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DISCOVERY OF SEVENTY THREE NEW RECORDS OF VASCULAR PLANTS FOR BANGLADESH FROM CHITTAGONG AND THE CHITTAGONG HILL TRACTS AREA

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Abstract

This paper deals with seventy three new vascular plant species records for Bangladesh from Chittagong and the Chittagong Hill Tracts area. Among those species, seventy two species belong to angiosperm and remaining one is under pteridophyte. Updated nomenclature, important synonyms, English name (whenever available), description, ecology, distribution, use (whenever available), specimen examined and photographs are provided for each species.

Introduction

Chittagong and the Chittagong Hill Tracts (CHTs) region is comprises with five distrcts (*viz*, Chittagong, Cox's Bazar, Bandarban, Khagrachari and Rangamati). It is situated in the south-eastern part of Bangladesh. Geographically it is located in between 20°35' and 23°44' North latitude and 91°27' and 92°41' East longitude. The Tropic of Cancer crosses over the middle of Khagrachari district. The shape of the area is a funnel or turnip-like and comprises a total of 21,069.57 km^2. The area is bordered by Myanmar and India at the South-east and North-east respectively, and the Bay of Bengal at the South and West. The major river system intercepted the physiographic units along the east-west line. The largest river Karnaphuli in the north; Matamuhari and Sangu river in the middle, and Bakkhali river in the south. The major tributaries of the Karnaphuli are the Kassalong, Maini and Chengi from north and the Khagrachari, Rainkhong and Subolong from east. Near the month of Karnaphuli the Halda River join from north-west. At the extreme south-eastern part, the Naf river separates the territory of Bangladesh from Myanmar. The Bogakine Lake is situated about 700 m high in Bandarban district. Rising from the level of sea to the highest of about 1,003 m is the unique feature of the area. It possesses the highest hill range and hill ecosystem of the country. The hilly watershed of the area creates luxary growth of plants. It is the capital of economic activities through the largest sea port, the second largest airport, and busy rail and road destination.

The flora of the area is most diverse than any other areas in the country due to varied geological, climatical, ecological, phyto-transitional and altitudinal aspects. This place is also attractive due to migration of plants from different bordering countries notably Malayan and Burmese flora from the south-east, Sino-Japanese flora from the north and Indian flora from the west. It is always thought that Chittagong and the Chittagong Hill Tract's flora are strikingly different and rich from rest of the country. After the occupation of the then Bengal Province by the British East India Company in 1757, Chittagong region was gradually attracted by the British explorers. After the visit of Dr. Francis Buchanan, a great British explorer from 1796-1798, the place was then make rout by many world famous botanical explorers, like J.D.Hooker, T.Thomson, W.S.Kurz, J.L.Lister, C.B.Clarke, D.Brandis, H.G.Champion, C.E.C.Fisher, J.M. Cowan, D.Prain, J.Sinclair in 19th and 20th centuries. Records of plants occurring in Chittagong and the Chittagong Hill Tracts can be found in J.D. Hooker's 'Flora of British India (1872-1897)',

S. Kurz's 'Forest flora of British Burma (1877)', D. Prain's 'Bengal plants (1903)', D. Brandis's 'Indian Trees (1906)', R. L. Heinig's 'List of Plants of Chittagong Collectorate and Hill Tracts (1925)', J. Cowan's 'Flora of the Chokoria Sundarbans (1926)' J. Sinclair's 'The Flora of Cox's Bazar (1956)' and in some other older Indian floras. The first extensive attempt in this line was that of Heinig (1925) who first compiled a list of plants of Chittagong and the Chittagong Hill Tracts. His work was based on the work of some great explorers and botanists like Hooker and Thomson (1855), Hooker (1872-1897), Prain (1903) and Brandis (1906) along with his own findings. On these bases he prepared a checklist consists of 1555 angiosperm species under 777 genera belongs to 132 families from Chittagong Collectorate and Hill Tracts area. This overall list is actually an outcome of more than past 100 years of painstaking works starting from Buchanan (1798) to Brandis (1906) and Heinig (1925). Later, Raizada and Verma (1941) added 64 more species to Heinig's list. Then J.Sinclair (1956) added many new taxa from this region.

Their efforts make rout to Chittagong region by many of the latter explorers and botanists of the county to investigate plants more widely and extensively. Due to turmoil condition, little attention has so far been given by the natural scientists on the natural resources as well as biodiversity of the greater districts of Chittagong and the Chittagong Hill Tracts within last one hundred years to prepare a complete floral account for the area. During the Pakistan period and after the independence of Bangladesh some isolated and sporadic floristic surveys were conducted by a number of workers in the adjacent areas of the study area but most of those works were confined in publishing a checklist only. Among those Khan & Banu (1969 & 1972) recorded 295 angiospermic species from CHTs region. Khan *et al*. (1994) assesses the biodiversity of Teknaf Game Reserve focusing on economically and ecologically important plant species and recorded 290 species belongs to 212 genera under 65 families from the area. Rahman & Uddin (1997) recorded 203 species belongs to 154 genera under 54 families from Sitakund eco-park area under Chittagong district. Uddin *et al*. (1998) published a preliminary checklist on Sitapahar reserve forest and recorded 423 angiospermic species. Uddin & Rahman (1999) recorded 547 species belongs to 103 families from Himchari National Park, Cox's Bazar. Rahman *et al*. (2001) assessed the plant diversity of Sand dune ecosystem along the Cox's Bazar to Teknaf coast and reported 128 angiosperm species from the beach. In the same year, Huq & Khan (2001) recorded 422 angiosperm species from the Chunati Wildlife Sanctuary under Chittagong district. In 2004, Choudhury *et al*. reported 138 species from Dulahazra Safari Park area. More recently, Islam *et al*. (2009) conducted a survey in Ramgarh upazila under Khagrachari district and recorded 143 species under 195 genera and 75 angiosperm families. Uddin (2010) assessed the plant diversity of Upper Rezu reserve forest under Ramu upazila during his Ph. D. study and recorded 505 species under 347 genera and 113 families from the area. However, none of these workers could interpret the diversified aspects e.g. phenology, habitat, distributional variation, and valid nomenclature with taxonomic treatment of each species. From the above said discussion, it is clear that there is no floristic base survey report for Chittagong and the Chittagong Hill Tracts region as well as for Bangladesh.

Recent new addition to Bangladesh flora from the region by Uddin and Hassan (2009); Khatun *et al*. (2010); Alfasane *et al*. (2010); Mia *et al*. (2011); Rahman *et al*. (2011), Uddin *et al*. (2012); Ara and Hassan (2012); Rahman and Yusuf (2012 & 2013) and Rahman *et al*. (2014) indicates the necessity of comphrehensive floristic survey of the area. Floristic survey is essential to know the plant species occurring in a particular. It is also necessary to estimate plant genetic resources, to determine threatened & endangered plant species of the country. It is also vital for assessment of the adverse effects of climate change on biodiversity. Repeated floristic survey can help to understand changing pattern of biodiversity. Moreover, the updated knowledge of biodiversity is essential for any effective forest management and conservation program as well as

claiming Intellectual Property Rights (IPR). Considering all of these reasons, BNH has under taken a project entitled 'Survey of Vascular Flora of Chittagong and the Chittagong Hill Tracts' to complete the floristic survey of the region. One of the important goals of this survey is to discover new plant species for the country and floristic novelties within the areas. This report describes the methods and results of floristic surveys conducted in the above said area.

Materials and Methods

The present taxonomic research is mainly based on the voucher plant specimens collected under the project from the districts of Chattogram, Cox's Bazar, Khagrachari, Rangamati and Bandarban. Over 45,000 voucher plant specimens have been collected from the field by the five teams during the period from July 2016 to June 2018. The areas were surveyed by walking along the forest trails and springs (*charas*), and by country boat along the river to record all species encountered. At least one set of voucher specimen of each different species encountered in flowering condition was collected and preserved at BNH. Collection of voucher specimens were conducted in a manner that was consistent with conservation ethics. Location, date, habit and any other notable ecological characteristics were recorded at each collection. Both fresh materials and herbarium specimens were studied. All available taxonomic resources *viz*. literatures, herbarium specimens and botanical illustrations were taken under consideration to identify the species. Digital imagery of the species was also used to supplement plant identification and document their habitats. The new records are based on 73 specimens and all of them are deposited at DACB after labeled properly.

Results

Over forty-five thousand plant specimens were collected from the areas by the survey teams in the course of the taxonomic study during the period of 2016-2018. In the process, seventy three angiosperm species were encountered for which no herbarium specimens had ever been collected from the country. Later on, those species have been identified and are being described here to be new report for Bangladesh as they have never been mentioned in any publication on the flora covering the present territory of Bangladesh (*i.e*. Hooker, 1872-1897; Kurz, 1877; Prain, 1903; Heinig, 1925; Cowan, 1926; Cowan and Cowan, 1929; Kanjilal *et al*., 1934-1940; Raizada, 1941; Datta and Mitra, 1953; Sinclair, 1956; Mia and Khan, 1995; Das & Alam, 2001; Rahman 2004a & b; Siddiqui *et al*., 2007; Ahmed *et al*., 2008-2009). Twelve genera (*i.e*. *Anaxagorea*, *Blachia*, *Cansjera*, *Centratherum*, Hydrophylax, *Neuracanthus*, *Pachystylidium*, *Platycerium*, *Plukenetia*, *Sechium*, *Stachyphrynium*, *Sumbaviopsis* and *Xantolis*) are also being described here as new generic records for the country. Seventy three specific taxa in the following list belong to 63 genera and 42 families. The study has found that maximum number of new records are belong to four families namely Rubiaceae (9 species), Acanthaceae (8 species), Euphorbiaceae (6 species) and Piperaceae (3 species). Eight families (viz. Actinidiaceae, Commelinaceae, Cucurbitaceae, Fabaceae, Hippocrateacea, Myristicaceae, Orchidaceae and Zingiberaceae) possess two new records each and remaining thirty families possess a single new record each. Among those taxa, 14 species are trees, 11 species are shrubs, 18 species are climbers and 30 species are herbs. Families and entries under each family are arranged in alphabetical order. Detailed taxonomic accounts including photographs of all the species are provided below.

FAMILY: **ACANTHACEAE**

Eranthemum macrophyllum Wall. *ex* Nees, Pl. Asiat. Rar. 3: 106. 1832. (**Fig. 1**)

Daedalacanthus macrophyllus (Wall. *ex* Nees) T.Anderson, J. Linn. Soc. Bot. 9: 487. 1867.

Erect herbs, 50-100 cm high. Stems short glandular hairy. Leaves opposite; petiole 10-22 cm long; leaf blades elliptic-lanceolate, ovate, apex acuminate, base decurrent on petiole, margins serrulate or denticulate. Inflorescences terminal or axillary subinterrupted spikes, erect, linear, 5-20 cm long; peduncles 5-12 cm long, glandular-puberulous; bracts loosely imbricate, ovate or obovate, 12-18 mm long, bracteoles narrowly lanceolate, equaling or longer than calyx. Calyx minute, 2-3 mm long, 5-lobed, subequal, lobes lanceolate, erect, glandular-pubescent. Corolla 3.0-3.5 cm long, erect, pale violet-blue, tube very slender, curved, limb reflexed, 15-18 mm diameter, lobes oblong, obtuse with darker violet veins. Stamens 2, inserted below throat; filaments 15-18 mm long; staminodes 2, filiform. Ovary slender, with 2 ovules per locule, glandular-pubescent; style filiform; stigma 2-lobed, lobes unequal. Capsule clavate, 4-seeded; retinacula present. Seeds discoid, compressed, pubescent. *Flowering & fruiting:* January-May.

Ecology: Along the side of lake or forest margins at high altitude, upto 1000m.

Distribution: Myanmar.

Specimen examined: **Bandarban**: Boga Lake, Ruma, 12 ii 2018, Sahidul & Rashed, MSI 6965 (DACB).

Neuracanthus tetragonostachyus Nees in Wall., Pl. Asiat. Rar. 3: 97. 1832. (**Fig. 2**)

Ruellia tetragonostachya Wall., Numer. List 7168. 1832.

Justicia dasycarpa Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42: 96. 1873.

Perennial herbs or subshrubs, 30-45 cm high. Stem subterete or quadrangular with two lines of hairs. Leaves opposite, elliptic or obovate-lanceolate, 6-10 × 3-4 cm, base attenuate into a very short petiole, apex acuminate, membranous, hispid-pubescent. Inflorescence terminal, solitary spikes, erect, linear-oblong, 6-8 mm wide, 4-gonous, sessile; bracts elliptic-ovate 7.5-8.5 mm long, with 5 very strong raised nerves, thinly pilose, ciliate and muriculate on the edges and principal nerves. Flowers bright blue. Calyx segments linear- lanceolate, 5-6 mm long, minutely tubercled, densely white-villous. Corolla tube conical at base, limb 2-lipped, 5-6 mm diameter, upper lip darker blue-veined. Stamens didynamous. Styles 2-branched at the apex, one branch obsolete; ovules 2 in each cell. Capsules oblong, 5-6 mm long, compressed with a short solid beak or very acute, glabrous, 4-seeded. Seeds ovate, much compressed, densely silky. *Flowering & fruiting:* March-July.

Ecology: Hilly moist deciduous forests; between 700-1000 m altitudes.

Distribution: India, Myanmar, Thailan and Vietnam.

Specimen examined: **Bandarban**: Boga Lake, Ruma, 12 ii 2018, Sahidul & Rashed, MSI 6962 (DACB).

Phlogacanthus guttatus Nees, Pl. Asiat. Rar. 3: 99. 1832. (**Fig. 3**)

Justicia guttata Wall., Pl. Asiat. Rar. 1: 24. t. 28. 1830.

Shrubs up to 1-2 m high. Stems erect, glabrous. Leaves often crowded near branch tips, elliptic or oblanceolate, 6-15 × 3-5 cm, base cuneate, apex acuminate, lateral nerves 8-10; petiole 2.5-3.2 cm long. Inflorescence uninterrupted terminal thyrse, 3-20 × 4-5 cm, usually solitary, rarely 2-3; rhachis pubescent; bracts linear, 8-10 mm long, pubescent. Calyx 4-6 mm long, pubescent, lobes linear. Corolla tubular, 20-25 × 4-8 mm, white or orange-brown, shortly 2-lipped, pubescent; upper lip 6-7 mm wide, spreading, suberect, 2-lobed; lower 3-lobed, with purple spots, recurved. Stamens 2; anthers 4-5 mm long, exserted. Gynoecium 1.8-2.2 cm long, ovary glabrous. Capsules narrowly clavate, 2-3 cm long. Seeds 2.5-3.0 cm. *Flowering & fruiting:* December-April.

Ecology: Evergreen hill forests, thickets and scrub jungles; at low to high altitude.

Distribution: Bhutan, China, India and Malaysia.

Specimens examined: **Bandarban**: Y-Junction Forest Range, Bandarban Sadar, 26 x 2016, Imam *et al*., IH1051 (DACB); Rowangchari Forest Range, Rowangchari, 07 iii 2017, Imam *et al*., IH4586 (DACB); Thanchi Forest Range, Thanchi, 27 iii 2017, Imam *et al*., IH4981 (DACB).

Pseuderanthemum crenulatum (Wall. *ex* Lindl.) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München. 13: 286. 1883. (**Fig. 4**)

Eranthemum crenulatum Wall. *ex* Lindl., Bot. Reg. 11: t. 879. 1825.

Eranthemum graciliflorum Nees, Pl. Asiat. Rar. 3: 107. 1832.

Eranthemum malaccense C.B.Clarke in Hook.f., Fl. Brit. India 4: 498. 1884.

Pseuderanthemum graciliflorum (Nees) Ridley, Fl. Malay Penins. 2: 591. 1923.

Subshrubs or shrubs, 1-3 m tall. Stems blackish brown, subterete, pubescent. Petiole 1-4 cm long, puberulent; leaf blades ovate-elliptic to oblong-lanceolate, 5-15 × 3-6 cm, abaxially light green, pubescent along veins, adaxially pubescent, lateral nerves 5-7 pairs, base cuneate, margins entire, apex acute to acuminate. Inflorescence thyrses, 3-10 cm long, densely flowered; bracts triangular, 5-7 × 2-3 mm, brown tomentose; bracteoles subulate, 3-4 × 1.1-1.5 mm, brown tomentose. Pedicel 1-3 mm long, pubescent. Calyx 4-5 mm long; lobes linear-lanceolate, densely pubescent. Corolla white or light purplish, 3.5-4.5 cm long, outside pubescent; tube 2.5-3.5 cm long; lower lip 3-lobed, lobes oblong; upper lip 2-lobed to middle. Stamens slightly exserted; filaments 2-3 mm long, glabrous; anther thecae ovoid. Ovary pilose; style basally white pilose; stigma spherical. Capsules clavate, 1.5-2.5 cm long. Seeds subcircular, 3.0-3.5 mm diameter, verrucose, glabrous. *Flowering & fruiting*: April-August.

Ecology: Forests & thickets; between 200-700 m altitudes.

Distribution: India, China, Laos, Malaysia, Thailand and Vietnam.

Specimen examined: **Cox's Bazar:** ChepotKhali, Ukhia, 13 iii 2018, Niyamul *et al*., NK 7183 (DACB).

Strobilanthes capitata (Nees) T.Anderson, J. Linn. Soc. Bot. 9: 475. 1867. (**Fig. 5**)

Goldfussia capitata Nees in Wall., Pl. Asiat. Rar. 3: 88. 1832.

Subshrubs or perennial herbs, up to 1 m tall; much branched, anisophyllous. Stems decumbent to ascending, pilose, glabrescent. Leaves opposite; petiole 1-3 cm long; leaf-bladeslanceolate, elliptic-ovate or elliptic, 5-15 × 1.5-10 cm, abaxially pubescent along veins, adaxiallypilose, lateral nerves 6-7 pairs, base attenuate, oblique, margins serrate, apex acuminate. Inflorescences axillary, pedunculate heads, ovoid to ellipsoid, 1.5-2.0 × 1-3 cm, 1-3 per axil; peduncle 1-6 cm long, glabrous or pubescent; floral bracts ovate, 1.5-2.3 cm long, deciduous as flowers open, pubescent, margin crenate; inner bracts oblong-elliptic, 1.3-1.6 cm long, margin entire or with 1 or 2 teeth; bracteoles oblong-elliptic, caducous, pilose. Calyx pale green, 1.0-1.2 cm long, 5-lobed; lobes linear-oblanceolate, pubescent, margin ciliate. Corolla blue, 4-6 cm long, straight, outside pilose, inside glabrous; tube cylindric, 1.2-1.5 cm long; lobes oblong, 3-5 × 3-4 mm. Stamens 4, included; filaments glabrous, shorter pair 1-2 mm, longer pair 7-8 mm long; anther thecae spherical, 1.0-1.2 mm diameter. Ovary pilose; style 3-4 cm, pilose. Capsules oblong, 1.4-2.0 cm, 4-seeded. Seeds ovate, 2-3 × 2.2-2.5 mm. *Flowering & fruiting*: September-February.

