or glabrescent on both surfaces; calyx urceolate; style glabrous   | <b>S. parviflora</b> |
| +  | Leaves densely stellate hairy on both surface; calyx campanulate; style hairy  | <b>S. balanghas</b>  |

**Sterculia balanghas** L., Sp. Pl.: 1007. 1753; M.J.Mast. in Hook.f., Fl. Brit. India 1: 358. 1874 (Reprint 1961); Brandis, Indian Trees: 84. 1906; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 345. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 75. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 422. 2018. *Sterculia angustifolia* Roxb., Fl. Ind. 3: 148. 1832; Kurz, Fl. Brit. Burma 1: 138. 1877; Raizada, Ind. For. 67: 245. 1941. *Sterculia ensifolia* M.J.Mast. in Hook.f., Fl. Brit. India 1: 358. 1874 (Reprint 1961). *Sterculia balanghas* L. var. *angustifolia* (Roxb.) M.J. Mast. in Hook.f., Fl. Brit. India 1: 358. 1874. *Balanghas telabo* Raf., Sylva Tellur. 72. 1838. *Sterculia angustifolia* Roxb. & G.Don, Gen. Hist. 1: 516. 1831. *Southwellia balanghas*

(L.) Spach, *Hist. Nat. Vég.* 3: 508. 1834. *Sterculia citrifolia* Salisb., *Prodr. Stirp. Chap. Allerton*: 387. 1796. *Sterculia mollis* Wall. *ex R.Br.*, *Pterocymbium*: 231. 1844. *Southwellia angustifolia* Wight, *Ill. Ind. Bot.* 1: 77. 1838. **Fig. 24.**

Bengali: *Balan Udal, Gandho Udal, Ram kola (Chakma).*

English: Balanahas, Panama Tree.

Deciduous trees, up to 20 m tall. Bole buttressed; bark greyish-brown, smooth, exfoliating in thin round flakes; young parts rusty tomentose. Leaves simple, alternate; lamina oblong-ovate, elliptic, obovate or elliptic-ovate, 10-25 × 5-13 cm, base subcordate or rounded, apex blunt or acute, margin entire, chartaceous, glabrescent above, densely stellate hairy beneath; petioles 2-5 cm long, swollen at both ends, pubescent; stipules free, lateral, cauducous. Inflorescence terminal or axillary panicles, 12-15 cm long, stellate hairy, slightly drooping from ends of branches. Flowers unisexual or polygamous, small, yellow or greenish-purple, fragrant. Calyx campanulate, tube 3-4 mm long, 5-lobed, 7-10 mm long, pubescent outside, incurved, connivent, hairy inside. Petals absent. Male flowers: stamens 10, staminal column c 2 mm long, with a group of 2-loculed anthers at tip, anthers sessile, staminodes 10. Female flowers: carpels 5, superior, free, hairy, with 4-8 ovules; styles cohering, densely hairy; stigmas recurved, 5-lobed. Follicle 4-5, oblong, 6-8 cm long, woody, almost sessile, orange-red, rusty tomentose. Seeds 3-6, oblong-ovoid, black, shining. *Fl. & fr.*: 3-8. *Hilly forests, moist deciduous forests, also sacred groves in the plains.*

**Bandarban:** Keukradong Peak, Ruma, 28 iii 2019, *K.K. Islam*, KKI- 3611 (DACB 63508); Boga Lake, Ruma, 26 iii 2019, *K.K. Islam*, KKI-3510 (DACB 47925); Rawangchari Forest, Rawangchari, 07 iii 2017, *I. Hossen et al.*, IH-4645 (DACB 66523). **Rangamati:** Kasalong Reserve, Mainimukh, 12 iii 1940, *T.V. Dent*. s.n. (?); Sitapahar, Kaptai, 04 iv 2011, *H.U. Rashid*, H-152 (CUH); Boro Kharikata, Langadu, 13 v 2017, *S.K. Chakma*, SKC-391 (DACB).

Belgium, Cambodia, India, Indonesia, Lao PDR, Malay Peninsula Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

The fruit is considered cooling and laxative (*Kirtikar et al.*, 2012). The plant grown as a hedge and ornamental. Roasted seeds are nearly as palatable as chestnuts and are edible. Bark fibre is used for building cottages.



Figure 24. *Sterculia balanghas* L.: a) Flowering shoot; b) flower; and c) fruit.

**Sterculia foetida** L., Sp. Pl.: 1008. 1753; Roxb., Fl. Ind. ed. Carey 3: 154. 1832; M.J. Mast. in Hook.f., Fl. Brit. India 1: 354. 1874; Kurz, Fl. Brit. Burma 1: 135. 1877; Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963); Brandis, Indian Trees: 80. 1906; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 16. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 459 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceyl. 9: 431. 1995; Das & Alam, Trees of Bangladesh, 257. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 346. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 75. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 423. 2018. *Clompanus foetidus* (L.) Kuntze, Revis. Gen. Pl. 1: 77. 1891. *Clompanus molucanus* Raf., Sylva Tellur 73. 1838. *Sterculia polyphylla* R.Br., Pterocymbium 227. 1844. *Sterculia mexicana* var. *guianensis* Sagot, Ann. Sci. Nat. Bot., sér. 6, 11: 153. 1881. **Fig. 25.**

Bengali: *Basket badam, Baxo badam, Jongli badam, Jora badam, Keron, Udal Badam, Yaa-hea* (Ckakma), *Hla-kho-dei* (Rakhain)

English: Dung Tree, Hazel Sterculia, Poon Tree, Java Olive Tree, Skunk Tree, Wild Almond Tree

Deciduous trees, up to 30 m tall, spreading. Bole buttressed; bark whitish, young shoots hairy smooth, irregularly flaking off in thin scales; blaze reddish-yellow; branches horizontal, whorled. Leaves crowded at ends of thick branchlets, digitately compound, 3-10 foliate; leaflets elliptic-lanceolate, or elliptic oblanceolate, 7-15 × 2-5 cm, base cuneate, apex acuminate, margin entire, glabrous, coriaceous, lateral nerves 10-24, parallel; petiolule to 3 mm long; rachis 8-24 cm long, slender, glabrous, swollen at base; stipules subulate, caducous. Inflorescence axillary or subterminal racemes. Flowers unisexual or polygamous, bud ovoid, c. 10 × 5 mm, dull red, yellow or purplish, with foetid smell; pedicels 1.5-2.5 cm long. Calyx campanulate, deeply 5-lobes, lobes linear-oblong to lanceolate, subacute, glabrous outside, stellate-hairy inside, dull orange red. Petals absent. Male flowers: stamens 14-15, staminal culum c. 1 cm long, curved, hairy at base, with 10-15 anthers grouped into a head, staminodes 14. Female flowers: carpels 5, free, ovary globose, densely villous, 5-lobed, 5-loculed, each locule 12-20 ovuled; styles cohering, deflexed, hairy; stigmas 5-lobed or flattened; staminodes sessile in a ring beneath the carpels. Follicles 1-5, ellipsoid boat-shaped, woody, short beaked, smooth outside, fibrous inside, many seeded, scarlet, nearly glabrous. Seeds oblong or ovoid-oblong, black, hard, smooth, with a small yellow aril.  $2n = 40$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 1-12. *Moist deciduous forests and in the plains along coastal areas.*





Figure 25. *Sterculia foetida* L.: a) Flowering shoot; b) gynoecium; c) flower; and d) fruits.

**Bandarban:** Betchara para, 06 vi 1983, *M.K. Alam*, 4606 (BFRIH). **Barishal:** Barishal sadar, 02 viii 1990, *M.A.S. Khan* (BFRIH). **Chattogram:** Mithachora, Fatehpur, 01 iii 2017, *A. Arif*, 382 (DACB); Kutubdia Baruk, 27 xii 1983, *Huq et al.*, H-6653 (DACB14279); Hamzarbangla, Near Bastuhara School, 13 iii 1985, *Mujib et al.*, 5345 (BFRIH). **Cox's Bazar:** Dineshpur, Moheshkhali, 02 v 2017, *Niyamul et al.*, NK-3644 (DACB 58610); Fasiakhali, Chakaria, 10 v 2017, *NJM-* 3912 (DACB 60213); Bhomoriaghona, 24 iv 2017, *Ehsanul Hoq*, 091 (DACB 59409); Banghabandhu Safari Park, Dulahajra, 31 x 2017, *Niyamul et al.*, NK-6153 (DACB); Himchari, *M.A. Rahman*, 390 (CUH). **Dhaka:** Dhaka Sadar, 12 iii 1947, *S.K. Sen*, (DUSH); Azimpur Maternity Hospital, 12 viii 1964, *A.F. Muhamamd*, 180 (DUSH); S. Loc., 24 ii 1947, *Sukdeo* (DUSH); Kakrail, 06 iv 1950, *S.K. Sen & Shahjahan*, (DUSH). **Munshiganj:** Bikrampur, 20 ix 1996, *Nazrul Huq*, (DACB 27683).

Angola, Australia, Benin, Brazil, Cambodia, Cameroon, Caribbean, China, Comoros, Costa Rica, Cuba, Dominica, French Polynesia, Ghana, Guadeloupe, Guyana, India, Indonesia, Japan, Malaysia, Mayotte, Mozambique, Myanmar, Philippines, Puerto Rico, Singapore, Sri Lanka, Tanzania, Thailand, Timor-Leste, Togo, United States of America, Venezuela and Vietnam.

The timber is used for making furniture. Bark is used for making rope. Leaves and bark are aperients, diaphoretic and diuretic. A decoction of fruits is taken orally in itch and skin diseases. Seed oil is used as a carminative and laxative (Ghani 2003). After removing the black seed coat, the tasty yellowish cotyledons are eaten by children (Das and Alam 2001). Leaves are used as insect repellent.

**Sterculia guttata** Roxb. [Hort. Beng.: 50. 1814, *nom. nud*], Fl. Ind. ed. Carey 3: 148. 1832; M.J. Mast. in Hook.f., Fl. Brit. India 1(2): 355. 1874 (Reprint 1961); Brandis, Indian Trees: 82. 1906; Craib, Fl. Siam. Enum. 1: 166. 1925; Kanjilal *et al.*, Fl. Assam 1: 152. 1934; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 462. 1993; Das & Alam, Trees of Bangladesh, 258. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 347. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 75. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 423. 2018. *Astrodendrum malabaricum* Dennst., Schlüssel Hortus Malab. 30. 1818. *Clompanus malabarica* Kuntze, Revis. Gen. Pl. 1: 77. 1891. **Fig. 26.**

Bengali: *Bansal, Raiphal*

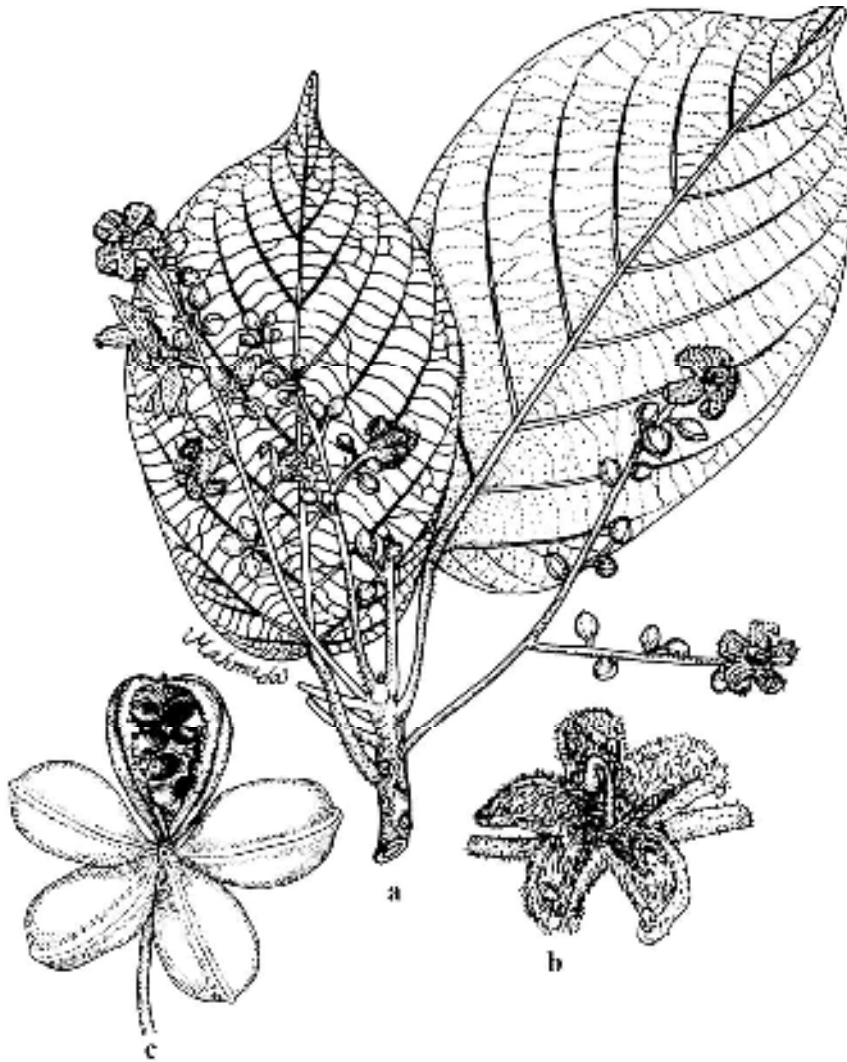


Figure 26. *Sterculia guttata* Roxb.: a) Flowering shoot; b) flower; and c) fruits.

Deciduous trees, up to 20 m high. Bole straight, young parts rusty stellate tomentose; bark greyish-brownish, warty, cracked outside; blaze white, mottled with brown. Leaves simple, alternate; blades ovate-oblong or ovate-elliptic, 12-25×6-15 cm, base obtuse, subcordate or truncate, apex acute or abruptly shortly acuminate, margin entire, coriaceous, glabrescent above, under surface tomentose, 3-5-ribbed from base, prominent, lateral nerves 5-7 pairs, pinnate; petioles 2-5 cm long, stout, stellate-pubescent, slightly swollen at base; stipules up to 1 cm, ensiform, caducous. Inflorescence terminal, rusty, tomentose racemiform panicles; bracts lanceolate. Flowers polygamous, white and pale yellow; pedicels 2-3 mm long, hairy, with an offensive smell. Calyx campanulate, 6-12 × 5-8 mm, deeply 5-partite, lobes narrowly lanceolate, acute, spreading, rusty tomentose outside, glandular and with scattered long hairs inside, greenish outside, reddish inside. Petals absent. Male flowers: stamens 10-12, staminal column 6-8 mm long, slender, recurved, anthers 10-15, sessile, very small, staminodes 10. Female flowers: carpels 5, free, hairy with sterile anthers at base, ovary surmounting ring of anthers, globose, woolly; styles curved; stigmas 5-lobed. Fruit an aggregate of 1-5 radiating follicles, obovoid, red when ripe, coriaceous, compressed, obscurely ribbed, brown tomentose outside, up to 10 seeded. Seeds oblong, 10-15 × 4-6 mm, black, ferruginous stiff hairy.  $2n=42$  (Pal, 1973). *Fl. & fr.*: 9-3. *Evergreen, semi-evergreen, moist deciduous forests, also in the plains; up to 900 m altitude.*

**Bandarban:** Dirjiling para, Keukradong, Ruma, 26 iii 2019, *K.K. Islam*, KKI-3584 (DACB 48028). **Chattogram:** Hazarikhil, 30 iii 1976, *S. K. Das*, 76 (BFRIH). **Sylhet:** *Wall.*, 1127 (BM?); Singla Reserve, Sylhet, 22 xii 1914, *U. N. Kanjilal*, 4908 (ASSAM).