Ecology: Evergreen forests; up to 700 m altitudes.

Distribution: Bhutan, China, India, Myanmar and Nepal.

Specimen examined: **Rangamati:** Kassalong Reserved Forest, Baghaichari, 17 ix 2017, Kawser *et al*., KH 6477 (DACB).

Strobilanthes chinensis (Nees) Wood & Deng, Bot. J. Linn. Soc. 150: 388. 2006. (**Fig. 6**)

Ruellia chinensis Nees in A. DC., Prodr. 11: 147. 1847.

Hemigraphis chinensis (Nees) T.Anderson *ex* Hemsl., J. Linn. Soc. Bot. 26: 238. 1891.

Herbs or subshrubs, 30-100 cm tall, isophyllous. Stems often procumbent, rooting at base, 4-angled, hirsute, basally slightly woody. Leaves opposite; petiole 4-10 mm long; leaf-blades obovate, obovate-elliptic or oblong-elliptic, 2-11 × 1-5 cm, sparsely hispid, adaxially densely covered with cystoliths, lateral veins 5 pairs, purplish, scabrous, base attenuate, decurrent into petiole, margins crenate to dentate, apex acute to acuminate. Inflorescences axillary or terminal, subcapitate; bracts imbricate, ovate, 1.5-2.0 cm, hirsute, usually 3-veined, apically beaked to a sub-obtuse point; bracteoles linear, 7-9 mm long, resembling calyx lobes. Calyx 5-11 mm long, subequally 5-lobed; lobes linear-lanceolate, 6-10 × 0.3-0.5 mm, outside gland-tipped pilose, inside pubescent, apex attenuate. Corolla yellow, 1.6-2.0 cm long, straight; tube cylindric, outside pubescent, inside villous; lobes orbicular, 3-4 mm diameter. Stamens 4, included or longer pair slightly exserted; shorter filament pair 1-2 mm long; longer filament pair 4-5 mm long; anther thecae oblong, 1-2 mm long. Ovary pilose; style 1.8-2.0 cm long, villous; stigma pilose. Capsules 0.8-1.2 cm long, pubescent, 8-seeded. Seeds yellowish, broadly ovate, 1-2 × 1-2 mm, subglabrous. *Flowering & fruiting*: October-July.

Ecology: Moist places along streams in evergreen forests; near sea level to 800 m altitudes.

Distribution: Cambodia, China, Laos and Vietnam.

Specimen examined: **Cox's Bazar:** Moggomorchara, Eidgarh, 07 ii 2018, Niyamul *et al.*, NK6971 (DACB).

Strobilanthes dimorphotricha Hance, J. Bot. 21: 355. 1883. (**Fig. 7**)

Much-branched, perennial herbs. Isophyllous or anisophyllous, stem glabrous or yellowish pubescent. Leaves petiolate, lamina elliptic, elliptic-lanceolate, ovate, oblong or oblong-elliptic, smaller pair adaxially usually dark green, white appressed pubescent, base cuneate to attenuate, apex acuminate, or acute, margin serrulate. Inflorescence axillary or terminal, head-like spikes, peduncled. Bracts ovate-elliptic, caducous, bracteoles lanceolate, caducous. Calyx 5-lobed, almost to base, lobes lanceolate, gland-tipped pubescent, one lobe slightly longer than others. Corolla basally cylindric then ventricose and gradually widened at mouth, lobes orbicular, subequal, apex emarginate, violet. Stamens 4, didynamous, included, filaments glabrous, shorter filament pair equal, longer filament pair unequal. Ovary pilose, style pilose. Capsules oblong-clavate, gland-tipped pubescent, 4-seeded. Seeds lenticular, pubescent. *Flowering & fruiting:* August-April.

Ecology: Thickets on limestone hills, streamsides.

Distribution: China, India, Laos, Myanmar, Thailand and Vietnam.

Specimen examined: **Bandarban**: Chingrijhiri (way to Keokra Dong), Ruma, 13 ii 2018, Sahidul & Rashed, MSI 7000 (DACB).

Strobilanthes glomerata (Nees) T.Anderson, J. Linn. Soc. Bot. 9: 475. 1867. (**Fig. 8**)

Goldfussia glomerata Nees in Wall., Pl. Asiat. Rar. 3: 88. 1832.

Subshrubs, up to 1 m tall, strongly anisophyllous. Stems and branches 4-angled to subterete, setose. Leaves opposite; petiole 0.6-3.0 cm long, pubescent; leaf-blades elliptic, narrowly ovate, 5-

20 × 3-10 cm, densely pubescent, lateral nerves 5-7 pairs, base oblique, rounded, decurrent into petiole, margins serrate, apex acuminate. Inflorescences capitate; bracts variable in size and shape; outer bracts sterile, lanceolate, 2-3 × 0.4-0.6 cm, densely pubescent, margin serrate; inner bracts lanceolate, 1.4-1.6 × 0.2-0.4 cm, apex acuminate; bracteoles lanceolate, 8-12 × 1-2 mm, pubescent. Calyx 1.3-1.5 cm long, 5-lobed; lobes 10-13 × 1.2-1.5 mm, unequal, outside pubescent, inside glabrous. Corolla purple, 4-6 cm long, outside pubescent, inside glabrous; tube cylindric, lobes ovate, 3-4 × 5-7 mm, apex retuse. Stamens 4, included; filaments glabrous, shorter pair 1.3-1.5 mm long, longer pair 7-9 mm long, unequal; anther thecae obliquely ellipsoid. Ovary glabrous; style 2-3 cm long, glabrous. Capsules fusiform, 8-2 × 2-3 mm, glabrous, 4-seeded. Seeds ovate, 1-2 × 1-2 mm, pubescent. *Flowering & fruiting*: August-October.

Ecology: Evergreen forests; up to 1000 m altitudes.

Distribution: India and China.

Specimen examined: **Rangamati:** Chotohorina, Barkal, 20 viii 2018, Joyanta *et al.*, JCR 7414 (DACB).

FAMILY: **ACTINIDIACEAE**

Saurauia armata Kurz, J. Asiat. Soc. Beng. 42: 59. 1873. (**Fig. 9**)

Saurauia cerea Griff. *ex* Dyer in Hook.f., Fl. Brit. India 1: 288. 1874.

Trees with warty brownish bark, innovations densely scaly. Leaves simple, alternate, petiolate, petioles 1.5-4.0 cm long, with subulate scales, lamina 10-35 × 8-20 cm, obovate or broadly oblanceolate, leathery, base cuneate, apex obtusely acuminate, margin densely setose-serrate, glabrous when old, lateral nerves on both surfaces brown scaly. Flowers large, 2-3 cm across, pinkish, solitary or fascicled on old branches, pedicels 1-2 cm long, with yellowish tomentum and scales, bracts 2, ovate. Sepals c 1 cm long, outer 3 elliptic, inner 2 orbicular, scaly, tomentose. Petals orbicular. Stamens indefinite. Ovary subglobose, villous, styles 4 or 5, distinct. Berries depressed-globose, c 1.5 cm across, 5-ribbed, greenish-white, yellowish-brown tomentose. *Flowering & fruiting:* June-March.

Ecology: Primary and secondary forests and bamboo forests.

Distribution: Bhutan, China, India, Myanmar and Nepal.

Use: Fruit is edible.

Specimens examined: **Bandarban**: Kuhalong Para, Kuhalong, Bandarban Sadar, 14 v 2017, U Mong Nu Marma, UMN 066 (DACB); Khaikkong Jhiri Forest Range, Ruma, 09 v 2019, Imam *et al*., IH5417 (DACB); Baghmata, Rowangchari, 27 v 2017, UOMM Rasel, UAMR 154 (DACB).

Saurauia punduana Wall., Pl. Asiat. Rar. 2: 40. 1831. (**Fig. 10**)

Trees with lenticellate, brownish-grey bark, branchlets scaly. Leaves petiolate, petioles 2-5 cm long, lamina 6-30 × 3-10 cm, elliptic to oblong-lanceolate, base acute or rounded, apex acute or acuminate, serrate, tomentose underneath, lateral nerves scaly. Inflorescence axillary cymes, 2-8 cm long, 1-3 fascicled, 2- or 4-flowered, glabrous, scaly, pedicels slender, bracts broadly elliptic. Flowers large, 1.2-1.6 cm across, pinkish-white. Sepals 5, outer 2 broadly elliptic, inner 3 narrowly elliptic to orbicular, persistent. Petals oblong. Stamens indefinite. Ovary subglobose, ribbed, styles 5, connate at the base. Berries globose, shining white. *Flowering & fruiting:* March-January.

Ecology: Edges of primary forests, secondary forests and also bamboo forests.

Distribution: Bhutan, China, India and Myanmar.

Use: Ripe fruit is edible.

Specimen examined: **Bandarban**: Gumdum, Naikhongchhari, 07 iv 2017, U.Chakma, UC134 (DACB).

FAMILY: **AMARANTHACEAE**

Celosia spicata Spreng., Syst. Veg. 1: 815. 1824. (**Fig. 11**)

Celosia spicata var. *cuspidata* Cavaco, Bull. Mus. Natl. Hist. Nat. II, 24: 577. 1952.

Celosia spicata var. *thouarsii* Cavaco, Bull. Soc. Bot. France 100: 373. 1953.

Celosia spicata var. *holostachya* (Baker) Cavaco, Bull. Soc. Bot. France 100: 343. 1953.

English name(s): Silver Cockscomb, Wheat Celosia, Wheatstraw Celosia

Annual, erect herb, with grooved stem, 60-75 cm high. Leaves alternate, linear-lanceolate, 5-12 cm × 4-8 mm, apex acute, margins entire, base tapering into the petiole. Inflorescence terminal spikes, narrowly cylindric or with a conic apex, 10-15 cm long, soft, dense feathery. Flowers pinkish at first gradually becoming white when old. Bracteoles scarious, linear, 3-4 mm long, white, shiny, with midvein, apex acuminate. Perianth 1-5 mm long, scarious, linear-lanceolate. Stamens 5, filaments united at the base to form a cup. Stigmas 2-3, very short, filiform style 5-7 mm long; ovary superior, 4-8-ovulate. Fruit a capsule, 3-4 mm, ovoid to almost globular, dehiscence transversely. Seeds lenticular, 1.2-1.5 mm long, black, shining, testa finely reticulate. *Flowering & fruiting:* September-December.

Ecology: Grass lands after rains.

Distribution: India.

Use: The seed is useful in diarrhoea.

Specimen examined: **Rangamati**: Mora Alikheong, Bilaichari, 23 x 2016, Joyanta *et al.*, JCR 1293 (DACB).

FAMILY: **ANNONACEAE**

Anaxagorea luzonensis A. Gray, U.S. Expl. Exped., Phan. 27. 1854. (**Fig. 12**)

Evergreen shrubs, 1-2 m tall. Stem erect, glabrous. Leaves simple, alternate, petiolate; leaf blade oblong to broadly elliptic, 8-18 × 3-8 cm, base rounded, apex acute to obtuse, margins entire, membranous, glabrous, yellowish when dry, secondary nerves 7 or 8 pairs; petioles 0.5-2.0 cm long, glabrous. Inflorescences leaf-opposed, 1- or 2-flowered; pedicels 3-6 mm long, puberulous; bracts 1-2, amplexicaul. Flowers ca. 1.2 cm across. Sepals 3, rounded to ovate, 2- 3 × 1.8-2.0 mm, outside puberulent, connate at base, obtuse. Petals 6 (3 + 3), greenish; outer petals ovate, slightly longer and twice broader than inner petals; inner petals 8-10 × 4-5 mm, valvate, glabrous. Stamens many, ca 2 mm long, broadly elliptic; connectives blunt. Carpels 2-4, ovoid-oblong, 2.5-3.0 mm long, pubescent; styles prominent; stigma blunt. Ripe carpels 2-3 together, follicular, 2-4 cm long (with stalk), cuneate-clavate, sharply apiculate, slightly compressed, narrowed into a long stalk, dehiscing on dorsal side. Seeds 1-2, obovoid, flat, 8-10 × 6-7 mm, shiny black. *Flowering & fruiting*: June-December.

Ecology: Grows in densely forested areas along the sides of water courses; between 100-700 m altitude.

Distribution: Sri Lanka, India, Myanmar, Thailand, Indonesia, Laos, Cambodia, China, the Philippines and South America.

Specimen examined: **Rangamati:** Pharua Reserved Forest, Bilaichari, 15 x 2008, S.N. Uddin, N-3085 (DACB).

FAMILY: **APOCYNACEAE**

Parsonsia latifolia (Benth.) S.T. Blake, Proc. Roy. Soc. Queensland 59: 167. 1948. (**Fig. 13**)

Lyonsia latifolia Benth., Fl. Austral. 4: 323. 1868.

Extensive, woody climbers with milky sap, viscid, copious. Leaves opposite; petioles 1.5-6.0 cm long; blades ovate or triangular-ovate, 6-18 × 4-10 cm, apex shortly acuminate or acute, mucronate, base broadly cuneate, truncate to subcordate, margins slightly irregular, dark green above, paler below, glabrous, midrib raised above and below, reticulation prominent above when dry, only primary vein visible below. Inflorescences terminal, many-flowered, minutely pubescent panicles; pedicles 3-5 mm long, pubescent. Calyx lobes subacute, 1.0-1.5 mm long, pubescent. Corolla cream coloured, tube 1.0-1.5 mm long, puberulent to glabrous outside, glabrous or sparsely bearded inside at throat, lobes acute, 5-6 mm long. Filaments 2.5-3.0 mm long; anthers 3-4 mm long. Follicles linear-terete, thick, woody, 12-18 cm long. *Flowering & fruiting*: March-August.

Ecology: Rain forests, near coastal areas.

Distribution: Queensland.

Specimen examined: **Chattogram:** Chandranath Pahar, Sitakundo, 10 x 2016, Tajul *et al.*, TOK 1047 (DACB).

FAMILY: **ASCLEPIADACEAE**

Gymnema yunnanense Tsiang, Sunyatsenia.6: 131. 1941. (**Fig. 14**)

Lianas up to 7 m long, minutely tomentose throughout. Petiole 1.0-1.5 cm long; leaf blade ovate to ovate-elliptic, rarely obovate, 6-15 × 2.5-6.0 cm, base rounded, apex acuminate, glabrescent except for veins, lateral nerves 5 or 6 pairs. Sepals ovate-oblong, as long as corolla tube, hirsute. Corolla yellowish green to white-green, lobes ovate, ciliate; appendages exserted from corolla tube, hair bands well developed. Anther appendages retuse, shorter than stigma head; pollinia oblong, erect. Stigma head globose, exserted. Follicles ovoid-lanceolate in outline, conspicuously beaked with asymmetrically swollen base, 5-7 × 2-3 cm, densely tomentose. Seeds ovate-oblong, 1.2-1.5 cm × 4-6 mm, margin membranous; coma 2.0-2.5 cm long. *Flowering & fruiting*: February-October.

Ecology: Mixed evergreen forests; 300-1000 m altitudes.

Distribution: China.

Specimen examined: **Bandarban**: Keokradong Forest, Ruma, 14 ii 2018, Sahidul & Rashed, MSI 7020 (DACB).