Brazil, China, India, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand and Vietnam.

Roasted seeds have a flavour like peanuts and are eaten. Bark fiber is used for cordage and rough fabrics. Extracts from seeds is used as insecticides against mosquito larvae.

**Sterculia lanceolata** var. **coccinea** (Jack) Phengklai Thai Forest Bull., Bot. 23: 99. 1995. *Sterculia hamiltonii* (O. Kuntze) Adelb., Blumea 5: 506. 1945; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 464. 1993; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh. 10: 347. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 76. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 425. 2018. *Clompanus hamiltonii* Kuntze, Rev. Gen. P1. 1: 77. 1891. *Sterculia coccinea* Roxb. [Hort. Beng.: 50. 1814, *nom. nud*], Fl. Ind. ed. Carey 3: 151. 1832; M.J. Mast. in Hook.f., Fl. Brit. India 1: 357. 1874 (Reprint 1961); Brandis, Indian Trees: 83. 1906; Kanjilal *et al.*, Fl.

Assam 1: 153. 1934. *Sterculia indica* Men., J. Ann. Arb. 33: 245. 1952. *Sterculia linearis* Korth., Ned. Kruidk. Arch. 1: 305. 1848. *Clompanus linearis* (Korth.) Kuntze, Revis. Gen. Pl. 1: 78. 1891. **Fig: 27.**

Bengali: *Nak-chepeta, Puli pitha, Siduri phal gach, Toni udal*

English: Scarlet Shower

Shrubs or small trees, 8-10 m tall. Bark thin, grey, warty, whitish inside. Leaves simple, alternate, elliptic-lanceolate or oblanceolate, 10-25 × 5-10 cm, base tapering, apex abruptly short acuminate, chartaceous or subcoriaceous, glabrous above, sparsely stellately hairy beneath; petioles 3-6 cm long, terete, subulate, rusty tomentose, thickened, slightly geniculate; stipules 3-5 cm long, subulate, rusty pubescent, caducous. Inflorescence axillary, rarely supra-axillary panicles, 10-25 cm long, usually long peduncled, drooping. Flowers pale yellowish, scented, velvety outside; pedicels 3-5 mm long. Calyx 5-lobed, lobes deltoid, narrowed at apex, 8-15 mm long, patently white hairy outside, slightly thickened margins, incurved, connivent or free, sometimes spreading. Petals absent. Male flowers: 10 stamens, staminal column 4-5 mm long, curved, short, glabrous. Female flowers: carpels 5, ovary hairy with sterile anthers at the base; styles 2 mm long, curved; stigmas 5-lobed. Follicle 2-5, oblong-lanceolate, 7-12 × 1-2 cm, thinly coriaceous, velvety outside. Seeds ovoid, smooth, black. *Fl. & fr.*: 1-12. *Forest areas around waterfalls, forest trail near stream.*

**Bandarban:** Boga Lake, Ruma, 26 iii 2019, *K.K. Islam*, KKI-3515 (DACB 47927); Chingirjhiri, Ruma, 27 iii 2019, *K.K. Islam*, KKI-3599 (DACB 47926); Thana para, Ruma, 10 v 2018, *K.K. Islam*, KKI-2791 (DACB 47352); Paindu Forest Range, 07 ii 2017, *Imam et al.*, IH-3905 (DACB); Rowangchari, 27 iii 2017, *Raselet al.*, UAMR-32 (DACB); Thanchi Forest Range, 27 iii 2017, *Imam et al.*, IH-4994 (DACB); Khaikkang Jhiri Forest Range, Ruma, 09 v 2017, *Imamet al.*, IH-5412 (DACB); Sakdu Forest Range, Bolipara, 11 iv 2018, *Shahidul et al.*, MSI-7374 (DACB). **Chattogram:** Giondamari, Dhopachhari, 02 ix 1999, *M.A. Rahman et al.*, 5530 (CUH); Kalapanichara, Hazarikhil, 19 viii 2014, *S.N. Uddin*, N-5469 (DACB 42387); Hazarikhil, Fatikchari, 25 xii 2016, *Tajul et al.*, TOK-2491 (DACB 49496). **Cox's Bazar:** Hill side, 19 iii 1945, *J. Sinclair*, 4046 (E); Whykong Range, Harikoola, 02 vi 2000, *Khan et al.*, K-10521 (DACB 38902); Edhgarh, Ramu, 20 iii 2018, *Niyamul & Hasan*, NK-7218 (DACB 61143); Barachhar, Himchhari, 29 vi 1997, *M.K. Pasha et al.*, 1422 (CUH). **Khagrachhari:** Naraichari Reserve Forest, Dighinala, 25 ix 2017, *Kowser et al.*, KH-6689 (DACB 54972); Naraichari Reserve Forest, Dighinala, 25 ix 2017, *Kowser et al.*, KH-6675 (DACB 54971); Micechhari Reserve Forest, Mahalchhari, 12 vii 2017,



Figure 27. *Sterculia lanceolata* var. *coccinea* (Jack) Phengklai: a) Flowering shoot; b) flower; c) stigma; and d) fruits.

Kowser *et al.*, KH-5874 (DACB); Merung Reserve Forest, Dhiginala, Khagrachhari. 20 vii 2017, Kowser *et al.*, KH-5941 (DACB). **Moulvibazar:** Madhabkundo, 25 vi 2001, *S.N. Uddin*, N-1086 (DACB 29617); Isa Chara, Adampur, Kamalganj, 10 ix 2012, *S.N. Uddin*, N-4878 (DACB 45505); Adampur Forest Beat, Kamalganj, 20 ix 2011, *S.N. Uddin*, N-4745 (DACB 36684); Lawachara National Park, Kamalganj, 17 viii 2009, *S.N. Uddin*, N-3896 (DACB 35685). **Sylhet:** Specific locality unknown, *Wall.*, 1122 (K, BM); S. Loc., 12 x 1973, *Khan et al.*, K-3233 (DACB 14264); Golapgonj, Ranklia, 3 vi 1974, Altafur Rahman 60 (DACB); Serighat, Jointa, 3 x 1983, *Huq et al.*, H 6337 (DACB 14270); Jaintapur, 19 x 1986, *Huq & Mia*, H-7839 (DACB 14269); Kadim Nagar National Park, Sylhet Sadar, 18 x 2020, *M Sultana et al.*, DMS-3419 (DACB). **Rangamati:** Pharu R. Forest, Bilaichari, 15 x 2008 *S.N. Uddin*, N-3089 (DACB 40476); Dhandachar, Imachara, Barkal, 04 i 2016, *K.K.Islam*, KKI-1985 (DACB 46251); Morongchari Forest, Sapchari, Rangamati, 07. xi. 2017, *Jayanto et al.*, JCR-6914 (DACB); Chegaiyachari, Kutukchari, 16 vi 1998, *S.B. Uddin et al.*, N-3125 (CUH).

Bhutan, Burkina Faso, China, Ghana, India, Indonesia, Malaysia, Martinique, Nepal, Spain, Solomon Island, Thailand and Vietnam.

Heart wood takes a good polish and used for posts. The tender fruits are eaten cooked like beans. Mature seeds are eaten fried or roasted (*Kanjilal et al.*, 1934).

***Sterculia lanceifolia*** Roxb., Fl. Ind. 3: 150. 1832; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 425. 2018. *Sterculia roxburghii* Wall., Pl. Asiat. Rar., 3: 39, pl. 262. 1832; M.J.Mast. in Hook.f., Fl. Brit. India 1: 356. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963); Brandis, Indian Trees: 83. 1906; *Kanjilal et al.*, Fl. Assam 1: 153. 1934; Malick in Sharma & Sanjappa (eds.), Fl. Ind. 3: 468. 1993; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 76. 2012. *Sterculia lanceifolia* G.Don, Sylhet 1: 517. 1831. **Fig. 28.**

Bengali: *Lanci udal*, *Nag-phona*, *Mimong-omak*, *Misi-chik-udari* (Garo), *Ushli*

Evergreen shrubs or small trees. Bark ashy to dark brown, usually rough outside; branchlets puberulent. Leaves simple, linear-lanceolate, oblong-elliptic or oblanceolate, 10-20×3-7 cm, base rounded or subcordate, apex shortly acuminate, margin entire, chartaceous or subcoriaceous, glabrous, main lateral nerves 6-11 pairs; petioles 2-4 cm long, terete, geniculate at both ends; stipules subulate; minutely hairy, caducous. Inflorescence axillary, few-flowered racemes or rarely paniculate, 5-10 cm long, erect. Flowers unisexual, red to scarlet; pedicels slender, 5-8 mm long, sparingly stellate pilose. Calyx campanulate, 4-6 mm long, scarlet, 5-lobed, segments 2 mm broad,



Figure 28. *Sterculia lanceifolia* Roxb.: a) Flowering shoot; b) flower; and c) fruits.



oblong-lanceolate, spreading, pubescent outside. Petals absent. Male flowers: androgynophore curved, glabrous, 1 mm long. Female flowers: ovary globose, 1 mm long, on equally long gynandrophore, densely puberulent; styles up to 1.5 mm long; stigmas 5 lobed. Fruit a follicle, oblong or oblong-lanceolate, 5-7 cm long, scarlet, curved, long beaked, obscurely straited, abaxially densely red hirsute, 4-8-seeded. Seeds ovoid to oblong, 10-15 × 5-8 mm, shining black. *Fl. & fr.*: 2-9. *Forested slopes; up to 800 m altitude.*

**Chattogram:** Dhopachari, 21 iii 1921, *J.M. Cowan*, 2046 (E); 2 iv 1920, *J.M. Cowan* 156 (E). **Moulvibazar:** Adampur Forest Beat, Kamalgonj, 07 iii 2011, *S.N. Uddin*, N-4472 (DACB 35760). **Sylhet:** Specific locality & date unknown, *Wallich*, 1124, 1125 (K); Sylhet, 03 iii 1886, *G. Mann* 2728 (ASSAM); Specific locality unknown, December 1904, S. Abu Hossain, 52 (CAL).

Native to Bhutan, China and India.

Seeds are eaten after roasted (Malick, 1993). It is used as flavouring agent in food.

***Sterculia parviflora*** Roxb., *Fl. Ind.* 3: 147. 1832; M.J. Mast. in Hook.f., *Fl. Brit. India* 1: 359. 1874 (Reprint 1961); Malick in Sharma & Sanjappa (eds.), *Fl. India* 3: 468. 1993; Alam, *Bangladesh For. Res. Inst. Bull.* 5: 11. 1988. *Sterculia maingayi* M.J. Mast. in Hook. f., *Fl. Brit. India* 1(2): 359. 1874. *Sterculia holttumii* Ridl., *Kew Bull.* 10: 471. 1926. *Sterculia obscura* K. Schum., *Bot. Jahrb. Syst.* 24(3, Beibl. 58): 15. 1897. *Sterculia parviflora* Roxb. ex G. Don, *Gen. Hist.* 1: 516. 1831; Habib in Ahmed *et al.*, *Encycl. Fl. Fauna Bangladesh* 10: 348. 2009; Rahman *et al.*, *Bangladesh J. Plant Taxon.* 19(1): 75. 2012. **Fig. 29.**

Bengali: *Bhui udal*, *Parvi udal*

English: Bataria Teak, Common Sterculia, Guest Tree

Deciduous trees, up to 35 m tall. Bole with plank buttresses up to 3 m high; bark light coloured, smooth; primary branching is whorled, young shoots are finely brown and scurfy. Leaves simple, elliptic to oblong, 10-25 × 5-10 cm, subcoriaceous, base obtuse, apex acuminate, margin entire, glabrescent above, slightly pubescent beneath; petioles 2-4 cm long; stipules lanceolate, caducous. Inflorescence axillary or terminal spreading panicles, stellate-hairy. Flowers small, yellowish-brown; pedicels 2-6 mm long. Calyx tube urceolate, 2-3 mm long, lobes 5, linear-lanceolate, inflexed, hairy outside and inside glabrous. Petals absent. Male flowers with 10 stamens, anthers sessile, staminodes

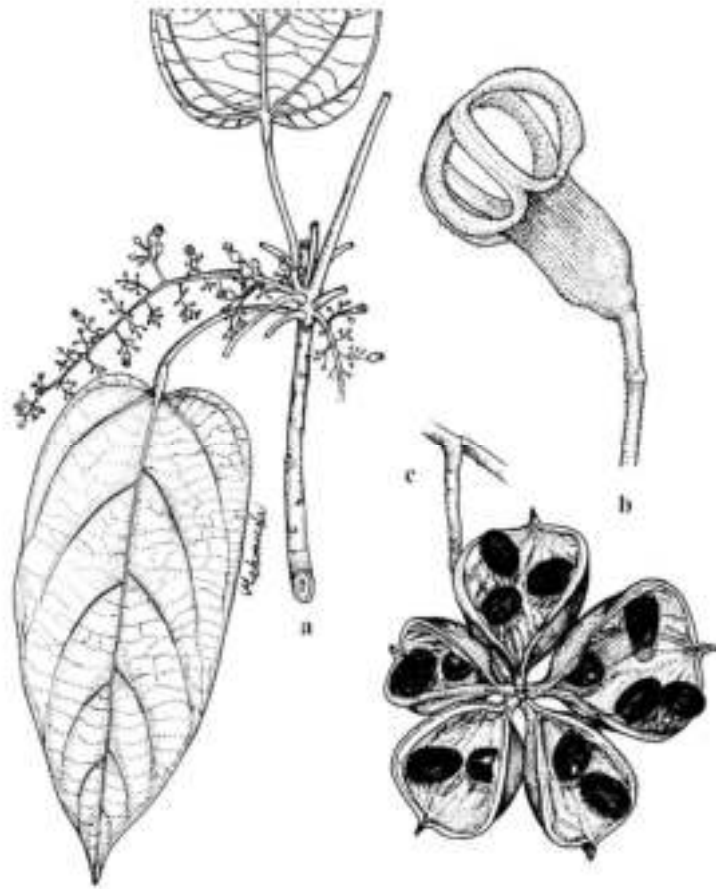


Figure 29. *Sterculia parviflora* Roxb.: a) Flowering shoot; b) flower; and c) fruits.

10. Female flowers with 5 carpels, free, ovary globose, glabrous, 6-ovuled; styles short, glabrous; stigmas 5-fid. Fruit a follicle, oblong, 3-5 cm long, pubescent, coriaceous, beaked. Seeds oblong, black. Fl. & fr.: 1-7. *Mixed deciduous and primary forests, lowland forests and hill forests.*

**Sylhet:** Specific locality & date unknown, *Wall.*, 1121/1 (BM).

Hooker (1874), Alam (1988), Habib (2009) and Rahman *et al.* 2012 reported the occurrence of this species from Sylhet, Bangladesh without citing any specific locality.

Bhutan, Brazil, Brunei Darussalam, Cambodia, China, French Guiana, India, Indonesia, Malaysia, Peru, Singapore, Thailand and United States of America.

It's white coloured wood is used for indoor construction and plywood. Bark yields good fibres (Phengkai, 2001). The tree is sometimes planted as an ornamental in gardens or along roadsides as an avenue tree.