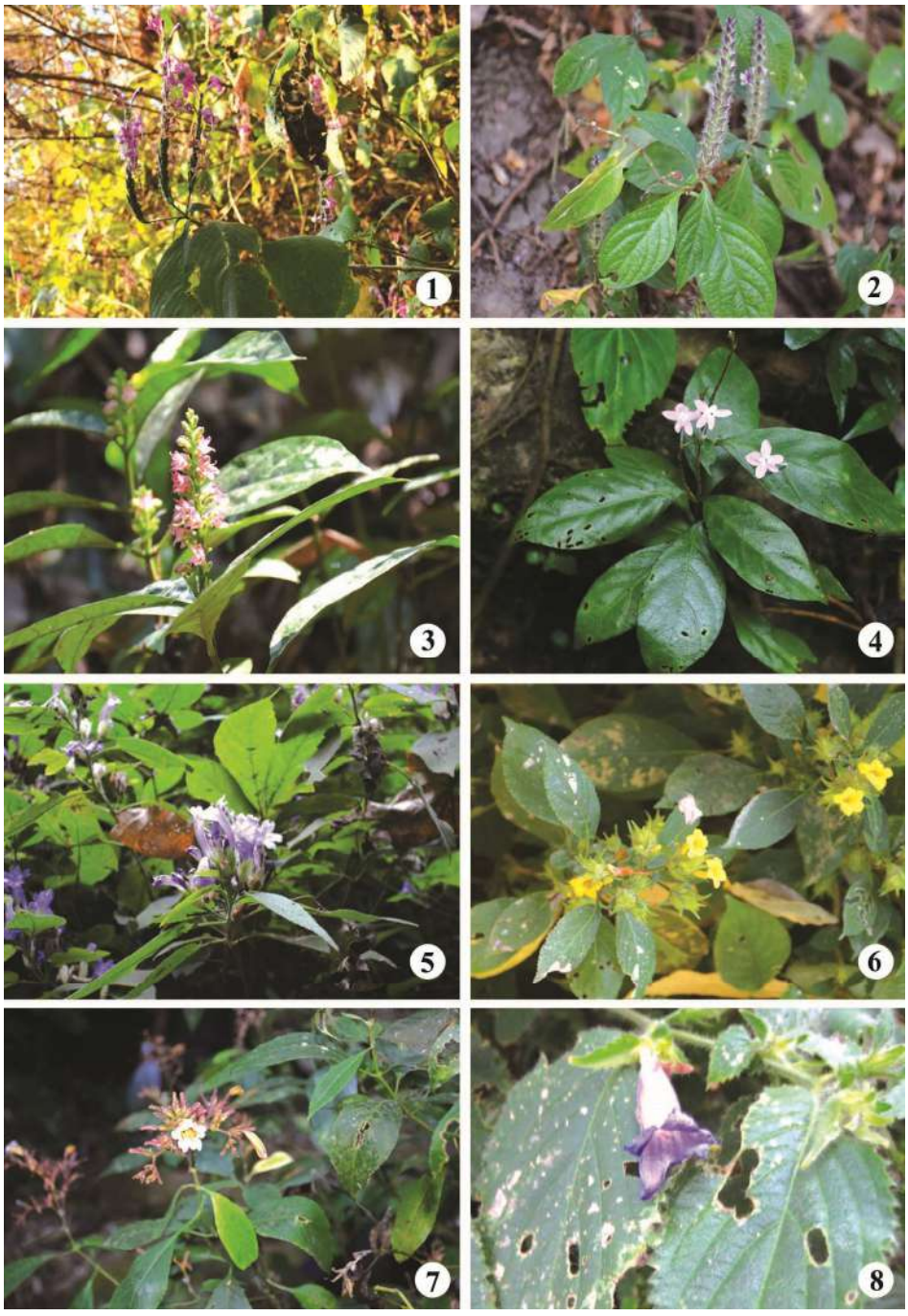
FAMILY: **ASTERACEAE**

Centratherum punctatum Cass., Dict. Sci. Nat., ed. 2, 7: 384. 1817. (**Fig. 15**)

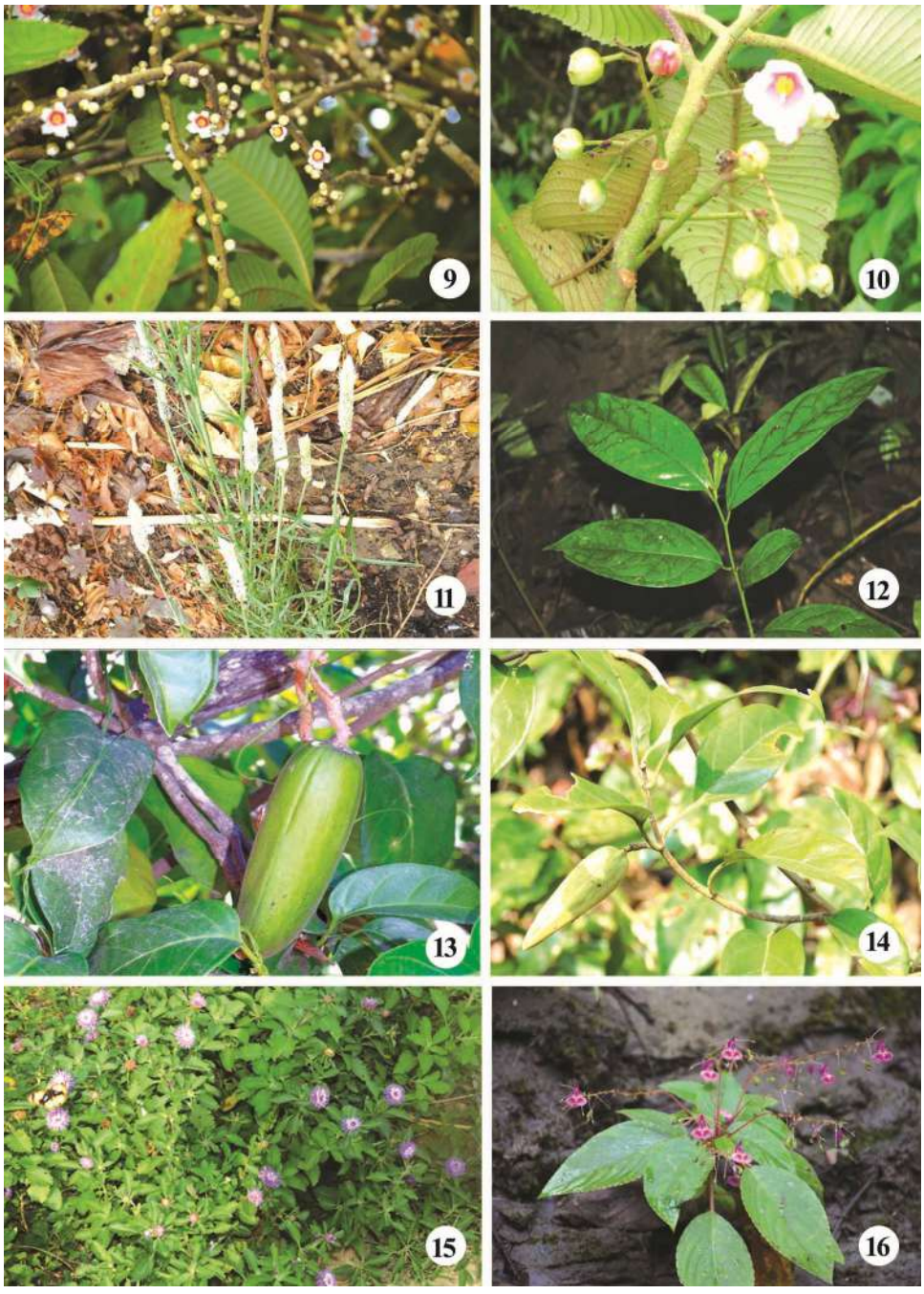
Centratherum aristatum (Kunth) Cass. *ex* B.D.Jacks., Index Kew. 1895: 478. 1895.

Centratherum intermedium (Link) Less., Linnaea 4: 320. 1829.

Herbs or subshrubs, 10-50 cm tall. Stems erect, pubescent, usually branched. Leaves lanceolate to ovate or obovate, 2-6 × 1-4 cm, apex acute, base cuneate, margins entire or with 4-6 pairs of teeth, glandular punctate and villose, lateral veins 3-6 pairs. Inflorescences sessile, solitary, terminal capitulum. Heads discoid with many florets; involucre broadly hemispherical, outer involucral bracts 6-15, foliaceous, curved and spreading, inner involucral bracts scariose, 4-6-seriate, narrowly deltoid, apically acute to obtuse, spinescent, awns 1-4 mm long; receptacle flat. Corolla tube narrowly cylindric, lavender-blue or purple, 5-7 mm long, 5-lobed, lobes linear to



Figs 1-8: 1: *Eranthemum macrophyllum* Wall. *ex* Nees, 2. *Neuracanthus tetragonostachyus* Nees, 3. *Phlogacanthus guttatus* Nees, 4. *Pseuderanthemum crenulatum* Radlk., 5. *Strobilanthes capitata* (Nees) T.Anderson Fig. 6: *Strobilanthes chinensis* Wood & Deng, 7. *Strobilanthes dimorphotricha* Hance, 8. *Strobilanthes glomerata* T. Anderson.



Figs 9-16: 9: *Saurauia armata* Kurz, 10. *Saurauia punduana* Wall. Fig. 11. *Celosia spicata* Spreng., 12. *Anaxagorea luzonensis* A. Gray, 13. *Parsonsia latifolia* (Benth.) S.T. Blake, 14. *Gymnema yunnanense* Tsiang, 15. *Centratherum punctatum* Cass., 16. *Impatiens glandulifera* Royle.

lanceolate, 1-2 mm long. Stamens 5. Styles 6-7 mm long, bilobed, lobes puberulous, 1-2 mm long, acute. Cypselas narrowly turbinate, weakly ribbed, 1-2 mm long; pappus of deciduous filiform scales 1-2 mm long, puberulent. *Flowering & fruiting:* November-January.

Ecology: Open waste places, hillsides and gardens.

Distribution: Mexico, West Indies, Central America and South America.

Use: Cultivated as an ornamental plant.

Specimen examined: **Bandarban**: Y-Junction Forest Range, Bandarban Sadar, 12 ii 2017, Imam *et al*., IH 4046 (DACB).

FAMILY: **BALSAMINACEAE**

Impatiens glandulifera Royle, Ill. Bot. Himal. Mts. 151. 1835. (**Fig. 16**)

Annual, robust, succulent herbs, 50 to 100 cm heigh; stem hexagonal, glabrous. Leaves opposite or in whorls of threes; petiole 30-35 mm long; leaf-blades elliptic-ovate, lanceolate to obovate, 12-20 × 5-7 cm, apex acuminate, margins sharply serrated. Inflorescences racemes, 2-4 cm long, 2-14 flowered; peduncles up to 90 mm long; bracts elliptic-ovate or lanceolate-ovate, 7-10 mm long. Flowers strongly zygomorphic, pink-red or red-purple, 2-3 cm long. Lateral sepals oblique cordate, 7-9 mm long. Lower sepal saccate, abruptly ending in a spur 5-6 mm long; spur incurved. Anterior petal orbicular-depressed, 7-8 × 8-12 mm; dorsally crested, apex bilobed. Lateral united petals 15-26 mm long, unequal; lower one larger (26 mm), upper with a thin incurved appendage. Capsules broadly clavate, 14-25 mm long, nodding. Seeds globose, 23 mm broad, rugose. *Flowering & fruiting*: July-August.

Ecology: Roadside ditches, field borders, hillsides; from 600-900 m altitute.

Distribution: West Himalaya's from Kashmir & Hazara to Kumaon.

Use: Seed is edible.

Specimen examined: **Bandarban**: Sangu Reserve Forest, Thanchi, 10 x 2017, Sahidul & Rashed, MSI 5975 (DACB).

FAMILY: **BEGONIACEAE**

Begonia sinuata Wall. *ex* Meisn., Ber. Verh. Naturf. Ges. Basel 2: 42. 1836. (**Fig. 17**)

Begonia bilocularis (Wight) Craib, Fl. Siam. 1: 771. 1931.

Begonia clivalis Ridl., J. Straits Branch Roy. Asiat. Soc. 54: 43. 1910.

Begonia subrotunda Wall., Numer. List 6293. 1832.

Begonia elongata Wall., Numer. List 6291. 1832.

Begonia guttata Wall., Numer. List 3671B. 1831.

Erect herbs, 2-10 cm tall. Stem thick, short, glossy, with star-like hairs, unbranched, slender, tuber pale brown, globose, 4-10 mm diam. Stipule elongate triangular, with star-like hairs, margin entire, tip acuminate, caducous. Leaves broadly obovate to rounded, 1.5-8.0 × 1.5-8.5 cm, base unequally cordate, margins bluntly toothed, apex acuminate, bright green above, paler below, with star-like hairs on both side; petiole red, sparsely hairs, 0.5-3.0 cm long. Inflorescence terminal cymes, dicotomously branched; peduncle 3-7 cm long. Male flower: pedicel 1.0-1.5 cm long, tepal 4, slightly hairy, margin entire, apex acute-rounded, outer two oval, 5-7 × 5-7 mm, inner two narrowly elliptic, 5-7 × 2-3 mm, stamens ca 12, yellow, cluster globose, 1-2 mm diameter, anther yellow, obovate, apex notched. Female flower: pedicel 3-8 mm long, ovary 2-5 × 4-7 mm, wings 3, locules 2; tepals 4-5, slightly hairs, outer broadly obovate, margin entire, apex rounded, 2-5 × 1.5-2.5 mm; style 2, stigmas U shaped, yellow, 2-3 mm long. Capsule 6-10 × 10-20 mm, wings 3,

unequal, larger wing 10-16 mm wide, shorter wing 3-9 mm long, splitting between wing and capsule; fruiting pedicel 5-9 mm long. *Flowering & fruiting*: May-September.

Ecology: Grows on shady and wet rocks; between 200-500 m altitudes.

Distribution: Thailand, Cambodia, Vietnam, Peninsular Malaysia and Indonesia.

Specimen examined: **Bandarban**: Gumdum, Naikhongchhari, 23 v 2017, Ukchain Chakma, UC358 (DACB).

FAMILY: **BORAGINACEAE**

Cynoglossum wallichii G. Don, Gen. Hist. 4: 354. 1837 var. **glochidiatum** (Wall. *ex* Benth.) Kazmi, J. Arnold Arbor. 52: 347. 1971. (**Fig. 18**)

Cynoglossum glochidiatum Wall. *ex* Benth., Ill. Bot. Himal. Mts. 306. 1836.

Annual herbs, 20-70 cm tall. Stems single or several and cespitose, branched above, densely hispid, hairs discoid at base; branches slender, spreading. Basal and lower stem leaves petiolate, green to gray-green, lanceolate to obovate, 2-5 cm × 5-12 mm; middle and upper stem leaves sessile, green to gray-green, smaller, sparsely hispid and appressed pubescent. Inflorescences terminal and axillary, forked, to 20 cm long in fruit, becoming raceme-like, many flowered at anthesis, ebracteate. Pedicel 4-5 mm long in fruit, recurved. Calyx 2.0-2.5 mm, densely and antrorsely appressed pilose; lobes erect, ovate to oblong, ca. 1.8-2.0 × 0.4-0.5 mm, slightly enlarged in fruit, margin ciliate. Corolla blue or blue-purple, campanulate, base 3-4 mm wide; throat appendages trapeziform, margin pubescent; limb 2.5-4.5 mm wide; lobes orbicular; veins distinctly reticulate. Anthers oblong, 0.8-1.0 mm long. Nutlets ovoid, 3-4 × 2.5-3.0 mm; abaxially concave, with glochids only along center line keel. *Flowering & fruiting*: July-December.

Ecology: Grows on shady and wet rocks; between 200-500 m altitudes.

Distribution: Thailand, Cambodia, Vietnam, Peninsular Malaysia and Indonesia.

Specimens examined: **Bandarban**: Khanshama Bazar, Rowangchari, 05 ix 2016, I Hossen *et al*., IH 345 (DACB); Betchata Forest range, Rowangchari, 27 ix 2016, Imam *et al*., IH 443 (DACB); Khaiyachalang Forest range, Rowangchari, 21 xi 2016, Imam *et al*., IH 1855 (DACB); Tankaboti Forest Range, Bandarban Sadar, 26 xii 2016, Imam *et al*., IH 2680 (DACB).

FAMILY: **CAPPARACEAE**

Capparis cantoniensis Lour., Fl. Cochinch. 1: 331. 1790. (**Fig. 19**)

Capparis pumila Champ. *ex* Benth., Hooker's J. Bot. Kew Gard. Misc. 3: 260. 1851.

Scandent shrubs, 2-5 m tall. Older twigs cylindric, glabrous; twigs gray to green, pale yellow pubescent. Stipular spines firm, flat or recurved, 2-5 mm long. Petiole 4-10 mm long; leaf blade oblong, oblong-lanceolate, or ovate, 5-12 × 1.5-2.0 cm, leathery, abaxially orange when young but reddish brown when dry, adaxially green, glabrous, secondary nerves 7-12 pairs, base cuneate, apex acuminate. Inflorescences axillary and subumbellate or axillary and terminal forming a panicle, up to 11-flowered; peduncle 1-3 cm long; bracts subulate, 1-2 mm long; bractlets small or absent. Flowers fragrant. Pedicel 7-12 mm long. Sepals 4-5 × 2-3 mm, pubescent; sepals of inner whorl elliptic to obovate, margin white, membranous, with white cilia. Petals white, obovate to oblong, 4-6 × 1.5-2.5 mm, white pubescent. Stamens 20-45; filaments white when fresh but red when dry; anthers 0.7-0.8 mm long. Gynophore 6-8(-12) mm long, glabrous; ovary nearly ellipsoid, glabrous; placentae 2. Fruit spheroid to ellipsoid, 1.0-1.5 cm in diameter, smooth; pericarp thin, leathery. Seeds 1 to several per fruit, globose or ellipsoid, 6-7 mm diameter. *Flowering & fruiting*: All the year round.

Ecology: Wet and shaded places, hillsides, thickets, open forests; from sea level to 800 m altitude.

Distribution: Bhutan, China, India, Indonesia, Myanmar, Philippines, Thailand and Vietnam.

Use: Ripe fruit is edible.

Specimen examined: **Bandarban**: Gundum, Naikhyongchari, 19 v 2017, Uk-Chain Chakma, UC 289 (DACB).

FAMILY: **CELASTRACEAE**

Euonymus theifolius Wall. *ex* M.A. Lawson in Hook.f., Fl. Brit. India 1: 612. 1875. (**Fig. 20**)

Evergreen shrubs, 2-3 m tall, sometimes trailing on trees with adventitious roots, rarely epiphytic. Branches and twigs round, usually brown or yellow. Petiole 5-10 mm long, channelled; leaf blades elliptic or elliptic-lanceolate, 5-12 × 2-5 cm, base cuneate, margin crenulate to serrate, apex acute or acuminate; lateral nerves 7-10 pairs, glabrous, distinct on both sides, reticulate, arcuate. Flowers 4-merous, in dichotomously branched peduncled cymes, 5-7-flowered; peduncles 2-3 cm long; pedicels 2-5 mm long. Flowers 4-merous, 4-5 mm diameter. Sepals rounded, broader than long. Petals orbicular, short clawed, entire, greenish or whitish. Stamens smaller than the petals. Ovary sunk in the disc; styles short. Capsules globose, obscurely angled, brown or brown-yellow, 5-8 mm diameter Seeds arilate; aril yellowish red. *Flowering & fruiting*: May-December.

Ecology: Forests and scrubs; between 300-700 m altitudes.

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

Specimen examined: Cox's Bazar: Kudumgath, Horikhola, Whykeong, 01 xi 2008, S.N. Uddin, N-3129 (DACB).

FAMILY: **COMBRETACEAE**

Combretum bracteosum (Hochst.) Engl. & Diels, Monogr. Afrik. Pflanzen-Fam. 3: 95. 1899. (**Fig. 21**)

Poivrea bracteosa Hochst., Flora 27: 424. 1844.

Codonocroton triphyllum E. Mey. *ex* Engl. & Diels, Monogr. Afrik. Pflanzen-Fam. 3: 95. 1899.