**Sterculia urens** Roxb., Pl. Corom. 1(1): 25, t. 24. 1795; Fl. Ind. ed. Carey 3: 145. 1832; Wight & Arn, Prodr. 1: 63. 1834; M.J. Mast. in Hook.f., Fl. Brit. India 1: 355. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963); Brandis, Indian Trees: 80. 1906; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 470. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceyl. 9: 432. 1995; Mia *et al.*, Bangladesh J. Plant Taxon. 18(2): 155. 2011; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 76. 2012. *Cavallium urens* (Roxb.) Schott & Endl., Melet. Bot.: 33. 1832. *Clompanus urens* (Roxb.) Kuntze, Revis. Gen. Pl. 1: 78. 1891. *Kavalama urens* (Roxb.) Raf., Sylva Tellur.: 72. 1838. **Fig. 30.**

Bengali: *Buli udal*, *Deo udal*, *Fashiy udal*, *Kanta udal*, *Teudal udal gach* (Chakma), *Ural gach* (Marma)

English: Gum Tree, Indian Ghost Tree, Indian Tragacanth, Karaya Gum, Sterculia Gum

Deciduous trees, up to 15 m tall. Bark white or greenish-grey, smooth, exfoliating in large, thin, papery flakes; blaze red; exudation yellowish-white, sticky; twigs glabrescent, with distinct raised leaf scars and lenticels. Leaves simple, palmately 3-5 lobed, alternate, crowded at end of branchlets, palmately 3-5 lobed, blade orbicular, 12-30 × 10-25 cm, base deeply cordate or sagittate, apex acuminate to cuspidate, margin entire, coriaceous, glabrous above, velvety pubescent beneath, usually 5-nerved from base, lateral nerves 5-7 pairs; petiole very long, 8-15 cm long; stipules narrowly lanceolate, caducous. Inflorescence axillary or terminal, many flowered panicles, 10-30 cm long, glandular pubescent. Flowers polygamous, small, less than 8 mm wide, yellowish; pedicels c. 4 mm long. Cayx campanulate, calyx-tube 4-8 mm long, 5-lobed, yellow, lobes oblong or narrowly triangular, 4-8 × 3-5 mm, hairy on both surface. Male flowers: stamens 10; anthers sessile; staminodes 10. Female flowers: ovary 5-6, ovoid, hairy; style hairy; stigma 5-lobed, recurved. Fruit an aggregate of 4-6 follicles, radiating oblong, ellipsoid or kidney-shaped, 4-6 × 1-2 cm, red, densely rusty pubescent. Seeds 3-6, oblong to ellipsoid, brown or black. 2n = 40 (Singhal, 1987). *Fl. & fr.*: 10-2. *Moist and dry deciduous forests.*

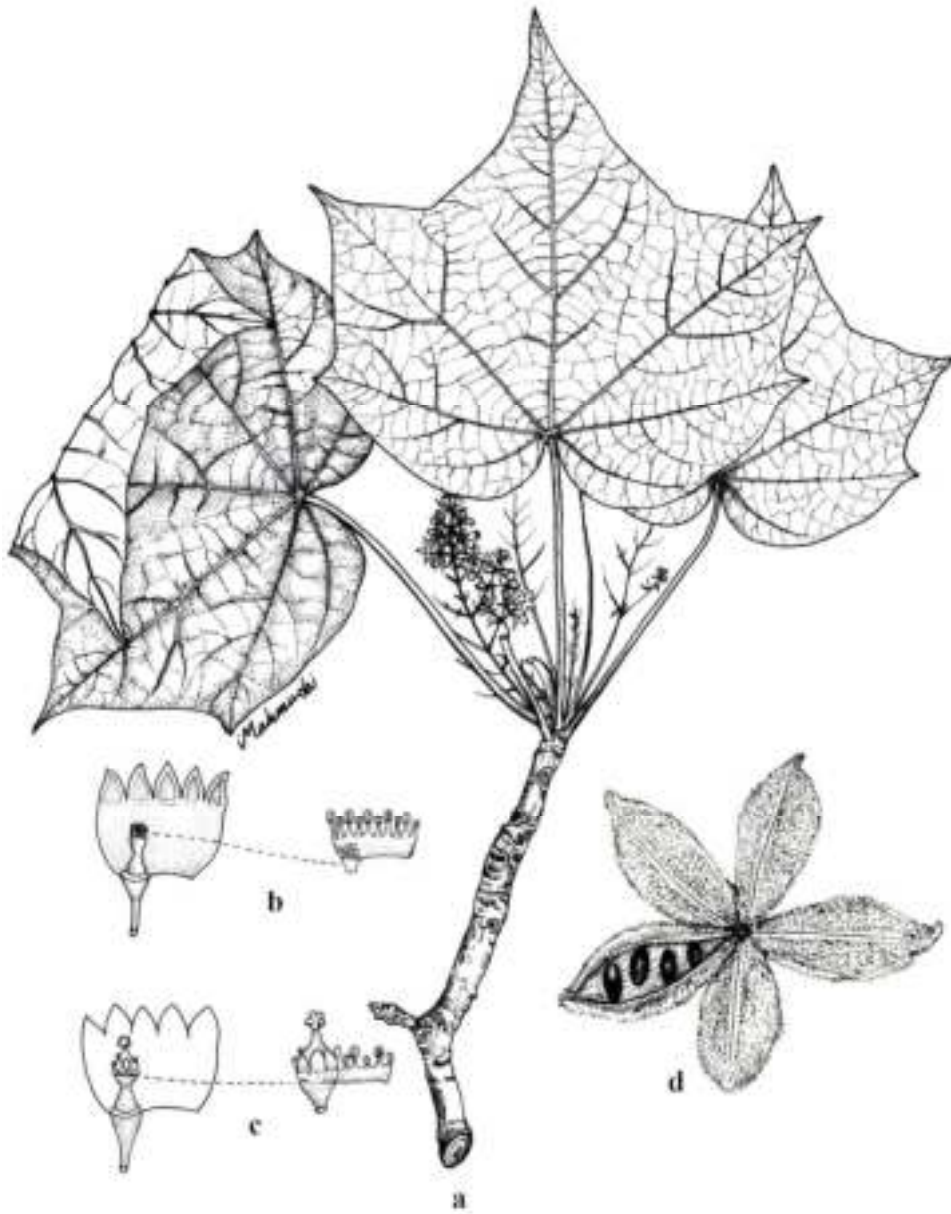


Figure 30. *Sterculia urens* Roxb.: a) Flowering shoot; b) male flower; c) female flower; and d) fruit.

**Chattogram:** Specific locality unknown, 31 xi 1850, *Hooker & Thomson*, 302 (K); Dudhpukuria, Rungunia, 17 v 2017, *Tajul et al.*, TAK-5028 (DACB). **Khagrachhari:** Anokchhari, Jugolchhari, Panchari, 05 ix 2016, *Kowser et al.*, KH-393 (DACB). **Rangamati:** Vadrapatichap Forest, Sadar, 01 iii 2017, *K.T. Chakma*, KTC-198 (DACB).

Argentina, Belgium, Cambodia, China, France, Hong Kong, India, Japan, Korea, Netherlands, Pakistan, Spain, Sri Lanka, Taiwan, Thailand, United States of America and Vietnam.

The gum obtained from the trunk is eaten in curries. It is used, mainly as a stabilizer, emulsifier and thickener in a range of processed foods. The seeds are sometimes roasted and used as a substitute for coffee. Tender young roots cooked simetime. The gum is used as a bulk laxative and also used to treat throat infections. A gum, known as 'Karaya Gum', is obtained from wounds made in the trunk. It is used medicinally; as a pulp binder; as a thickening agent for printing dyes, as a size for textiles; in cosmetics; as a stabilizer, thickening agent and emulsifier in foods; as a denture adhesive, where the finely powdered gum is dusted on the dental plate and swells when it touches the moist surface of the gums, thus giving a comfortable and tight fit of the plate. The fibres obtained from the bark are used for making cordage (Tropical Plants Database 2022).