English name: Hiccup nut

Scrambling and creeping, deciduous shrubs or small trees, can reach up to 8 m long. Bark pale brown, smooth on young trees, becoming faintly grooved and flaking on older stems. Leaves simple, opposite or in whorls, rarely alternate, blades broadly ovate, 3-10 x 2-5 cm, apex sharply pointed. glabrous, pale green, turns russet-purple when becomes old, lateral nerves 7-8 pairs; scanty leafstalks eventually grow into curved, woody spines, 10-15 mm long. Inflorescence of terminal spikes, densely many flowered. Flowers orange or scarlet; pedicels 4-6 mm long; bracts 2, leaf-like. Calyx tube ellipsoid or fusiform, slightly contracted above ovary, distally narrowly funnel form to saucer-shaped; lobes 5, deltoid. Petals 5, orange-red. Stamens usually 8 or 10, usually exserted from calyx tube, giving the flowers a prickly appearance. Style not adnate to inside of calyx tube. Fruits spherical, 15-20 mm diameter, with 4-5 vertical grooves, hard, wingless nut (unlike most other Combretum species), green when young, ripening to a rich chestnut colour, one seeded. *Flowering & fruiting*: March-September.

Ecology: Grows in sandy, well-drained soils, in evergreen hill forests.

Distribution: South Africa and Madagascar.

Use: The roasted nut is eaten. The leaves contain antifungal compounds and are used in treating ailments. Root has medicinal value also.

Specimen examined: **Khagrachari**: Achalong Reserve Forest, Matiranga, 24 v 2017, Kowser *et al*., KH 5156 (DACB).

FAMILY: **COMMELINACEAE**

Amischotolype hookeri (Hassk.) H.Hara, Fl. E. Himalaya 1: 399. 1966. (**Fig. 22**)

Forrestia hookeri Hassk. Flora 47: 629. 1864.

Rhizomatous, perennial herbs. Stem stout, 1-4 m high; internodes 3-4 cm long; nodes swollen, sparsely hairy. Leaf sheath 2-3 cm long, mouth ciliate, margin hairy; leaves crowded at top, leaf-blades oblanceolate, 25-40 × 6-10 cm, margin undulate, sparsely hairy, apex caudate, base gradually narrowed into pseudo-petiole, lower surface hairy, upper surface glabrous. Inflorescence crowded at nodes, sessile, 1-3 × 1-2 cm, 10-15 flowered. Flowers sessile, white to pink. Sepals persistent, 6-8 × 2-3 mm, green to deep purple, glabrous, tip hooded. Petals 6-8 × 3-4 mm, white to pink, glabrous. Filaments 1-2 mm long; anthers yellow, linear. Capsules 1.0-1.5 × 0.5-0.7 cm, ovoid, much exerted from sepals, pink or purple, sparsely hairy, apex acute. Seeds 2 per locule, 3-5 × 2-3 mm, testa reticulate, grey, embedded in scarlet aril. *Flowering & fruiting*: Throughout the year.

Ecology: Evergreen forests, along streams.

Distribution: Bhutan, China, India, Laos, Myanmar, Nepal and Vietnam.

Specimen examined: **Cox's Bazar**: Eidgor, Ramu, 20 iii 2017, Niyamul *et al*., NK7210 (DACB).

Pollia miranda (H.Lév.) H.Hara, J. Jap. Bot. 59: 182. 1984. **(Fig. 23)**

Pollia minor Honda, Bot. Mag. (Tokyo) 45: 2. 1931.

Pollia zollingeri C.B.Clarke, Monogr. Phan. 3: 127. 1881.

Tovaria miranda H.Lév., Liliac. & C.Chine 33. 1905.

Perennial herbs. Stems ascending, 15-35 cm tall, subglabrous. Leaves subpetiolate, flexuosus; leaf sheath 1-2 cm long, puberulent; leaf blade elliptic or ovate-elliptic, 5-15 × 2.5-5.0 cm, apex acuminate, base attenuate, glabrous, sheaths cylindrical, overlapping. Inflorescence terminal thyrse; peduncle 2-6 cm long, with short hairs; bracts lanceolate, 5-7 × 1-2 mm; bracteoles deltoid, infundibuliform, 2 mm wide, glabrous; pedicel 1-2 mm long, glabrous. Flowers actinomorphic, dimorphic: male flowers with abortive pistil and bisexual flowers. Sepals 3, free, white, persistent, elliptic, concave, 3.5-4.5 × 2.3-2.5 mm, apex obtuse, glabrous. Petals 3, white with pink spot, equal, obovate, 4-5 × 2.5-3.0 mm, apex obtuse, base cuneate. Stamens 6, fertile, subequal; filaments 3.5-4.0 mm long. Ovary globose, 1.1-1.3 mm long, glabrous; style 4-5 mm long. Capsules globose, 4-5 mm in diameter, indehiscent, trilocular, black when ripe, locules 5-7 seeded. Seeds biseriate, polygonal, 1.0-1.5 × 1.2-1.5 mm, blue-gray. *Flowering & fruiting*: June-September.

Ecology: Damp and shady places in evergreen hill forests; up to 1000 m altitudes.

Distribution: China and Japan.

Specimen examined: **Khagrachari**: Maicechari Reserve Forest, Mohalchari, 12 ix 2017, Kowser *et al*., KH6439 (DACB).

FAMILY: **CONVOLVULACEAE**

Lepistemon lobatum Pilger in Diels, Notizbl. Bot. Gart. Berlin-Dahlem. 9: 1029. 1926. (**Fig. 24**)

Twining herbs, with whitish gray hirsute axial parts. Leaves opposite; petiole 5-10 cm long; leaf blade broadly ovate-cordate, 5-8 × 4-10 cm, pilose to glabrous, base deeply cordate, margin sinuately 3-5-lobed, apex obtuse or apiculate. Cymes many flowered; peduncle 1.0-1.2 cm long; pedicel slender. Sepals ovate or ovate-lanceolate, 2.5-3.0 mm long, sparsely pilose abaxially, apex obtuse or acute. Corolla whitish green, 1.8-2.2 cm long; tube inflated, slightly contracted distally; limb 1.5-1.8 cm wide, margin subentire. Stamens inserted; filaments filiform, 2-3 mm long; basal scales ovate-lanceolate or ovate-elliptic, 2.2-2.5 × 3.5-4.0 mm, abaxially pilose; anthers 1.8-2.0 mm long. Disc ring-like. Style 1.5-2.0 mm long; stigmas globose-capitate, papillose. Capsules with persistent calyx, ovoid, 6-7 mm long, glabrous. Seeds 4, ovoid, 3-4 mm diameter, dark brown, yellowish villous. *Flowering & fruiting*: July-November.

Ecology: Evergreen hill forests, along stream sides.

Distribution: China.

Specimen examined: **Bandarban:** Sekdu Forest, Bolipara, 22 xi 2017, Sahidul & Rashed, MSI 6377 (DACB).

FAMILY: **CUCURBITACEAE**

Cucumis javanicus (Miq.) Ghebret. & Thulin, Novon 17: 177. 2007. (**Fig. 25**)

Mukia javanica (Miquel) C. Jeffrey, Hooker's Icon. Pl. 37: t. 3661. 1969.

Melothria assamica Chakrav., J. Bombay Nat. Hist. Soc. 50: 897. 1952.

Melothria assamica var. *scabra* Chakrav., Rec. Bot. Surv. India 17(1): 145. 1959.

Local name: Java shasa

Climber, up to 3 m long, scabrous hairy. Leaves simple, alternate, ovate-cordate, 4-6 × 3-6 cm, 3-5-lobed, median lobe ovate-triangular, both surfaces hispid, dentate, apex acuminate. Male flowers: 2 to several, fasciculate, in leaf axils; pedicel 2-3 mm long, calyx tube cupular, 2.0-2.5 mm long; segments erect, subulate, 1.5-2.5 mm long; corolla yellow, segments ovate-oblong, 3-4 mm long; filaments 0.5 mm long. Female flowers: fasciculate in same axil as male flowers, calyx tube copular, 0.5 × 0.3 mm, corolla ovate-oblong, 2.5 × 1.5 mm, ovary ovoid, style 1 mm. Fruits oblong-ellipsoid, 1.0-1.5 × 1 cm, red, juicy, glabrous,pedicel 2-4 mm. Seeds 8-18, whitish, obovate, compressed, 4-5 × 3.5-4.0 mm, smooth, broad 2-grooved margin. *Flowering & fruiting:* May-October.

Ecology: Forests, grasslands on hill slopes; between 500-1000 m altitudes.

Distribution: India and Malaysia.

Use: Young fruits are eaten as vegetables.

Specimen examined: **Khagrachari:** Achalong Reserved Forest, Matiranga, 08 x 2017, Kawser *et al*., KH6869 (DACB).

Sechium edule (Jacq.) Sw., Fl. Ind. Occid. 2: 1150. 1800. (**Fig. 26**)

Sicyos edulis Jacq., Enum. Syst. Pl. 32. 1760.

Chayota edulis (Jacq.) Jacq., Select. Stirp. Amer. Hist. t. 245, 1780.

Local name: Scoot; English names: Squash, Quash, Chow-Chow, Chyote.

Perennial extensive climber, root tuberous. Leaves lamina 10-12 cm long and as long as much broad, basal sinus deeply emarginate, 3-5 angular or loabed, petiole 5-15 cm long, smooth, tendril

3-5 fid. Male flowers: peduncles 8-30 cm long, 10-30 flowered, in fascicles, robust, pedicels 1-6 mm long, calyx tube short, lobes 5-7 × 1.0-1.5 mm, elongate, subglabrous, 12-17 mm broad, divided up to base, triangular, staminal column 1 mm long, anther suborbicular, spreading. Female flower: calyx and corolla as in male, ovary obovoid, 5 sulcate, style 2-3 mm long, stigma broad. Fruits obovoid, 10-16 × 7-10 cm, light green, deeply 5 sulcate, sparse spinulose, one seeded, viviparous germination is generally found through style region. *Flowering & fruiting:* May-December.

Ecology: Cultivated, sometimes escaped.

Distribution: Center America to Guatemala, southern Mexico, India.

Use: Unripe fruits & tender shoots are used as vegetable. Tuber is also used as food.

Specimen examined: **Rangamati:** Konglakpara, Sajek Valley, Baghaichari, 09 v 2018, Kawser *et al*., KH9371 (DACB).

FAMILY: **CYPERACEAE**

Cyperus eleusinoides Kunth, Enum. Pl. 2: 39. 1837. (**Fig. 27**)

Perennials. Rhizomes short, surculose. Culms to 1 m tall, stout, 3-angled, smooth, base swollen into a tuber shape, with leaves at basal part. Leaves shorter than culm; sheath long, brown; leaf blade 6-12 mm wide, flat, margin scabrous. Involucral bracts 5 or 6, basal 2 or 3 longer than inflorescence. Inflorescence a compound or decompound anthela; rays 6-12, to 18 cm, each with 3-6 raylets; raylets mostly to 4 cm, unequal in length. Spikes oblong to cylindric, 1-3 cm × 4-10 mm, with very many spikelets. Spikelets densely arranged in several rows, linear-oblong, 4-8 × ca. 2 mm, 6-12-flowered; rachilla wings white, hyaline, caducous. Glumes pale and brown striate or brown, lax, ovate-elliptic, ca. 2 mm, membranous, 5-7-veined, keel green, apical margin white hyaline, apex mucronate. Stamens 3; anthers linear; connective prominent beyond anthers. Style short; stigmas 3, long. Nutlet dark brown. *Flowering & fruiting*: August-December.

Ecology: Forests, mountain slopes, sunny water margins, wet places in valleys; 200-2500 m.

Distribution: Cambodia, China, India, Indonesia, Japan, Laos, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Tropical Africa and Tropical Australia.

Specimen examined: Rangamati: Baluchara, Rampahar, 09 x 2016, Joyanta *et al*., JCR 3253 (DACB).

FAMILY: **EBENACEAE**

Diospyros paniculata Dalz., Hooker's J. Bot. Kew Gard. Misc. 4: 109. 1852. (**Fig. 28**)

Middle-sized trees. Bark smooth, dark-colored; branches glabrous, somewhat angular. Leaves alternate, elliptic-oblong, 8-20 × 3-7 cm, subcoriaccous, apex obtusely acuminate, glabrous, base rounded; petioles 1.0-1.5 cm long, transversely striate, glabrous. Male flowers few in pauniculate cymes, 2.5-4.0 cm long, axils of fallen leaves; pedicels and buds pubescent. Calyx 5-7 mm long, nigro-pubescent; segments foliaccous, reticulately veined, broadly elliptic, obtuse. Corolla 1.2-1.5 cm long, clothed outside with sooty-velvety hairs, glabrous inside; tube pentagonal; lobes 7-9 mm long, elliptic-oblong, obtuse. Stamens 20, inserted in base of corolla tube, glabrous; filaments short; anther linear. Rudimentary ovary 0.Female flowers solitary, axillary; pedicels 12-16 mm long, bracts ovate, caducous.Ovary 4-celled; ovule 1 in each cell. Fruits ovoid, 1.8-3.6 cm long, apex rounded, tipped with remains of style, ferruginous glandular hairy; fruiting calyx 5-lobbed, enlarged, lobes 1.2-3.6 cm long. *Flowering & fruiting:* March-October.

Ecology: Dry places in the forests.

Distribution: India.

Use: Wood is extremely hard and suitable for house posts and poles.

Specimen examined: **Cox's Bazar**: Bhomoriaghona, Cox;s Bazar Sadar, 21 iii 2018, Niyamul *et al*., NK 7266 (DACB).

FAMILY**: EUPHORBIACEAE**

Blachia andamanica (Kurz) Hook.f., Fl. Brit. India 5: 403. 1887. (**Fig. 29**)

Codiaeum andamanicum Kurz in J. Asiat. Soc. Beng., Pl. 2, Nat. Hist. 42(2): 246. 1873.

Local name: Kala Manik

Shrubs or trees, up to 8 m tall, glabrous. Leaves broadly to narrowly oblong, elliptic to ovate, acute to obtuse or rounded base, acuminate to caudate apex, 5-22 × 3-10 cm, membranous to coriaceous, glossy, obscurely to clearly 3-nerved base, lateral nerves 4-9 pairs; petiole 3-18 mm long. Male inflorescences subumbellate to racemiform, 1.5-6.0 mm long; peduncle 1-5 cm long; pedicels 5-16 mm long; sepals 4 or 5, orbicular; petals 4 or 5, broadly ovate; stamens 14-22, 3-4 mm long. Female inflorescences umbellate, up to 5 cm long, 2-5 flowered; pedicels 2-16 mm long; sepals as in male, style 3-5, 3-8 mm long. Fruit subglobose, 3-5 lobed, 8-14 × 10-15 mm, glabrous. Seeds oblong-ellipsoid to subglobose, 5-10 mm long. *Flowering & fruiting*: March-December.

Ecology: Mixed forests.

Distribution: China, India, Indonesia, Malaysia, Myanmar and Philippines.

Specimen examined: **Chattogram:** Kumarikhal, Hathazari, 23 xi 2016, Tajul *et al*., TOK 2033 (DACB).

Bridelia ferruginea Benth. in Hook., Niger Fl. 511. 1849. (**Fig. 30**)

Bridelia micrantha var. *ferruginea* (Benth.) Müll.-*Arg.*, Prodr. 15(2): 498. 1866.

Bridelia speciosa var. *kourousensis* Beill, Bull. Soc. Bot. France 40(8): 68. 1908.

Shrubs or small trees, 3-5 m high; branches ferruginous-pubescent. Leaves elliptic and oblong-elliptic, 5-10 × 2.5-7.0 cm, apex shortly acuminate, base rounded, coriaceous, upper surface glabrous, lower surface pubescent on the nerves; lateral nerves 7-9 pairs; tertiary nerves wavy; petiole 4-8 mm long, tomentose; stipules lanceolate, acute, 4-6 mm long, pubescent. Inflorescence axillary, 3-9-flowered spikes; bracts ovate-lanceolate, pubescent. Male flowers: pedicels very short; receptacle cup-shaped; sepals ovate-lanceolate, 3-4 × 2-3 mm, apex subacute and slightly hooded, pubescent outside with long adpressed hairs; petals obovate, 5-6 mm in diameter, 3-5-toothed; staminal column 1-2 mm long; filaments 1.0-1.5 mm long; anthers ovoid; disc thick, wrinkled; rudimentary ovary subentire. Female flowers: receptacle nearly funnel-shaped; sepals as in the male; petals lanceolate, acute; disc bottle-shaped, enclosing the ovary, lobed, pubescent; ovary ovoid; styles 2, bipartite. Fruit 1-celled, ovoid-oblong, 9-12 × 5-7 mm. Seeds semiovoid, 6-8 × 3-6 mm, yellow to brown, smooth. *Flowering & fruiting*: June-November.

Ecology: Hilly, broad-leaved primary forests; between 300-900 m altitudes.

Use: Fruit is edible.

Distribution: Western tropical Africa to Sierra Leone, East to Central African Republic, South to Angola and Zambia.

Specimens examined: **Bandarban:** Nilachal Forest Range, Bandarban Sadar, 12 iii 2017, Imam Hossain *et al*. IH 4736 (DACB). **Rangamati:** Shishok Khagrachari, Baghaichari, 03 iv 2018, Joyanta *et al*., JCR 7434 (DACB).

Croton hirtus L'Hér., Stirp. Nov. 17. 1785. (**Fig. 31**)

Croton glandulosus subsp. *hirtus* (L'Hér.) Croizat, Bull. Torrey Bot. Club 75: 401. 1948.

Croton aberrans Müll.-Arg., Fl. Bras. 11(2): 232. 1873.

Croton guaraniticus Chodat & Hassl., Bull. Herb. Boissier II, 5: 496. 1905.

Monoecious, erect, annual herb, 5-40 cm tall. Leaves alternate, sometimes opposite at branch nodes, simple; stipules subulate, 5-8 mm long; petioles to 3.5 cm long, bearing 2 stalked glands at apex, densely stellate-pubescent; blades ovate-deltoid to elliptic, 2-6 × 1.5- 4.0 cm, apex acute to obtuse, base broadly cuneate, margins doubly crenate-serrate, basal veins 5, lateral veins in 3-6 pairs. Inflorescences terminal spikes, stellate hairy, 1.0-2.5 cm long, male flowers at the top and female at the base. Staminate flowers: 4-5 mm diameter, white, 5-parted, bracteole trifid, 1-2 mm long; sepals 5, a minute gland at base; petals 5, oblong, equaling calyx lobes, white; stamens 11; filaments glabrous. Pistillate flowers: subsessile or 1 mm long pedicel; calyx lobes 5, unequal, linear-spathulate, 4-5 mm long, lacinate; petals 5, ellipsoid; disk 5-angled; ovary subglobose, 5-6 mm diameter, styles 3, connate at base, 1.0-1.5 mm long, stigmas red. Capsules explosive, subglobose, 3-4 mm diameter, stellate-hispidulous. Seeds compressed, greyish-brown, smooth, 2-3 mm diameter. *Flowering & fruiting*: May-October.

Ecology: Widespread in disturbed areas, tropical moist forests.

Distribution: Pan-tropical and widespread in the Guinea of West Africa.

Specimens examined: **Chittagong**: Isamoti, Rangunia, 05 v 2017, Aman Uddin, AU263 (DACB). **Cox's Bazar:** Panjeghona, Rajarkul, Ramu, 17 x 2017, Niyamul *et al*., NK 6053 (DACB).

Pachystylidium hirsutum (Blume) Pax & K.Hoffm., Pflanzenr. IV, 147, IX: 108. 1919. (**Fig. 32**)

Tragia hirsuta Blume., Bijdr. 630. 1825.

Tragia irritans Merr., Philipp. J. Sci., Bot. 9: 491. 1914.

Tragia gagei Haines, J. Proc. Asiat. Soc. Bengal, n.s. 15: 317. 1920.

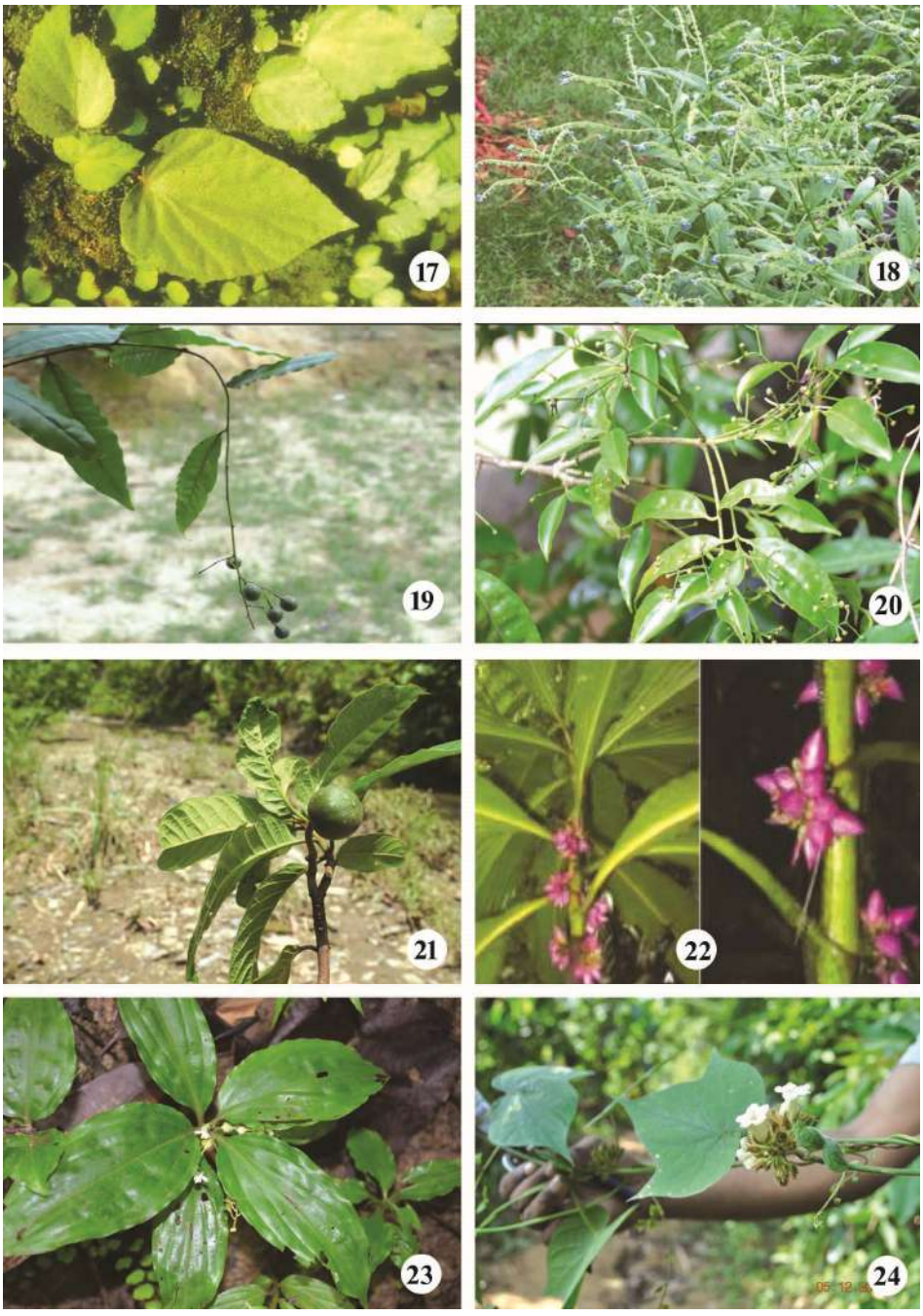
Tragia delpyana Gagnep., Bull. Soc. Bot. France 71: 1027. 1924.

Twining herbs, up to 3 m tong, with stinging hairs. Stems slender, woody, hirsute. Leaf blades ovate or elliptic, 5-15 × 3-10 cm, papery, sparsely hirsute to glabrescent, base cordate, margin serrate, apex abruptly acuminate, lateral veins 3 or 5 pairs; stipules reddish-brown, triangular, 1.5-4.0 mm long; petiole 1-4 cm long. Inflorescence 1-8 cm; peduncle 0.5-3.0 cm, with 1-5 female flowers and many male flowers; bracts narrowly lanceolate, 1-2 mm long. Male flowers: pedicel 1.5-2.3 mm long; calyx lobes ovate, ca. 1 mm; anther 0.4-0.5 mm long. Female flowers: pale green, pedicel 1 mm long; sepals lanceolate, elliptic or ovate, 1.5-2.5 mm long, sparsely pubescent; ovary densely hirsute; styles connate into a stout-cylindric or ellipsoid column, free style tips recurved. Capsules 1.0-1.2 cm diameter, fruiting pedicel 3-5 mm long; fruiting sepals persistent, reflexed. Seeds subglobose, 3.0-5.5 mm diameter, pale brown to dark reddish-brown. *Flowering & fruiting*: June-September.

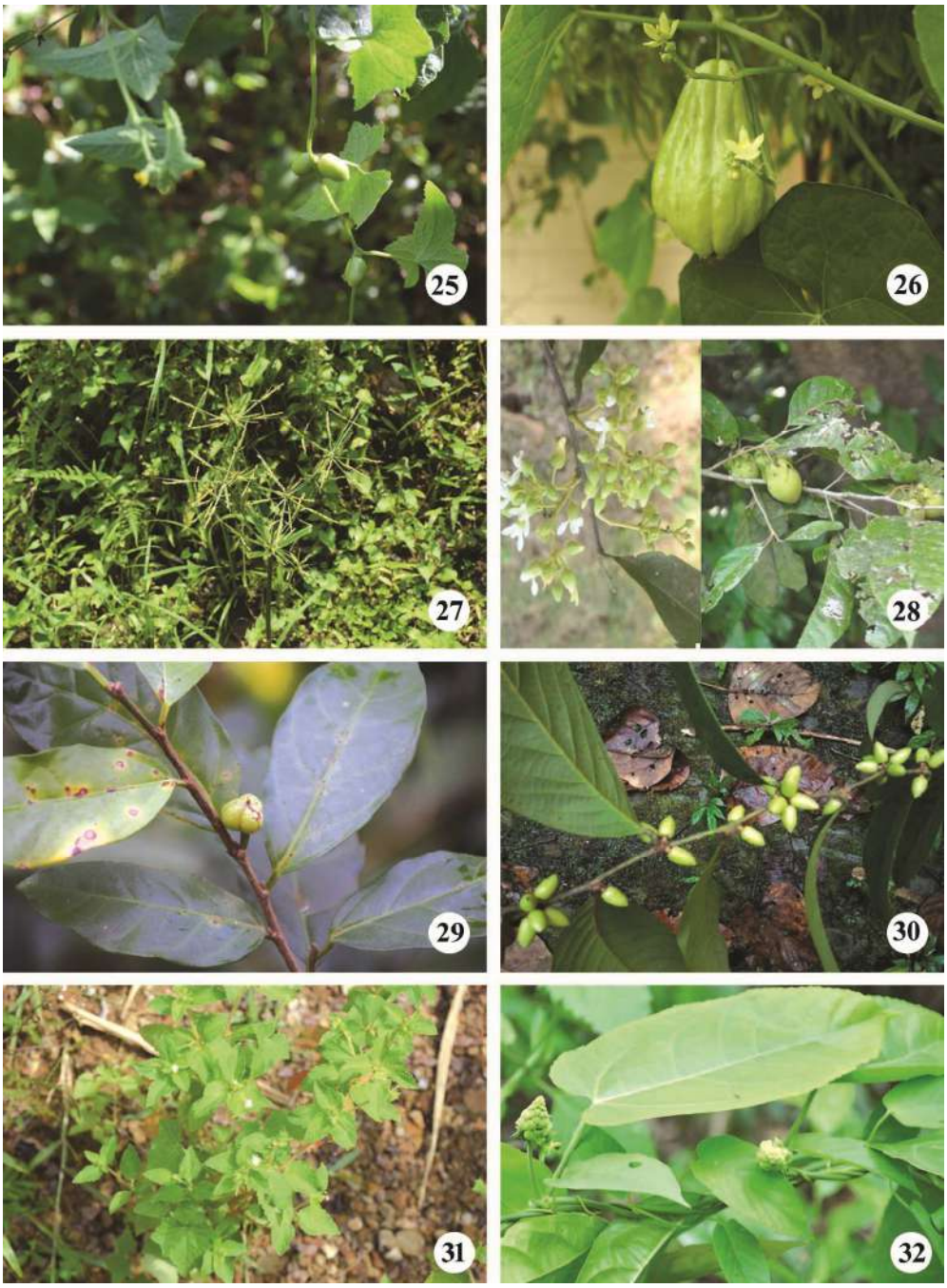
Ecology: Open forests, scrubs, evergreen, deciduous or bamboo forests; between 200-600 m altitudes.

Distribution: Cambodia, China, India, Indonesia, Laos, Philippines, Thailand and Vietnam.

Specimen examined: **Rangamati**: Kochuchhari, Baghaichhari, 18 x 2017, Joyanta *et al*., JCR6463 (DACB).



Figs 17-24: 17. *Begonia sinuata* Wall. *ex* Meisn., 18. *Cynoglossum wallichii* var. *glochidiatum* Kazmi, 19. *Capparis cantoniensis* Lour., 20. *Euonymus theifolius* Wall., 21. *Combretum bracteosum* Engl. & Diels, 22. *Amischotolype hookeri* (Hassk.) H.Hara, 23. *Pollia miranda* (H.Lév.) H.Hara, 24. *Lepistemon lobatum* Pilger.



Figs 25-32: 25. *Cucumis javanicus* Ghebret. & Thulin, 26. *Sechium edule* (Jacq.) Sw., 27. *Cyperus eleusinoides* Kunth, 28. *Diospyros paniculata* Dalz., 29. *Blachia andamanica* (Kurz) Hook.f., 30. *Bridelia ferruginea* Benth., 31. *Croton hirtus* L'Hér., 32. *Pachystylidium hirsutum* Pax & Hoffm.

Plukenetia corniculata Sm., Nov. Acta Regiae Soc. Sci. Upsal. 6: 4. 1799. (**Fig. 33**)
Pterococcus corniculata (Sm.) Pax & K.Hoffm. in Engl., Pflanzenr. IV. 143. ix: 22. 1919.

Local name: Netikula

Twining shrubs. Leaves oblong-ovate, 6-18 × 3-10 cm, truncate-subcordate base, serrate-dentate, caudate-acuminate apex, membranous, puberulous; petioles 2-6 cm long; 2 glands at base of lamina on either sides. Racemes axillary or leaf-opposed; peduncule 2.0-4.5 cm long. Male flowers: 1.0-1.5 mm across, crowded at apical part of racemes; pedicels 1.5-2.5 mm long; bracts 3-fid, 1.2 mm long, bracteoles paired; stamens 8-20, sessile on a cushion-like receptacle. Female flowers: 2-3 mm across, at base of racemes; bract lanceolate, obscurely 3-fid; bracteoles paired; pedicels 2-3 mm long; sepals 1.0-1.5 mm long, fleshy. Fruits 3-5 cm long pedicels, depressed-globose, 2.0-3.5 cm across, 4-winged, nearly flat, 4 stellately spreading granulate cocci, each produced outwards into a vertical, linear, obtuse, 1 cm long wing. *Flowering & fruiting*: June-September.

Ecology: Deciduous forests and thickets.

Distribution: North India to Thailand and throughout Malesia to the Philippines.

Specimen examined: **Rangamati**: Kachuchari, Baghaichari, 18 ix 2017, Joyanta *et al.*, JCR 6470 (DACB).

Sumbaviopsis albicans (Blume) Sm., Meded. Dept. Landb. Ned.-Indië 10: 357. 1910. (**Fig. 34**)
Doryxylon albicaus (Blume) N.P.Balakr., Bull. Bot. Surv. India 9: 58. f. 1-7, 1967 (1968).
Adisca albicans Blume, Bijdr. Fl. Ned. Ind. 611. 1826.

Local name: Shet Garjan

Trees, 6-25 m tall. Leaves elliptic or lanceolate, entire, undulate or distantly dentate, acute or acuminate apex, 7-35 × 4-16 cm, coriaceous, shiny above, densely velvety white tomentose beneath, lateral nerves 7-13 pairs; petioles 2-10 cm long. Male inflorescences up to 15cm long, female inflorescences up to 35 cm long. Male flowers: in fascicles of 3-5, bracts oblong-triangular; pedicels 2-5 mm long; calyx concave, 3-5 × 2-3 mm, petals obovate, 2.5 mm across, stamens 50, filaments 2.5 mm long. Female flowers: solitary amidst male flower-clusters; calyx oblong-triangular; petals rudimentary. Fruits subglobose, flattened, 2.0-3.5 × 1.5-3.0 cm, dark stellate tomentellous; pedicels 2-4 cm long. Seeds oblong, narrowed at base, 1.3-2.0 × 1.0-1.5 cm, longitudinally pitted, black. *Flowering & fruiting*: December-April.

Ecology: Hilly evergreen forests; medium to high altitude.

Use. Seeds are edible.

Distribution: India, Myanmar, Thailand, Vietnam, Indonesia, Malaysia and the Philippines.

Specimen examined: **Bandarban:** Gundhum, Naikhyongchari, 27 ii 2017, Ukchain Chakma, UC51 (DACB).

FAMILY**: FABACEAE**

Crotalaria berteroana DC., Prodr. 2: 127. 1825. (**Fig. 35**)
Crotalaria fulva Roxb., Fl. Ind. (ed. Carey) 3: 266. 1832.

Local name: Ana jhunjhuni; English name(s): Tawny Rattlepod, Tawny Crotalaria

Stiff erect herbs, 1.0-1.5 m high, copiously paniculately branched, clothed with golden-brown silky hairs. Leaves simple, alternate, sessile, obovate-oblanceolate, 6-10 × 2-3 cm, exstipulate, subcoriaceous. Flowers in leafy panicles, bracts conspicuous, obovate, brown when dried. Calyx 1.3-1.6 cm long, upper teeth oblong, lower teeth lanceolate. Corolla yellow, 2.0-2.5 cm long,

standard silky pubescent outside, pointed. Fruit a pod, 5-6 × 4-5 mm silky pubescent, as long as or included in the calyx, 1-2 seeded. Seeds 5-6 mm long, curved, violet-brown, shining. *Flowering & fruiting:* May-December.

Ecology: Shady and moist places, at the periferi of forests.

Distribution: Hawaii, India and Sri Lanka.

Specimen examined: **Cox's Bazar**: Bangdeba, Joarianala, Ramu, 15 xi 2017, Niyamul *et al*., NK6409 (DACB).

Uraria leptostachya Graham, Numer. List 5684. 1831. (**Fig. 36**)

Subshrubs, triquetrous, 40-100 cm tall, brown hooked hairy. Leaves unifoliolate; petiole 1.0-2.5 cm long, hairy; stipules 8-12 mm long, acuminate; leaf blades elliptic or ovate-elliptic, 3-8 × 2-4 cm, abaxially hispid, adaxially glabrous, lateral veins 11-13 on each side of midvein, base rounded or slightly cordate, apex acute or obtuse. Inflorescences terminal, 10-20 cm, densely hooked hairy and pubescent. Flowers sparse. Pedicel short, 5-6 mm at fruiting, apically hooked. Calyx 2-3 mm long, 5-parted; lower lobes longer than tube, upper lobes slightly shorter. Corolla purple, standard 5-6 × 6-8 mm, orbicular, cuneate at base, pinkish; wings 4-5 × 2-3 mm, oblique; keel 5-6 × 2-3 mm, shortly spurred near the base. Legume 6-12-jointed, compressed, slightly reticulate veined. *Flowering & fruiting:* October-January.

Ecology: Roadsides, mountain slopes; up to 900 m altitudes.

Distribution: India and Myanmar.

Specimens examined: **Chittagong**: Khaiyachara, Mirsharai, 05 i 2017, Tajul *et al*., TOK 2555 (DACB); Mohamaya, Mirsharai, 22 xi 2017, Moniruzzaman *et al*., MAK 6501 (DACB). **Cox's Bazar**: Rupmoti, Inani, 05 xii 2017, Niyamul *et al*., NK 6533 (DACB).

FAMILY**: FLACOURTIACEAE**

Homalium ceylanicum (Gardn.) Benth., J. Proc. Linn. Soc., Bot. 4: 35. 1860. (**Fig. 37**)

Blackwellia ceylanica Gardn., Calc. J. Nat. Hist. 7: 452. 1846.