**Sterculia versicolor** Wall., Pl. Asiat. Rar. 1: 48, t. 59. 1830; M.J. Mast. in Hook.f., Fl. Brit. India 1: 355.1874 (Reprint 1961); Kanjilal *et al.*, Fl. Assam 1: 150. 1934; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 349. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 77. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 427. 2018. *Clompanus versicolor* Kuntze, Revis. Gen. Pl. 1: 78. 1891. **Fig: 31.**

Bengali: *Ranga udal*

Large trees with spreading crown, up to 28 m tall. Trunk straight, stout; bark grey, branchlets with prominent scars of fallen leaves. Leaves peltate, digitately 5-7 foliolate; leaflets elliptic-lanceolate, 18-27 × 5-15 cm, base tapering, apex acute or shortly acuminate, subcoriaceous, glabrous above, puberulous or glabrescent beneath, lateral nerves 22-32 pairs, prominent; petioles 8-15 cm long, dilated at apex. Inflorescence many flowered erect panicles, crowded at ends of branchlets. Flowers fragrant, orange-yellow or pale yellow, pedicels short. Calyx campanulate, hairy, c. 1 cm long, lobes oblong, inflexed. Male flowers with c. 2 mm long staminal column, curved, filaments

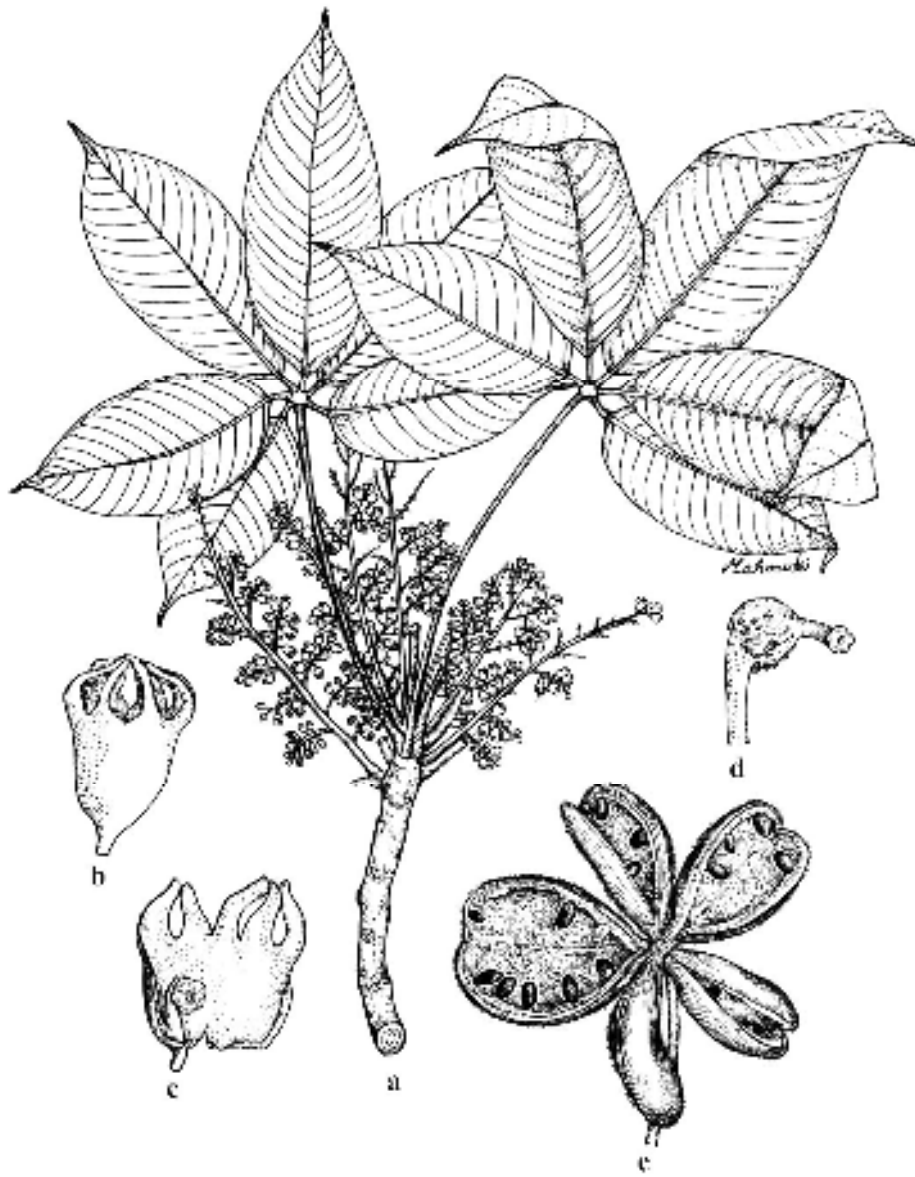


Figure 31. *Sterculia versicolor* Wall.: a) Flowering shoot; b) flower; c) open flower; d) gynoecium; and e) fruits.

short, anthers 2-loculed. Female flowers with 5-lobed ovary, hairy with sterile anthers at base, styles c. 2 mm long, villous, curved with radiating subpeltate stigmas. Fruit a follicle, slightly compressed, coriaceous, obscurely ribbed, covered with dark brown bristles. Seeds oblong, 7-15 mm long, black, shining. *Fl. & fr.*: 3-8. *Mixed evergreen forests.*

**Cox's Bazar:** Garkhata to Kalmadia, Moheshkhali, 07 iii 1978, *Khan et al.* K-4895 (DACB 14273).

Native to India, Myanmar and Thailand.

The timber is used as fuel wood. Seeds are eaten after roasting (*Kanjilal et al.*, 1934).

***Sterculia villosa*** Roxb. [Hort. Beng.: 50.1814, *nom. nud.*], Fl. Ind. ed. Carey 3: 153. 1832; M.J. Mast. in Hook. f., Fl. Brit. India 1: 355.1874 (Reprint 1961); Prain, Beng. Pl. 1: 187. 1903 (Indian reprint 1963); Brandis, Indian Trees: 80. 1906; Abedin and Ghafoor in Nasir & Ali (eds.), Fl. W. Pakistan 99: 18. 1976; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 472. 1993; Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; *Kanjilal et al.*, Fl. Assam 1: 151. 1934; Das & Alam, Trees of Bangladesh, 258. 2001; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 350. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 77. 2012; Alam in Uddin & Hassan, Vas. Fl. Chittagong & CHT. 2: 428. 2018. *Sterculia ornata* Wall. ex Kurz in J. Asiat. Soc. Beng. 42(2): 228. 1873; Kurz, Fl. Brit. Burma 1: 136. 1877; Brandis, Indian Trees: 81. 1906. *Sterculia armata* J.M. Mast. in Hook.f., Fl. Brit. India 1(2): 357. 1874 (Reprint 1961). *Sterculia lantsangensis* Hu, Bull. Fan Mem. Inst. Biol. Bot. 8: 42. 1937. **Fig. 32.**

Bengali: *Chala, Chandul, Lambuk, Loma Udal, Sibotoigo kali* (Tripura), *Udal*

English: Elephant Rope Tree, The Hairy Sterculia

Small to medium deciduous trees, up to 18 m tall. Bark white; branches whorled, spreading, with heart-shaped scars of fallen leaves; young shoots tomentose. Leaves simple, crowded at ends of branchlets when young, rachis 25-40 cm long, base cordate, 5-7 lobed, each lobe again 3-lobed, lobes oblong, acuminate at apex, entire, blade 30-40 cm across, glabrescent or sparsely hairy above, tomentose beneath, nerves 5-7 pairs; petioles 15-35 cm long, minutely tomentose; stipules lanceolate, 7-10 mm, acuminate, caducous. Inflorescence subterminal, drooping panicles, densely stellate tomentose. Flowers pinkish-yellow, male and female flowers intermixed. Calyx broadly