English name(s): Liyan, Blackwellia zeylanica Gard, Homalium ceylanicum Gardner

Evergreen trees, up to 25 m tall; bark smooth, grey, peeling off in irregular flakes; trunk reaching up to 80 cm in diam. Branchlets slender, terete, glabrous. Leaves simple, alternate, distichous; stipules caducous; petiole 0.5-1.3 cm long, glabrous; narrowly to broadly elliptic, rarely elliptic-oblong, lanceolate or oblanceolate, cuneate at base, short or long acuminate at apex, coarsely crenate to subentire along margins, 7-19 × 3.5-10 cm, usually subcoriaceous, sometimes also membranous; secondary veins 5-7 pairs; tertiary and quaternary veins forming fine reticulum; petioles 7-12 mm long, usually puberulent. Racemes slender, axillary and subterminal, pendent, simple, rarely slightly branched towards base, 10-35 cm long. Flowers greenish white, foetid, sometimes few clusters crimson red in the same spike; pedicels ca 2 mm long, articulated below the calyx. Sepals 4-6, linear-oblong. Petals as many and a little longer and broader than sepals. Stamens as many and opposite to each petal, alternating with densely hairy episepalous glands, ciliate along margins; filaments 2-3 mm long. Ovary densely pilose to sparsely pubescent; styles 4 (-5), spreading, hairy, 1.5-2 mm long; stigmas capitate. Fruit a capsule. Seeds small, many, oblong or angular. *Flowering & fruiting:* February-July.

Ecology: Evergreen and semi-evergreen forests.

Distribution: China, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

Use: It is cultivated for ornament and its wood is used commercially.

Specimen examined: **Rangamati:** Ferong-kheong Forest, Kaptai, 11 ii 2018, Joyanto *et al*., JCR 7285 (DACB).

FAMILY: HERNANDIACEAE

Illigera trifoliata (Griff.) Dunn, J. Linn. Soc., Bot. 38(266): 294. 1908. (**Fig. 38**)

Coryzadenia trifoliata Griff. *Not. Pl. Asiat. 4: 356. 1854.*

Local name: *Gera lata*

Lianas, angulate, glabrous. Leaves 3-foliolate, petiole 6-8 cm, striate, glabrous, leaflets petiolules 0.8-2.0 cm, glabrous, blade lanceolate-elliptic, 6-9 × 3.5-6.0 cm, papery to subleathery, both surfaces glabrous, lateral veins 3- or 4-paired, base rounded, apex abruptly shortly acuminate. Inflorescence axillary panicles, yellow-brown pubescent, bracteoles narrowly elliptic, 2.5 mm. Flowers purple-green or green. Outer tepals 6-7 mm, yellow-brown pubescent. Inner tepals similar to outer ones but shorter, 5-6 mm. Stamens as long as inner tepals; filaments straight in bud. Ovary tetragonous, densely yellow-brown pubescent. Fruit 2-winged; wings suborbicular, 4.0-4.5 cm wide. *Flowering & fruiting:* September-March.

Ecology: Occasional in hill forests.

Distribution: China, Laos, Thailand and Vietnam.

Specimen examined: **Cox's Bazar**: Kudum Guha, Teknaf, 10 x 2017, Niyamul *et al*., NK4869 (DACB).

FAMILY: HIPPOCRATEACEAE

Salacia fruticosa Heyne *ex* M.Lawson in Hook.f., Fl. Brit. India 1: 628. 1875. (**Fig. 39**)

Woody climbing shrubs; branchlets looped, rough, young shoots puberulous. Leaves elliptic-ovate or elliptic-oblong, ovate to elliptic-lanceolate, 5-12 × 2.5-5.0 cm, apex obtusely acuminate, base rounded or cuneate, margin serrate, chartaceous; petiole 5 mm long. Inflorescence axillary cymes, branched, 1.0-1.5 cm long, many flowered; pedicels 3-5 mm long. Flowers pale yellow to orange-yellow. Calyx 5-lobed, minute; lobes deltoid, minutely ciliate on margins lobes. Petals 5, orbicular, 1-2 mm across, brownish-yellow, margin white. Disc fleshy. Stamens 3; inserted on inner margin of disc; filaments broad, recurved. Ovary globose, partly immersed in disc, 3-loculed; style very short; stigma capitate, obscurely 3-lobed; ovules 2-8 in each cell. Fruit berry, globose or subglobose, 2.0-2.5 × 1.8-2.0 cm, smooth, red. Seeds 1-3, angular, 1.2-1.5 × 0.8-1.0 cm. *Flowering & Fruiting*: January-August.

Ecology: Semi-evergreen to evergreen forests, up to 800 m altitude.

Distribution: India.

Use: Ripe fruit is edible. It is used for treating diabetes, gonorrhea, asthma, itchiness, joint pain (rheumatism), obesity, thirst, and menstrual problems.

Specimen examined: **Cox's Bazar:** Malumghat, Chokoria, 26 ix 2017, Niyamul *et al*., NK 5825 (DACB).

Salacia malabarica Gamble, Bull. Misc. Inform. Kew 1916: 133. 1916. (**Fig. 40**)

English name: Malabar Salacia

Scandent shrubs or woody lianas; branchlets purplish, faintly spiny, lenticels distinct. Leaves opposite, elliptic-oblong, 8-15 × 4-7 cm, base a little attenuated or rounded, apex obtuse to long-pointed, margin obscurely or distinctly serrate; papery, glabrous, nerves 7-10, curved at margin, reticulate; petiole thick, 1 cm long. Flowers in axillary fascicles; pedicels 1.0-1.5 cm long, thin. Calyx minute, lobes ovate, entire. Petals elliptic-oblong, 2.5 mm long, glabrous, greenish-yellow,

margin transparent. Stamens 3, filaments short. Ovary 3-loculed; ovules 2 in each locule; styles conical, minute. Berry is hard, spherical, about 5 cm across, rugulose, orange or red at maturity. *Flowering & fruiting*: January-May.

Ecology: Moist deciduous or evergreen hill forests; up to 600 m altitudes.

Distribution: Western Ghats (India).

Use: Ripe fruits are edible.

Specimen examined: **Rangamati:** Pharua Reserved Forest, Bilaichari, 18 i 2009, S.N. Uddin, N-3253 (DACB).

FAMILY**: LAMIACEAE**

Pogostemon griffithii Prain, Bull. Misc. Inform. Kew 1908: 181. 1908. **(Fig. 41)**

Erect herbs, up to 1 meters high, obtusely four-angled, pubescent. Leaves linear-lanceolate, 5-9 × 1-2 cm wide, apex acute, base obtuse, margin irregularly serrate, herbaceous, pubescent, lateral veins 3 pairs; petiole 0.5-1.5 cm long, pubescent. Inflorescence terminal or axillary spikes, cylindrical, 5-10 cm long, verticillasters many flowered; bracteoles ovate-lanceolate or lanceolate, 2.0-2.5 mm long, densely pubescent, ciliate. Calyx narrowly bell-shaped, 4-5 mm long, pubescent outside, teeth 5, equal, triangular-lanceolate. Corolla pale blue, 5-6 mm long, outer lip slightly pubescent. Stamens 4, partially obscured by fleece corolla. Style apex 2-lobed, lobes 2.0-2.5 mm long, purple. Disk cup-shaped. *Flowering & fruiting:* August-December.

Ecology: Hillside river jungles, between 400-500 meters altitude.

Distribution: China.

Specimen examined: **Bandarban**: Khaiyachalang Forest Range, Rowangchari, 21 xi 2016, Hossen *et al*., IH 1880 (DACB).

FAMILY**: LAURACEAE**

Litsea grandis (Nees) Hook.f., Fl. Brit. India 5: 162. 1886. (**Fig. 42**)

Polyadenia grandis Nees, Pl. Asiat. Rar. 2: 62. 1831.

Trees, reaching 20 to 30 m height. Bark warted, branchelets angular, densely tawny-tomentose. Leaves alternate; blades broadly obovate or orbicular-ovate, 10-30 × 5-18 cm, apex obtuse to acuminate, base attenuate, rounded or subcordate, margins entire, coriaceous, upper surface shining, lower surface rusty-tomentose, lateral nerves 12-20 pairs; petiole stout, 2-4 cm long. Inflorescence axillary umbeles or racemes; penduncles 7-15 mm long; involucral bracts 5, orbicular, silky greyish tomentose. Male umbellules 6-10 mm diameter, 5-7 flowered. Female umbellules 7-8 mm diameter, 4-5 flowered. Pedicels stout. Male flowers: perianth tube short, lobes 6-8, linear-oblong or lanceolate, 3-4 mm long, acute, silky; stamens 12-21, anthers truncate at base, filaments 3-4 mm long, sparsely strigose, rudimentary ovary absent. Female flowers: perianth tube short, lobes 4-6, linear-oblong, 3-4 mm long; staminodes 12, filaments villous; ovary ovoid, glabrous, style hooked, stigma peltate. Fruits ellipsoid, 11-16 × 8-10 mm, seated on obconical perianth-tube; pedicles thick-ended, 6 mm long; pericarp yellowish, shining, smooth, glabrous. Flowering & fruiting: March-August.

Ecology: Hilly mixed forests, up to 600 m altitudes.

Distribution: Myanmar, Thailand, Cambodia, Vietnam, Malaysia, Indonesia, Philippines to New Guinea.

Specimen examined: **Cox's Bazar:** Chipotkhali, Ukhia, 13 iii 2018, Niyamul *et al*., NK7179 (DACB).

FAMILY**: MALVACEAE**

Sida alnifolia L., Sp. Pl.: 684. 1753. (**Fig. 43**)

Sida rhombifolia ssp. *alnifolia* (L.) Ugborogho, Bol. Soc. Brot. ser. 54: 70. 1980.

Much-branched undershrubs, stems and branches pubescent with minute stellate hairs. Leaves alternate, short-petioled, petioles hairy with minutely stellate hairs, lamina obcordate, base obtuse, apex acute to shallow cordate, margins dentate towards the apex, sparsely pubescent with minute stellate hairs above and densely tomentose with grayish hairs beneath, sometimes glabrescent above, stipules linear-subulate. Inflorescence usually axillary, solitary. Flowers bisexual, pedicel pilose, jointed above middle. Epicalyx absent. Calyx 5-lobed or 5-fid, campanulate, lobes triangular. Corolla showy, yellow, pale yellow, adnate to staminal column. Staminal column shorter than petals, anthers basifixed. Ovary 7-10 carpellate, ovoid, ovules 1 per locule, style 1 per carpel, stigma capitate. Fruit schizocarp, oblate or discoid, enclosed by persistent calyx, minutely pubescent, indehiscent or partly dehiscent by middle dorsal line, mericarps 6-8, reniform, dorsally reticulate, minutely velutinous. Seed 1 in each mericarp, ovoid to reniform, blackish-brown. *Flowering & fruiting:* September-December.

Ecology: Moist deciduous forests, also in the plains.

Distribution: Indo-Malesian region.

Specimen examined: **Cox's Bazar:** Domdomia Nature Park, Teknaf, 14 ii 2018, Niyamul *et al*., NK 7024 (DACB).

FAMILY**: MARANTACEAE**

Stachyphrynium spicatum (Roxb.) K.Schum., Pflanzenr. IV, 48: 46. 1902. (**Fig. 44**)

Phrynium spicatum Roxb., Fl. Ind. 1: 5. 1820.

Phrynium zeylanicum Benth., Gen. Pl. 3: 653. 1883.

Stachyphrynium zeylanicu (Benth.) K.Schum., Pflanzenr. IV, 48: 46. 1902.

Stachyphrynium sinense H.Li, Acta Phytotax. Sin. 23: 146. 1985.

Local name: Marsh Maranta

Perennial herbs, up to 55 cm tall, bearing 2-6 leaves; rhizomes creeping, woody, nodose. Leaves oblong or oblong-lanceolate, 10-35 × 5-7 cm, apex shortly caudate-acuminate, cuneate or rounded at base, nerves many; petiole 15-45 cm long, sheathing at base. Inflorescence basal spike, 1 or 2 arise from the base of leafy shoot, 3-5 × 1.0-1.2 cm, sessile or shortly peduncled; bracts broadly elliptic, 1.8-2.0 × 1.0-1.5 cm, obtuse. Bracteoles membranous, 1.0-1.2 cm long. Flowers 3-8, sessile, 2 cm across, pale pink, fragrant. Outer tepals lanceolate, 2-4 × 1.2-1.5 mm, membranous, acuminate; tube formed by inner tepals, 1.5-1.8 cm long, glabrous, 6-8 mm long; labellum 4-5 mm long; fertile stamen 1, petalloid;. Ovary 2 mm long, puberulent, 3-celled; free part of style 3 mm long, curved at tip; ovule solitary in each cell. Capsules oblong or ellipsoid, 6-8 × 5-6 mm, obtusely trigonous, pale. Seeds 2, flattened on one side, 5-6 mm long, rugulose, red-brown; aril white, bilobed. *Flowering & fruiting*: July-September.

Ecology: Hilly moist deciduous and semi-evergreen forests.

Distribution: Western Ghats (India) and Sri Lanka.

Specimen examined: **Chittagong**: Chunati Wildlife Sanctuary, Lohagara, 28 iv 2017, Tajul *et al*., TaK 4478 (DACB).

FAMILY**: MENISPERMACEAE**

Pycnarrhena lucida (Teusm. & Binn.) Miq., Ann. Bot. Lugduno-Batavi 4(3): 87. 1868.

Cocculus lucidus Teusm. & Binn., Natuurk. Tijdschr. Ned.-Indie 4: 397. 1853.

Antitaxis calocarpa Kurz, J. Bot. 13: 324. 1875.

Pycnarrhena calocarpa (Kurz) Diels, Pflanzenr. (Enger) iv. 94 (Heft. 46): 51. 1910.

Scandent shrubs. Young stems ferruginous pubescent. Leaves petiolate, lamina elliptic-lanceolate or elliptic, base broadly subcuneate or rounded, apex mucronate, acuminate or subacute, thinly leathery, glossy. Inflorescence axillary, fasciculate, cymose, usually 1- (or few)-flowered. Male flowers: sepals of outer whorl minute, obovate, puberulent, inner larger, slightly fleshy, sub-rotund, saccate, petals usually 2 (-5), broadly elliptic, fleshy, synandrium with 4- or 5 anthers. Drupes globose or slightly oblique, red, endocarp fibrously woody. Seeds reniform. *Flowering & fruiting:* March-July.

Ecology: Evergreen forests, along the water courses.

Distribution: Cambodia, China, India, Indonesia, Laos, Malaysia and Thailand.

Specimen examined: **Bandarban:** Kuhalong para, Bandarban sadar, 14 v 2017, Umong Nu Marma, UMN 216 (DACB).

FAMILY**: MORACEAE**

Ficus trichocarpa Blume, Bijdr. 448. 1825. (**Fig. 45**)

Ficus obtusa Hassk., Cat. Hort. Bot. Bogor. 75. 1844.

Ficus ahernii Merr., Philipp. J. Sci. 18: 61. 1921.

Local name: Lata bot.

Dioecious, climbing shrubs with white latex; stems with aerial roots; branchlets, brown villous when young but becoming subglabrous. Leaves spirally arranged, alternate, simple; stipules 0.3-0.9 cm long, brown (sub)sericeous, caducous; petiolate 2-4 cm long, pubescent; leaf blades ovate-elliptic or broadly ovate, 5-20 × 4-12 cm, margin entire, apex obtuse to rounded or acuminate, base obtuse, rounded or cordate, leathery, covered with red hair on both surfaces, lateral veins 2-4, secondary veins 4-6 on each side of midvein. Inflorescence syconium (figs) single or paired from leaf axils, globose to obconic, 1.5-2.0 × 1.6-2.2 cm, wine-red when ripe, densely covered with short, brown hairs inside with bristles; peduncle 8-12 mm, hairy, involucral bracts triangular, persistent. Flowers tiny. Gall flowers: calyx lobes thin; ovary reddish brown. Female flowers: calyx lobed, sepals thin. *Flowering & fruiting:* May-November.

Ecology: Primary and secondary rainforests and freshwater swamp forests.

Distribution: China, Indonesia and Philippines.

Specimens examined: **Bandarban**: Rowangchari Forest Range, Rowangchari, 02 xi 2016, Imam *et al*., IH 1389 (DACB); Matamuhuri Forest Range, Alikodom, 15 v 2017, Imam *et al*., IH 5434 (DACB).

FAMILY**: MYRISTICACEAE**

Knema attenuata (Hook.f. & Thom.) Warb., Monog. Myrist.: 590. 1897. (**Fig. 46**)

Myristica attenuata Wall. *ex* Hook.f. & Thomson, Fl. Ind. 1: 157. 1855.

Trees, 7-30 m high. Twigs stout, straite, tomentose to glabrous. Leaves alternate, simple; blades elliptic-oblong to oblong-lanceolate, 10-32 × 3-12 cm, base attenuate to acute, apex obtuse to acuminate, blackish when dried, puberulous to tomentose only at base, lateral nerves 12-22 pairs; petiole 1-2 cm long, tomentose to glabrous, hairy. Inflorescence arise from 5 mm long

tubercle or sessile; bract triangular, bracteole semilunar. Male inflorescence 7-9-flowered; pedicel 5-10 mm long, puberous; bud obovoid; tepals triangular; striate, puberulous; disc transversely elliptic, 1.5–2.0 mm long; anthers 12-14, sessile or short stalked. Female inflorescence 2-3 flowered; pedicel 2-3 mm long; perianth tomentose; tepals triangular; ovary 3-4 mm long, pilose; style 0.5-0.6 mm long, glandular; stigma 4 lobed; lobes bilobulate. Fruits 2.7-3.5 cm long, ellipsoid to oblong, annular at base, 2-3 mm long apiculate at apex, puberulous to glabrous; pericarp 5-10 mm thick; fruiting stalk 1.0-1.5 cm long. Seed ellipsoid, 2.2-2.5 cm long. *Flowering & fruiting:* Throughout the year.

Ecology: Swamps, evergreen forests and rocky riverside; up to 900 m altitudes.

Distribution: India.

Use: Wood has less economic value.

Specimen examined: **Cox's Bazar:** Sisa beel, Khuniapalong, Ramu, 09 iv 2018, Niyamul *et al*., NK 7281 (DACB).