Figure 32. *Sterculia villosa* Roxb.: a) Vegetative shoot; b) flower; and c) fruits.

campanulate, pinkish inside, 5-lobed, lobes ovate, hairy outside. Petals absent. Male flowers with 10 stamens, staminal column 2-3 mm long, recurved, glabrous, staminodes 10. Female flowers: carpels 5, ovary globose, 5-loculed, strigose, many-ovuled; styles 2 mm long, recurved, hairy; stigmas flattened or with 5 lobes. Follicles 3-5, oblong, 2-4 × 1-3 cm, sessile, leathery, rusty pubescent, many-seeded, red when ripe. Seeds 3-5 in each follicle, oblong, 5-10 × 4-7 mm, smooth, black.  $2n = 40$  (Kumar and Subramaniam, 1986). *Fl. & fr.*: 1-4. *Hill slopes, forest openings, also planted in roadsides.*

**Bandarban:** Chingirjhiri, Keokaradong Road, *K.K. Islam*, KKI-3559 (DACB 48013); Paglachara, 16 vi 2001, *Mizan*, 5377 (BFRIH); Gumdum, Naikhyongchari, 27 ii 2017, *U. Chakma*, UC-57a (DACB). **Chattogram:** Specific locality unknown, 15 Nov.,



1886, Dr. King's collector, 495 (CAL 57543); Bariyadhala, 07 ii 1961, *P.C. Davidson et al.*, 011 (BFRIH); Chunati Wildlife Sanctuary, 25 ii 1999, *M.A. Rahman et al.*, 4437 (CUH); Jaldi Range, Badarmara, *J.M. Cowan*, 2275 (E), Harbang, Chunati Wildlife Sanctuari, Jangalia, 08 v 1994, *Huq & Mia*, H-10372 (DACB 26276); Dudhpukuria, Rangunia, 02 iv 2018, *Moniruzzam & Kawsar*, MK-8089 (DACB 54965); Hazarikhil, 07 iii 2017, *M. Mannan*, MM-71 (DACB 54966); Mahamaya Lake, Mirsorai, 21 ii 2018, *Moniruzzam et al.*, MAK- 7737 (DACB 54968); Mithachara, 19 iii 1999, *A. Rahman*, 4717 (DACB 29375); Hazarikhil, Fatikchori, 18 iv 2018, *Moniruzzam & Kawsar*, MK-8275 (DACB 54970); Chitagong University Campus, 29 viii 2016, *Tajul et al.*, TOK-197 (DACB 53892); Bariadhala, 7 ii 1961, *Davidson & Mannan*, 112 (BFRIH); FRI arboratum, 20 ii 1980, *M.K.Alam*, 3441 (BFRIH). **Cox's Bazar:** Kolatoli chara, 17.3.1945, *J. Sinclair* 4040 (E). **Dhaka:** Ramna, 23 i 1938, *S. K. Sen* (DUSH); Old Nursari, Segun Bagan, 26 i 1946, *Sukdeb* (DUSH); DU Botanic Garden, 23 i 1964, *A.F. Muhammed*, 78 (DUSH). National Botanical Garden, Mirpur, 18 ii 2007, *B.M.R. Khatun*, RK-5601 (DACB 33127); Dhamrai, 29 i 1982, *A. M. Haque*, H-5519 (DACB 14215); Ragendrapur, Dacca 25 iii 1964, *D. K. Das*, 365 (BFRIH). **Dinajpur:** Charkai, 24 i 1987, *D.K. Das*, 5724 (BFRIH); Charkai, Sil, 22 ii 1988, *J. Steringa*, 6020 (BFRIH). **Gazipur:** Salna forest, 24 i 1968, *N. Begum*, 83 (DUSH). **Habiganj:** Satchari, National Park, 31 v 2009, *Kamrul*, 170 (DUSH); Chanbari, Rema Kalenga W.S., 07 v 1998, *M.Z. Uddin*, 135 (DUSH). **Khagrachhari:** Anokchuri, Jugalchari Panchari, 05 ix 2016, *Kowser et al.*, KH-392 (DACB 54964); Hadukpara, Khagrapur, 28 x 2016, *Kowser et al.*, KH-1674 (DACB 54967); Upperpara Chara, 31 v 2000, *Yousuf. et al.*, 1352 (BSIRH). **Moulvibazar:** Adampur, Rajkandi Forest Range, Kamalganj, 7 iii 2011, *K. Haque*, 175 (JUH); Kamarchara, 17 vi 2012, *K. Haque*, 1275 (JUH); Kurma, 18 i 2012, *K. Haque*, 1278 (JUH); Patharia Forest, Sylhet, 08 iii 1886, *T. K. Gupta*, 32 (ASSAM). **Mymensingh:** Near Angargara, 16 ii 1959, *M.S. Khan*, 363 (DUSH). **Rangamati:** Pharu Reserve Forest, Bilaichori, 19 vi 2009, *S.N. Uddin*, N-3516 (DACB); Pablakhali, Saratali, 30 iv 1977, *Haque & Rahman*, H-3275 (DACB 14280); Pablakhali, 2015, *Rahim et al.*, (JUH); Kutuk Chhari, L2472 (CUH); Khashkhali, Kaukhali, 17 xi 1999, *Yousuf. et al.*, 1120 (BSIRH); Toolaban, Marissa, 21 ix 99, *Yousuf et al.*, 1139 (BSIRH). **Rajshahi:** Bhawaniganj, 13 iii 1909, Cat no 1136 (K001112187). **Rangpur:** Rangpur Sadar, Dharmadas shardarpara, 15 iv 1994, *M. Mohiuddin*, 1107 (BFRIH). **Sherpur:** Gajni forest, 07 v 1982, *Mia et al.*, M-817 (DACB 24572); Gozni, Jhinaigati, 09 ii 1985, *Khan et al.*, K-7041 (DACB 14277); Runctia, 17 v 2007, Ershad Tutul 147 (DUSH). **Sylhet:** Specific location unknown, 17 i 1886, 42723 (CAL 57517); Satgoan Forest, 08 ii 1967, *P. Bhattacharjee*, 153 (DUSH). **Tangail:** Madhupur, Pirgacha, 14. vi 1989, *M.K. Mia*, M-21163 (DACB 25567).

Bhutan, Cambodia, China, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and United States of America.

A coarse fiber obtained from the inner bark is used for making ropes, cordage and bags. The tree exudes, a clear gum, which is used in the preparation of medicine and as a substitute for gum karaya in confectionery. Seeds are eaten baked or roasted.

**Theobroma** L., Sp. Pl. 2: 782. 1753.

Type species: *Theobroma cacao* L.

Small to medium trees. Leaves alternate, large and entire. Inflorescence 1-flowered or cymose, usually on trunk or major branches. Flowers bisexual, small and perfect. Calyx 5-lobed, divided nearly to base. Petals 5, lower part deeply concave, middle part becoming narrow, upper spatulate. Stamens in 5 groups of 1-3, alternate with staminodes; filaments connate at base into tube; staminodes 5. Ovary sessile, 5-celled; ovules many per locule; stigma 5-lobed. Fruit large, drupaceous. Seeds many, embedded in pulp; cotyledons fleshy; endosperm absent.