Knema erratica (Hook.f. & Thom.) Sinclair, Gard. Bull. Singapore 18: 205, f. 9. 1961. (**Fig. 47**)

Myristica erratica Hook. f. & Thom., Fl. Ind. 1: 156. 1855.

Myristica longifolia Wall. *ex* Blume var. *erratica* (Hook.f. & Thom.) Hook.f., Fl. Brit. India 5: 110. 1886.

Trees, 10-20 m high. Twigs stout, striate, glabrous to puberulous. Leaves alternate, simple; petiole 1.0-1.5 cm long, puberulous to glabrous; blades lanceolate to narrowly lanceolate, 12-35 × 3-5 cm, coriaceous, base obtuse to cuneate, apex acute to acuminate, margins entire, lateral nerves 25-28 pairs. Inflorescence arises from 5 mm long tubercles. Male inflorescence 7-8 flowered; pedicels 5-8 mm long, filiform, stellate hairy, bracts keeled; bracteole annular; bud obovoid, 4-5 mm diameter; tepals ovate, 3-4 × 2-3 mm, acute, puberulous; disc elliptic to triangular, concave; anthers 12-14, 1.5-2.0 mm long. Female inflorescence 2-3 flowered; flowers subsessile, bud ellipsoid, 4-5 mm long; tepals obovate, 3-4 × 2-3 mm, bluntly acute, stellate hairy; ovary triangular, 2-3 mm long, pilose; style short, glabrous; stigma 2. Fruits 1-3 together, obovoid, 1.8-2.3 × 1.3-1.7 cm, blunt at apex, puberulous to glabrescent; pericarp 2.5-5.0 mm thick, fruiting stalk 8-10 mm long, tomentose. Seed obovoid. *Flowering & fruiting:* November-March.

Ecology: Evergreen hilly forests; up to 500 m altitudes.

Distribution: India.

Use: Latex is used to treat mouth sore and dysentery.

Specimen examined: **Bandarban**: Thanchi Forest, 28 ii 2018, Sahidul & Rashed, MSI 7082 (DACB).

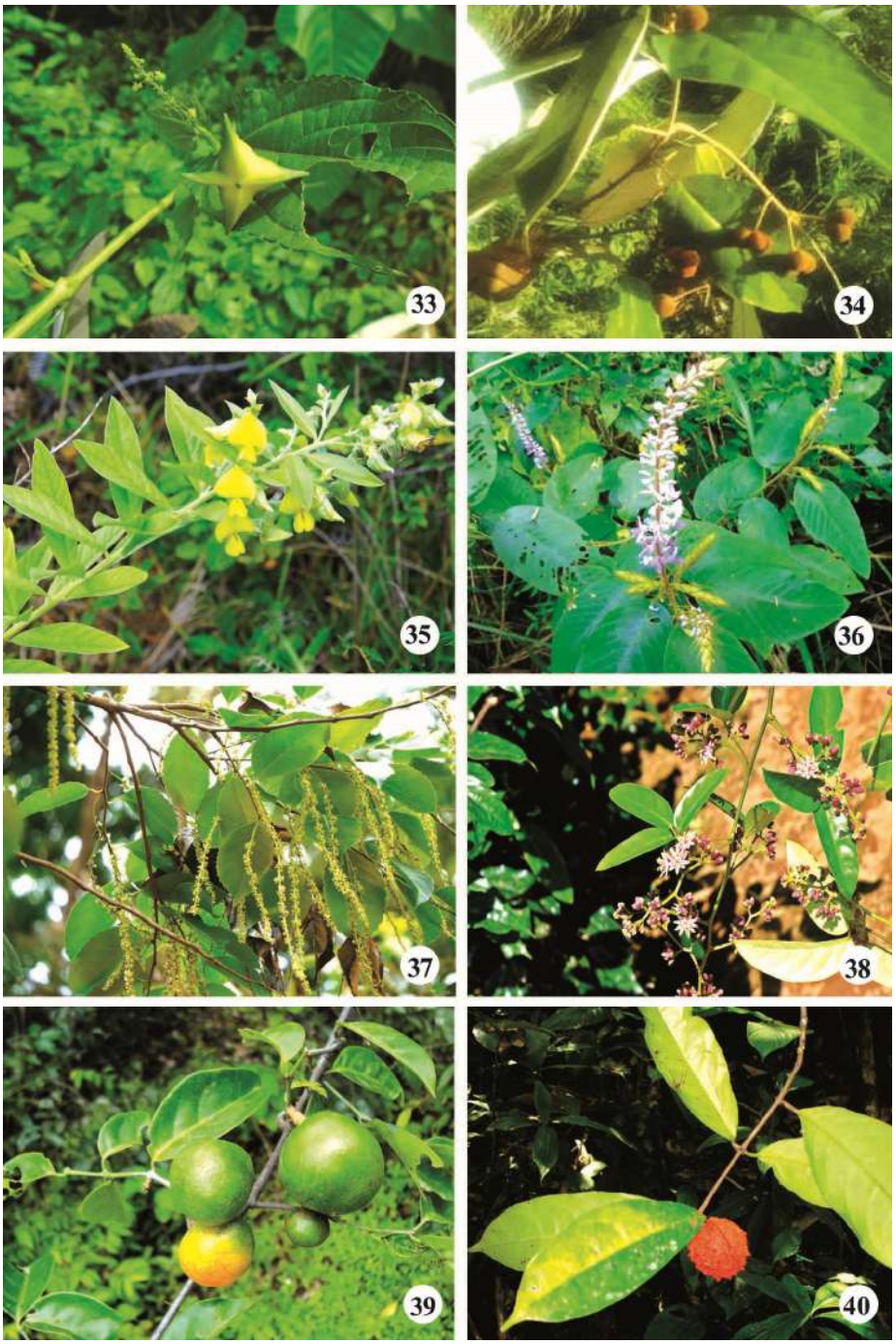
FAMILY**: OLEACEAE**

Jasminum subglandulosum Kurz, J. Bot. 13: 329. 1875. (**Fig. 48**)

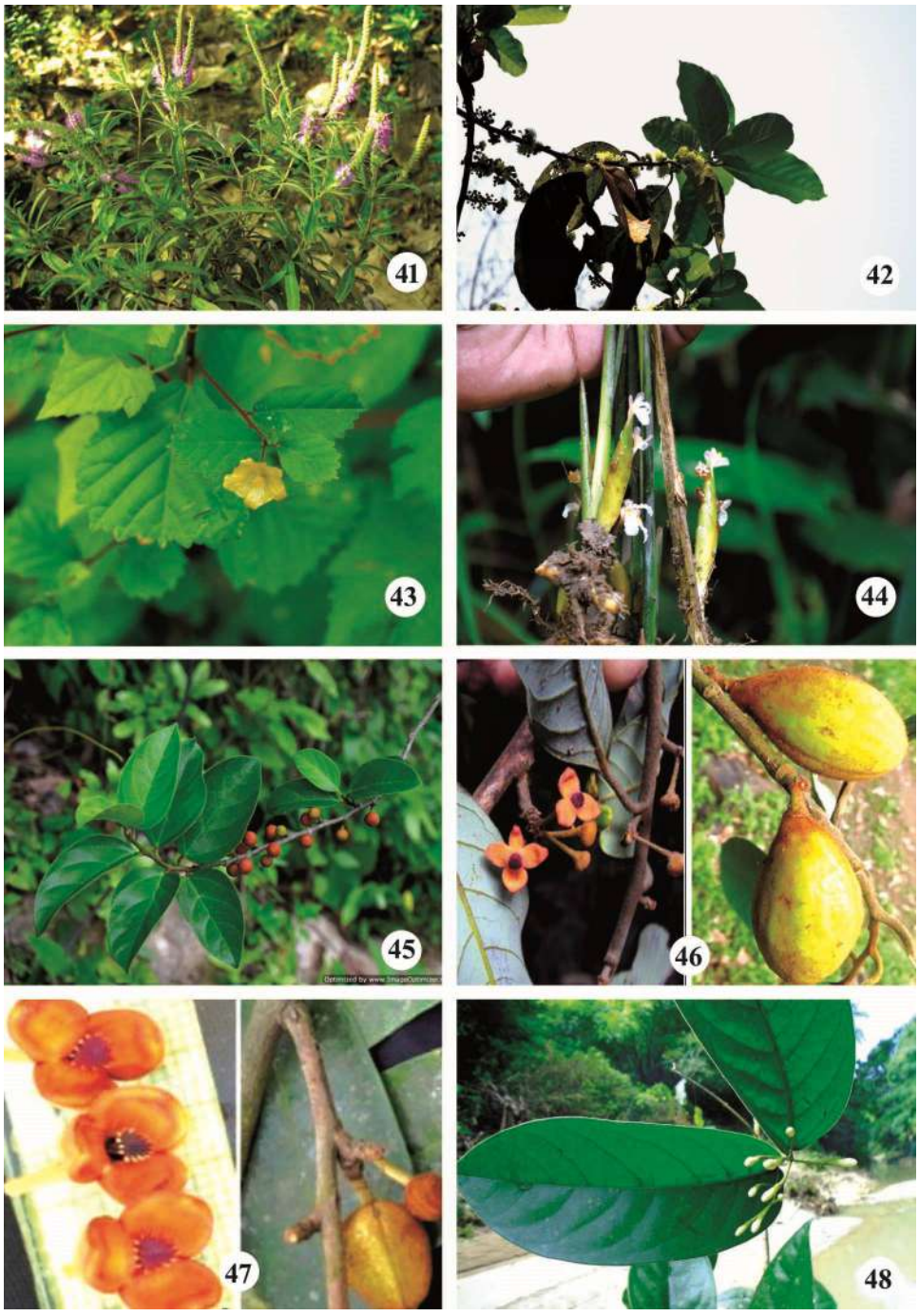
Jasminum sempervirens Kerr, Bull. Misc. Inform. Kew 1938: 30. 1938.

Jasminum wangii Kobuski, J. Arnold Arbor. 20: 69. 1939.

Scandent shrubs, up to 3-5 m long; branchlets glabrous when young. Leaves opposite, simple; petiole 2-5 cm long, glabrous; leaf-blades obovate, ovate-elliptic, 10-25 × 5-10 cm, base cuneate or rounded-cuneate, apex very shortly acuminate, papery or thinly leathery, shiny and glabrous, secondary veins 5-6 on each side of midrib, slightly raised above, prominent below. Inforescence terminal or axillary cymes, with 3-10 fowers; bracts linear, 1-2 mm long, glabrous; pedicel 1-3 cm long, glabrous. Calyx campanulate, glabrous, tube 2-3 mm long; lobes 5, deltoid, 0.5-0.8 mm long,



Figs 33-40: 33. *Plukenetia corniculata* Sm., 34. *Sumbaviopsis albicans* (Blume) J.J.Sm., 35. *Crotalaria berteroana* DC., 36. *Uraria leptostachya* Graham, 37. *Homalium ceylanicum* (Gardn.) Benth., 38. *Illigera trifoliata* (Griff.) Dunn, 39. *Salacia fruticosa* Heyne, 40. *Salacia malabarica* Gamble.



Figs 41-48: 41. *Pogostemon griffithii* Prain, 42. *Litsea grandis* (Nees) Hook.f., 43. *Sida alnifolia* L., 44. *Stachyphrynium spicatum* K.Schum., 45. *Ficus trichocarpa* Blume, 46. *Knema attenuata* Warb., 47. *Knema erratica* J. Sinclair, 48. *Jasminum subglandulosum* Kurz

glabrous. Corolla tube 1.5-3.0 cm long, pale white; lobes 6-8, narrowly lanceolate, 8-10 × 4-5 mm, white, apex acute to shortly acuminate. Stamens 2; filaments 0.2-0.5 mm long, glabrous. Ovary spherical, 0.2-0.8 mm long, glabrous; style 0.5-0.8 cm long, stigma 0.5-0.7 mm long; ovules 2. Fruit a berry, ellipsoid or globose, 12-16 × 6-10 mm, purple-black. *Flowering & fruiting:* August-November.

Ecology: Mixed evergreen forests, near streams.

Distribution: China, India, Myanmar and Thailand.

Specimens examined: **Cox's Bazar**: Kudum guha, Teknaf, 10 x 2017, Niyamul *et al*., NK5953 (DACB). **Rangamati**: Choto Harina Forest Reserve, Barkal, 28 viii 2017, Joyanta *et al*., JCR 6425 (DACB).

FAMILY**: OPILIACEAE**

Cansjera rheedii J.F. Gmelin in Syst. Nat. ed. 13, 2(1): 280. 1791. (**Fig. 49**)

Climbing shrubs or small trees, up to 5 m tall. Branchlets yellowish tomentose, with stout spines. Leaves elliptic-oblong to ovate-lanceolate, 4-13 × 2.5-6.0 cm, apex acuminate, base broadly cuneate to rounded, leathery, glabrescent, on drying somewhat wrinkled, nerves 4-6 pairs; petioles 2-4 mm long, pubescent. Inflorescences fascicled, 1-3 cm long, tomentulose; bracts triangular, 0.8-1.2 mm long. Flowers greenish white or yellow, sessile. Perianth yellowish, urceolate, 2-3 mm long; lobes 4, ovate-triangular, 0.4- 0.5 mm long, recurved. Filaments 1-2 mm long; anthers broadly ovoid. Disk scales 4, ovate, apex acute. Ovary cylindric; style 0.8-1.0 mm long, persistent; stigma capitate, 4-lobed. Drupes ellipsoid, 1.2-1.5 × 0.6-1.0 cm, orange-red when ripe, glabrous. *Flowering & fruiting*: October-April.

Ecology: Scattered in moist deciduous forests and in scrub jungles along coasts, ravines and near water; up to 1000 m altitudes.

Distribution: Cambodia, China, India, Laos, Malaysia, Myanmar, Nepal, Philippines; Sri Lanka, Thailand and Vietnam.

Specimen examined: **Chittagong**: Khoyachara, Mirsharai, 30 iv 2017, Tajul et al., TAK 4606 (DACB).

FAMILY**: ORCHIDACEAE**

Bulbophyllum orientale Seidenf., Dansk Bot. Ark. 33(3): 138. 1979. (**Fig. 50**)

Epiphytic herbs. Rhizome stout, rooting from base of pseudobulbs. Pseudobulbs ovoid, usually 2-3 cm long, with a terminal leaf. Petiole 0.5-1.0 cm long; leaf blade oblong, 8-30 × 1.5-3.5 cm, leathery or fleshy, base contracted into petiole, apex slightly retuse. Scape arise from base of pseudobulb, arching, 5-15 cm long; raceme 3-6 cm long, densely many flowered; peduncle with 4 or 5 large sheaths ca. 2 cm; floral bracts ovate-lanceolate, 5-6 mm long, apex acute. Pedicel and ovary 4-5 mm long. Flowers orange-yellow with brown venation on sepals and petals and black spots on lip. Dorsal sepal ovate, 5-6 × 2-3 mm, entire, acute; lateral sepals obliquely ovate-lanceolate, 6-8 × 4-5 mm, abaxially slightly papillate, base adnate to column foot, apex acute. Petals obliquely triangular, 2.4-2.6 × 1.6-1.8 mm, decurrent to column foot, apex cuspidate; lip 5-6 mm long, fleshy, apex obtuse, recurved, margin papillate, apex irregularly toothed. Column yellow, subcylindric, 1.8-2.0 mm long; anther cap glabrous. *Flowering & fruiting:* October-February.

Ecology: Grows on tree trunks in evergreen broad-leaved forests; between 500-1000 m altitudes.

Distribution: China, Thailand and Vietnam.

Use: The plant has horticultural value.

Specimen examined: **Cox's Bazar**: Banghabandhu Safari Park, 23 i 2017, Niyamul *et al*., NK2498 (DACB).

Nervilia plicata (Andrews) Schltr., Bot. Jahrb. Syst. 45: 403. 1911. (**Fig. 51**)

Arethusa plicata Andrews, Bot. Repos. 5: 321. 1803.

Nervilia discolor (Blume) Schltr., Bot. Jahrb. Syst. 45: 403. 1911.

Nervilia purpurea (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. 10: 6. 1911.

Nervilia biflora (Wight) Schltr., Bot. Jahrb. Syst. 39: 48. 1906.

Local name: Panpatashiral

Terrestrial herbs; tuber globose to ellipsoid, 5-20 mm diameter, whitish. Leaves orbicular-cordate, 7-12 × 10-13 cm, base cordate, apex acute, abaxially dark purple, adaxially green, many veined; petiole-like stalk erect, purple, 1.5-3.0 cm long. Inflorescence 12-20 cm long, 2-flowered; peduncle with 2 or 3 tubular sheaths; floral bracts lanceolate, 5-7 × 1-2 mm, apex acuminate. Flowers open widely; pedicel and ovary 1.0-1.5 cm long, ridged. Sepals brownish- yellow or purple with purplish-red venation, spatulate, 15-25 × 2.5-4 mm, apex acute. Petals linear-oblanceolate, 14-22 × 2.5-3 mm, apex acute, brownish yellow or purple with purplish red venation; lip 15-20 × 10-15 mm, brownish tinged yellow at center, spurless, obscurely 3-lobed above middle; lateral lobes erect and loosely enclosing column; mid-lobe subsquare or ovate, longitudinally folded at apex, apex truncate-obtuse; disk glabrous. Column white, 7-10 mm long; stigma suborbicular. *Flowering & fruiting:* April-August.

Ecology: Shady and damp places in evergreen forests; between 200-800 m altitudes.

Distribution: China, India, Indonesia, Nepal, Pakistan, Myanmar, Thailand, Laos, Vietnam, Malaysia, New Guinea, Philippines, and Australia.

Specimen(s) examined: **Cox's Bazar**: Jadi Pahar, Teknaf, 26 iv 2017, Niyamul *et al*., NK 3412 (DACB).

FAMILY**: PIPERACEAE**

Piper boehmeriifolium (Miq.) Wall. *ex* C. DC., Prodr. 16(1): 348. 1869. (**Fig. 52**)

Chavica boehmeriifolia Miq., Syst. Piper 265. 1843.