**Theobroma cacao** L., Sp. Pl. 2: 782. 1753; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 476. 1993. *Cacao minar* Gaertn., Fruct. Sem. Pl. 2: 190. 1791. *Cacao minus* Gaertn., Fruct. Sem. Pl., 190, t. 122. 1791. *Cacao sativa* Aubl., Hist. Pl. Guiane 2: 689. 1775. *Cacao theobroma* Tussac, Fl. Antill. 1: t. 13. 1811. *Theobroma integerrimum* Stokes, Bot. Mat. Med. 4: 83. 1812. **Fig. 33.**

Bengali: *Koko, Chokolet*

English: Cocoa Tree

Evergreen trees, up to 12 m tall. Bark thick, dark gray-brown; branchlets brown, puberulent. Leaves simple, alternate, large; leaf blade narrowly ovate to obovate-elliptic, 15-30 × 5-10 cm, base rounded to shallowly cordate, apex long acuminate, both surfaces glabrous or sparsely stellate; stipules linear, caducous. Inflorescence small, delicate cymose, usually occur in clusters on trunk and older branches. Flowers small c. 18 mm in diameter; pedicels c. 15 mm long. Calyx pinkish, lobes narrowly lanceolate, persistent, margin hairy. Petals 5, yellowish, lightly longer than calyx, lower part helmet-shaped and abruptly narrowed, reflexed, apex acute. Staminodes linear to lanceolate. Ovary obovoid, slightly 5-angular, 5-celled; ovules 14-16 per locule, in 2 rows; style cylindrical. Drupes ellipsoid or narrowly ellipsoid, 10-20 × c. 7 cm, longitudinally 10-grooved; endocarp thick, fleshy, hard and woody when dried, 5-10 mm thick. Seeds 12-14 per cell, ovoid, slightly flattened, c. 2.5 × 1.5 cm. *Fl. & fr.*: 1-12. *Widely planted.*



Figure 33. *Theobroma cacao* L.: a) Fertile shoot; b) flower; c) fruit; and d) seed.

**Dhaka:** Botanical Garden, Curzon Hall Campus, DU, 20 xii 2021, *M. Sultana* DMS-4420 (DACB).

Belize, Brazil, Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Italy, Madagascar, Malaysia, Martinique, Mexico, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Singapore, Sri Lanka, Trinidad & Tobago, Uganda, United States of America, Venezuela and Vietnam.

The seeds, known as cacao beans, are widely used to make chocolates. It is dried, fermented, and roasted to yield cocoa chocolate and cocoa butter. The fruit pulp can be eaten raw or made into juices and jealously. Although mainly cultivated for food use, cacao also has medicinal uses. It is used to stimulate the nervous system, lower blood pressure, dilates the coronary arteries, soothes and softens damaged skin. It is also used against anemia, angina, bruises, chapped skin and burns, diarrhea, and leprosy spots. Cacao tree also provides other commodities for local use such as fiber for clothing, thread and paper, wood for construction and implements and coverings for houses, among many other items.

**Waltheria** L., Sp. Pl. 2: 673. 1762.

Type species: *Waltheria americana* L.

Herbs or undershrubs, rarely woody, stellate pubescent. Leaves simple, alternate, margin serrate, stipulate, stipules filiform to lanceolate, caducous. Inflorescence terminal or axillary, cymose often in clusters. Flowers small, bisexual. Calyx with 5 sepals, connate at base into a tube. Corolla with 5 petals, spathulate or oblong-spathulate, persistent. Stamens 5, opposite to petals, filaments tubular, connate at base, anthers 2-lobed, parallel, staminodes absent. Ovary sessile, 1-celled with 2 ascending ovules, styles clavate, fimbriate at apex, excentric, stigmas penicillate. Capsules 2-valved, pilose, enclosed in calyx tube, 1-seeded. Seeds smooth, with copious endosperm, embryo straight, cotyledons flat.

**Waltheria indica** L., Sp. Pl.: 673. 1753. M.J. Mast. in Hook.f., Fl. Brit. India 1: 374. 1874 (Reprint 1961); Prain, Beng. Pl. 1: 190. 1903 (Indian reprint 1963); Heinig, List Pl. Chitt. Coll. & HT.: 7. 1925; Malick in Sharma & Sanjappa (eds.), Fl. India 3: 473. 1993; Verdcourt in Dassanayake *et al.*, Rev. Handb. Fl. Ceyl. 9: 418. 1995; Habib in Ahmed *et al.*, Encycl. Fl. Fauna Bangladesh 10: 351. 2009; Rahman *et al.*, Bangladesh J. Plant Taxon. 19(1): 77. 2012; Alam in Uddin & Hassan, Vas.Fl. Chittagong & CHT. 2: 429. 2018. *Waltheria americana* L., Sp. Pl. 2: 673. 1753. Kongl. Denske Vidensk Selskalbs Naturv. Math. Afhandl. 9: 70. 1829. *Waltheria africana* K. Schum., Fongl.

Danske Vidensk. Selskabs Naturv. Math. Afhandl. 4: 70. 1829. *Waltheria angustifolia* L., Syst. Nat., ed. 10. 2: 1140. 1759. *Waltheria arborescens* Cav., Diss. 6, Sexta Diss. Bot. 316. 1788. *Waltheria erioclada* DC., Prodr. [A. P. de Candolle] 1: 493. 1824. *Waltheria detonsa* A.Gray, Smithsonian Contr. Knowl. 5(6): 24. 1853. *Waltheria american* var. *indica* (L.) K.Schum., Monogr. Afrik. Pflanzen-Fam. 5: 47. 1900. *Waltheri indica* var. *americana* (L.) R.Br. ex Hosaka, Occas. Pap. Bernice Pauahi Bishop Mus. 13: 224. 1937. *Waltheria guineensis* K. Schum., Kongl. Danske Vidensk. Selskabs Naturv. Math. Afhandl. 4: 69. 1829. *Waltheria laevis* Schrank, Pl. Rar. Hort. Acad. Monac. 5. 55. 1818. *Waltheri amakinoi* Hayata, Enum. Pl. Formosa 61, pl. 5. 1906. *Waltheria wildii* Suess., Proc. Trans. Rhod. Sci. Ass. 43: 107. 1951. **Fig. 34.**

Bengali: *Khar dudhi, Khar dudha, Khar dundi*

English: Boater Bush, Buff Coat, Leather Coat, Monkey Bush, Marsh-mallow, Sleepy Morning, Velvet Leaf

Herbs or undershrubs, erect to ascending, up to 1 m tall. Stem much-branched, branchlets more or less pubescent, terete. Leaves simple, ovate, elliptic-ovate, 2.5-6.0 × 1.5-4.0 cm, base shallowly cordate to rounded, apex acute to rounded, margin serrate-dentate, stellate-pubescent on both surfaces. Inflorescence usually axillary cymose, capitate; peduncles up to 4 cm long. Flowers with epicalyx lobes narrowly lanceolate, up to 5 mm long. Calyx 5-lobed, sometimes lanceolate, acute to acuminate, 3-4 mm long, lobes triangular. Corolla about 4 mm long, yellow, spatulate, apex truncate, slightly longer than sepals, veined. Stamens 5, filament tube enclosing ovary, staminal cup about 2 mm high, subconical. Ovary sessile, unilocular, puberulent, styles obliquely inserted, fimbriate at the apex, stigma fimbriate. Capsules obovoid, about 3 mm long, hairy, 1-seeded, enclosed by persistent calyx, with an acute hooked apex. Seeds obovate, very small, smooth. *Fl. & fr.*: 11-4. *Waste places as weed and sometimes grown in gardens.*

**Dhaka:** Dhaka farm, 12 i 1941, *Sen & Singh*, s.n. (DUSH); Nakhla para, 20 vii 1969, *M.M.R. Bhuiyan* 158 (DUSH).

Australia, Benin, Botswana, Brazil, China, Costa Rica, Cuba, El Salvador, French Guiana, Haiti, Honduras, India, Indonesia, Kenya, Malaysia, Mexico, Myanmar, Namibia, Nicaragua, Puerto Rico, South Africa, Sri Lanka, Taiwan, Tanzania, United States of America, Virgin Island (USA), Vietnam and Zimbabwe.

The plant has medicinal and horticultural values.



Figure 34. *Waltheria indica* L.: a) Fertile shoot; b) flower; c) fruit; and d) seed.

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