Dioecious climbers with ribbed branches, glabrous. Leaves petiolate, petiole up to 1.3 cm long, glabrous or sometimes sparsely pubescent, lamina 15-20 × 8-10 cm, ovate, ovate-oblong, elliptic-lanceolate, 7-8 veined, base oblique, one side rounded, other side tapered and acute, apex acute to long acuminate, glabrous, membranous. Spikes mostly leaf-opposed, often terminal in male plants. Male spikes 10-15 cm long, peduncle 1.0-3.5 cm long, bracts ± orbicular, peltate, obconicle, glabrous. Stamens 2-seriate, filaments thick, anthers reniform. Female spikes 6-12 cm long, pedunculate, bracts as in male spikes, rachis sparsely pubescent, stigmas deciduous. Drupes c 0.3 cm across, subglobose, densely clustered. *Flowering & fruiting:* March-August.

Ecology: In shady places of forests.

Distribution: Bhutan, China, India, Malaysia, Myanmar, Thailand and Vietnam.

Specimens examined: **Bandarban**: Gungdum, Naikhongchhari, 7 iv 2017, U. Chakma, UC149 (DACB). **Rangamati**: Tongtullya Jhiri, Rangamati Sadar, 03 iii 2017, Krishna Thakur

Chakma, KTC 178 (DACB); Sitapahar Reserve Forest, Kaptai, 14 v 2017, Joyanta *et al*., JCR 5432 (DACB).

Piper brachyrachis C.H.Wright, Fl. Trop. Afr. 6(1): 147. 1909. (**Fig. 53**)

Aromatic, evergreen lianas, stems 3-5 m long, glabrous to hairy at swollen nodes rootstock tuberous. Leaves alternate, simple; stipules lanceolate, 1.0-1.5 cm long, adnate to petiole and enclosing the stem, caducous; petiole 0.5-8.0 cm long, grooved, glabrous or hairy; blade broadly ovate to elliptical, 5-18 × 2.5-8.0 cm, base cuneate, rounded or slightly cordate, slightly asymmetrical, apex acuminate, margins entire, palmately (3-)5-11 veined, 3 median ones reaching the apex. Inflorescence solitary terminal or leaf-opposed spike, creamy white, 2-3 cm long; peduncle 1-5 cm long, rachis 2.5-8.5 cm long. Flowers minute, bisexual or male in separate spikes, or male and bisexual flowers on one spike with male flowers towards the base, sessile; perianth absent; stamens 2-3; ovary superior, ovoid, 1-celled, with short style and 2 recurved stigmas. Berry globose-ovoid, 2-4 mm long, sessile, 1-seeded. Seed brown, shiny. *Flowering & fruiting:* May-November.

Ecology: Occasional in evergreen rainforests, swamp forests, moist riverine forests, mixed bamboo forests scrub and thickets near streams; up to 600 m altitudes.

Distribution: India.

Use: Leaves, fruits and roots are widely used in different treatments.

Specimen(s) examined: **Chittagong**: Mithachari, Hathazari, 24 xi 2016, Tajul *et al*., TOK 2175 (DACB).

Piper mullesua Buch.-Ham. *ex* D. Don, Prodr. Fl. Nepal. 20. 1825. (**Fig. 54**)

Woody climbers, glabrous. Leaves alternate; petiole 1-2 cm long, slender; prophylls very short; blades elliptic or narrowly elliptic or ovate-lanceolate, 7-9 × 3-4 cm, papery to thinly leathery, without glands, base wedge-shaped, symmetric or slightly oblique, apex long-pointed, veins 5-7, very prominent below, reticulate veins conspicuous. Inflorescences leaf-opposed, short, subglobose spikes, 5-7 × 3-4 mm; peduncle 2-3 mm long; rachis pubescent; bracts orbicular, 1 mm wide, peltate; stalk short. Flowers bisexual, 2-3 × 2.5-3.0 mm. Stamens 2; anthers reniform. Ovary obovoid; stigmas 3 or 4, very small. Berry obovoid, 2.0-2.5 mm diameter, partly immersed in rachis. *Flowering & fruiting:* April-October.

Ecology: Rare in evergreen hill forests, valleys, ravines; between 400-800 m altitudes.

Distribution: Bhutan, China, India and Nepal.

Use: Flowers are added to vegetables and curries as a flavouring agent. The fruits are used to treat coughs and colds.

Specimens examined: **Bandarban**: Poly Forest Range, Ruma, 15 iii 2017, Imam *et al*., IH 4936 (DACB); Sangu Resrve Forest, Thanchi, 11 x 2017, Sahidul & Rashed, MSI 5992 (DACB). **Chittagong**: Kalapanichara, Hazarikhil, Fatikchari, 05 iv 2017, Md. Mannan, MM 156 (DACB). **Rangamati**: Machalang Reserve Forest, Baghaichari, 16 v 2017, Kawser *et al*., KH 4997 (DACB).

FAMILY**: POACEAE**

Mnesithea merguensis (Hook.f.) A.Camus in Bull. Mus. Hist. Nat. Paris 25: 57. 1919. (**Fig. 55**)

Rottboellia merguensis Hook.f., Fl. Brit. India 7: 158. 1896.

Perennial grasses. Culms tufted, erect, slender, 15-70 cm tall, usually unbranched. Leaf sheaths glabrous, often keeled; leaf blades linear, 8-25 × 0.8-1.2 cm, glabrous, apex abruptly acute;

ligule 0.5-1.0 mm long. Racemes solitary, either terminal and axillary, cylindrical, 5-10 cm × 1.5-2.0 mm, spikelets sessile, 3.5-4.0 mm. Sessile spikelet 3-5 mm long; lower glumes oblong, smooth, margins winged, apex oblique; upper glumes boat-shaped, membranous, equal to lower glume; palea absent; upper lemmas 2.2-2.5 mm long. Pedicelled spikelet minute or absent; pedicel linear, adnate to rachis internode. *Flowering & fruiting*: August-December.

Ecology: Meadows & grassy hill slopes; between 100-500 m altitudes.

Distribution: Myanmar.

Specimen examined: **Chittagong**: Kumarikhal, Sarkerhat, Fatikchari, 17 x 2017, Moniruzzaman *et al*., MAK 6090 (DACB).

FAMILY**: POLYGALACEAE**

Polygala alphonsii Buch.-Ham. *ex* DC., Prodr. 1: 327. 1824. (**Fig. 56**)

Perennial herbs, 15-35 cm tall. Stems woody at base, branched, erect. Leaves alternate; petiole 1-2 mm long; blades elliptic or obovate-elliptic, 1.5-4.0 × 1.0-2.5 cm, base obtuse, rounded or subcordate, margin entire, ciliate, apex obtuse or retuse, papery, lateral veins 3-5 pairs. Racemes axillary or leaves opposed, 0.5-1.0 cm long, 3-8-flowered; pedicel 1-2 mm long; bracts 3, persistent, ovate, ciliate. Flowers 6-9 mm across. Sepals 5, persistent, ciliate; outer sepals 3, unequal, upper one broadly elliptic, 3-4 × 2-3 mm, inner sepals 2, petaloid, obliquely ovate, 6-7 × 3-4 mm. Petals 3, free, purple striate; lateral petals 4-5 mm long, keel longer than lateral petals, 5-7 mm long. Stamens 8; filaments 5-6 mm long. Ovary subglobose, winged; style curved; stigmas 2. Capsules orbicular, 3-4 mm diameter, narrowly winged. Seeds 2, black, oblong, 2.0-2.5 × 1.3-1.6 mm, densely villous, slightly 3-lobed. *Flowering & fruiting*: September-April.

Ecology: Scrubs, hill slopes and in grasslands; between 300-800 m altitudes.

Distribution: Myanmar.

Specimens examined: **Bandarban**: Thanchi Forest Range, Thanchi, 10 x 2016, Imam *et al*., IH 839 (DACB); Y-Junction Forest Range, Bandarban Sadar, 28 x 2016, Imam *et al*., IH 1185 (DACB); Paindu Forest Range, Rowangchari, 04 x 2016, Imam *et al*., IH 659 (DACB); Rowangchari Forest Range, Rowangchari, 01 xi 2016, Imam *et al*., IH 1292 (DACB); Kuhalong Forest Range, 21 xii 2016, Imam *et al.*, IH 2556 (DACB). **Khagrachari**: Hazachara Reserve Forest, Ramgarh, 9 iv 2017, Kowser *et al.*, KH4263 (DACB). **Rangamati**: Gilachari, Naniarchar, 09 x 2016, Joyanto *et al*., JCR 885 (DACB); Baro Kachuchari, Baghaichari, 30 xii 2016, Joyanto *et al*., JCR 2037 (DACB); Morghona Forest, Mogban, 15 ii 2017, Joyanto *et al*., JCR3217 (DACB).

FAMILY: **POLYPODIACEAE**

Platycerium wallichii Hook., Gard. Chron. 765. 1858. (**Fig. 57**)

Acrostichum alcicorne Willemet, Ann. Bot. (Usteri) 18 (Neue Ann. Bot. 12): 61. 1796.

Local name: *Gundhi muri*

Epiphytic fern. Rhizome creeping. Stipe fall off when old. Fronds sessile, two kinds. One nest leaves another foliage fronds. Nest fronds persistent, brown, about 60-70 cm long, as wide as long, much lobed, irregularly lobate, deepest sinus reaching more than half way to the base, ultimate lobe usually longer than wide. Fertile fronds erect or pendulous, dichotomously branched from the base, green to yellow, produced initially into pairs, usually about 60 cm long. Lamina extended to broadly cuneate base, repeatedly dichotomous with narrow ultimate lobes. Sporangia

covering large area on various parts of lower surface. Spores tetrahedral, smooth. *Sporation time*: August-November.

Ecology: Evergreen forests on tree trunks; from 300-1000 m altitude.

Distribution: China, India, Malaysia, Myanmar and Thailand.

Use: Grown in gardens as an ornamental one.

Specimens examined: **Cox's Bazar**: Shilkhali, Teknaf, 18 ix 2017, Niyamul *et al*., NK5792 (DACB); Fasiyakhali, Chokoria, 25 ix 2017, Niyamul *et al*., NK5815 (DACB).

FAMILY**: RUBIACEAE**

Discospermum sphaerocarpum Dalz. *ex* Hook., Enum. Pl. Zeyl.: 158. 1859. (**Fig. 58**)

Diplospora sphaerocarpa (Dalzell *ex* Hook.f.) Hook.f., Fl. Brit. India 3: 123. 1880.

Diplospora dalzellii (Thwaites) Hook.f., Fl. Brit. India 3: 123. 1880.

Discospermum dalzellii Thwaites, Enum. Pl. Zeyl. 158. 1859.

Shrubs or Trees up to 15 m high. Bark smooth or finely fissured, pale yellow-brown, inner bark red to dirty yellow. Leaves elliptic-oblong, oblong-lanceolate, 6-12 × 2-5 cm, coriaceous, apex acute, base acute, lateral nerves 4-6 pairs; stipules-triangular, 2-3 mm long with long acuminate tip; petiole 0.4-1.0 cm long. Inflorescences shortly cymose, 1.0-1.5 cm long, subsessile, puberulent; bracts ovate to triangular; pedicels 0.5-3.0 mm long. Male inflorescens usually 6-12 flowered spikes; female inflorescens apparently 3-6 flowered spikes. Flowers more or less sessile, hypanthium short, 0.3 mm long. Calyx lobes broadly triangular, 0.4-0.6 mm long, glabrous. Corolla white or rarely yellow, tube of female flowers broadly tubular, up to 2 mm long, tube of the male flowers narrowly tubular, 3-4 mm long, lobes ovate-oblong, 2-3 mm long. Fruits ovoid to sub-globose berry, 1.5-2.0 cm diameter, green; fruiting pedicels to 10 mm long. Seeds flattened, striate, 2-3 mm diameter. *Flowering & fruiting*: May-September.

Ecology: Thickets or forests in ravines; between 200-800 m altitudes.

Distribution: Western Ghats (India) and Australia.

Specimen examined: **Rangamati**: Barkal Reserve Forest, Barkal, 6 viii 2017, Jayanto *et al*., JCR6217 (DACB).

Hedyotis neesiana Arn., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 18: 341. 1836. (**Fig. 59**)

Hedyotis glabella R.Br. *ex* Bedd., Icon. Pl. Ind. Or. t. 36. 1869.

Hedyotis nitida Wight & Arn., Prodr. Fl. Ind. Orient. 412. 1834.

Perennial, prostrate herbs. Stems 4-angled, coarsely scabrid. Leaves opposite, sub-sessile; stipules persistent, interpetiolar; variable in size and shape, ovate to narrowly-elliptic, or linear-lanceolate, 1-6 × 0.5-2.0 cm, apex acute to acuminate, base merging in to the stipules, coriaceous, above minutely scabrid on the margins, below minutely scabrid on the midrib, pale below; stipule ovate, 5-8 mm long, apex rounded, strongly long-toothed, villous. Inflorescences axillary, few to many flowered and fasciculate cymes; 1-3 together. Flowers homostylous, bisexual, white, sessile or shortly pedicelled. Calyx 4 mm long, 4-lobed; lobes acute, ciliate. Corolla tubular, 4-5 mm long; lobes 4, spreading, white, glabrous. Stamens 4, inserted in corolla tube; anthers dorsifixed. Ovary 2-celled, ovules few to numerous; stigma 2-lobed. Capsules globose to ovoid, 2-3 × 1-2 mm, glabrous, slightly ribbed, dehiscence longitudinal from the apex. Seeds 8-15 per placenta, angled, ovoid, glabrous, slightly reticulate, deep brown. *Flowering & fruiting*: October-March.

Ecology: Evergreen hill forests; up to 600 m altitudes.

Distribution: India and Sri Lanka.

Specimens examined: **Bandarban**: Kuhalong Forest Range, Bandarban sadar, 21 xii 2016, Imam Hossen *et al*., IH 2579 (DACB); Betchara Forest Range, Rowangchari, 04 x 2017, Sahidul & Rashed, MSI 5909 (DACB); Sangu Reserve, Thanchi, 10 x 2017, Sahidul & Rashed, MSI 5958 (DACB); Gumdhum, Naikhyongchari, 27 ii 2017, Ukchain Chakma, UC060 (DACB).

Hedyotis tenelliflora Blume, Bijdr. 971. 1826. (**Fig. 60**)

Hedyotis angustifolia Cham. & Schltdl., Linnaea 4: 153. 1829.

Oldenlandia angustifolia (Cham. & Schltdl.) Kuntze, Revis. Gen. Pl. 1: 292. 1891.

Oldenlandia tenelliflora (Blume) Kuntze, Revis. Gen. Pl. 1: 292. 1891.

Annual or perennial herbs, diffusely branched, up to 40 cm tall; stems subterete or 4-angled, smooth, 2-sulcate, glabrous or scaberulous along grooves. Leaves sessile or subsessile; petiole 0.8-1.0 mm long, glabrescent; blades thinly leathery, linear, linear-lanceolate, narrowly elliptic-oblong, or narrowly spatulate, 1.2-5.0 cm × 2-4 mm, adaxially glabrous or scaberulous near margins, abaxially glabrous, sometimes both surfaces scaly, base cuneate or decurrent, margins revolute, apex acute or acuminate; stipules fused to petiole bases, triangular to rounded, 1-2 mm long, puberulent, hispidulous, with 2-5 setiform lobes. Inflorescences axillary, 1-flowered or 2-3-flowered, congested-cymose, glomerulate, or fasciculate, 4-8 mm diameter, sessile to subsessile; bracts acicular to lanceolate, 1.0-2.5 mm long, entire or scaberulous; pedicels 1 mm long. Flowers sessile to subsessile, homostylous. Calyx glabrous; hypanthium subglobose to obovoid, ca. 1 mm long; limb lobed nearly to base; lobes linear-lanceolate, triangular, 1.5-2.0 mm long, ciliolate. Corolla white, funnel form, outside glabrous; tube ca. 2 mm long, pubescent in throat; lobes narrowly spatulate-oblong, 1-2 mm long. Anthers exserted, ca. 1 mm long. Stigma 0.2-0.3 mm long.Capsules ovoid, 2.0-2.5 × 1.5-2.0 mm, loculicidal across top. Seeds numerous. *Flowering & fruiting*: February-July.

Ecology: Slopes in valleys, ridges of fields; from 100-500 m altitude.

Distribution: Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Thailand and Vietnam.

Specimens examined: **Bandarban**: Gumdhum, Naikhyongchari, 27 ii 2017, Ukchain Chakma, UC052 (DACB). **Cox's Bazar**: Jadi Pahar, Teknaf, 26 iv 2017, Niyamul *et al*., NK 3402 (DACB); Balukhali, Ukhia 12 vii 2017, Niyamul *et al*., NK 4664 (DACB); Roikhong, Teknaf, 09 x 2017, Niyamul *et al*., NK 5931 (DACB).

Hydrophylax maritima L.f., Suppl.: 126. 1781. **(Fig. 61)**

Perennial herbs. Stems prostrate creeping, rooting at nodes, stout, glabrous, clothed with cup-like persistent stipules of fallen leaves, ascending flowering shoots often not more than 10 cm long. Leaves opposite, subsessile; blades narrowly elliptic-oblong or spathulate, 10-25 × 5-8 mm, apex acute, recurved, glabrous, fleshy, much wrinkled when dry; stipules large, membranous, forming a cup around stem, truncate or obscurely toothed, sometimes ciliate. Flowers sessile, solitary, axillary. Calyx lobes 4, lanceolate or triangular, 6-8 mm long. Corolla white, tube 10-12 mm long, a ring of hairs in the throat; lobes 4, ovate, 3-4 mm long, acute. Filaments slender, 3-4 mm long, anthers oblong, 1.5 mm long. Ovary two celled; style and stigma 6-8 mm long. Fruits a dry berry, oblong, tapered at both ends, 4-5 mm long, glabrous, shining, 3-ribbed, crowned with persistent calyx teeth. Seeds linear-oblong, 4-6 mm long. *Flowering & fruiting:* March-September.

Ecology: Rarely grows on sandy beaches forming colonies.

Distribution: India, Sri Lanka and Thailand.

Specimens examined: **Cox's Bazar**: Jhilongjha, Uttaron Residential Area, 27 ix 2016, Niyamul *et al*., NK 516 (DACB); Sonadia Island, Moheshkhali, 30 iv 2017, Niyamul *et al*., NK 4490 (DACB).

Ixora brachiata Roxb., Fl. Ind. 1: 381. 1820. (**Fig. 62**)

Ixora arnottiana Miq. *ex* Hook.f., Fl. Brit. India 3: 142. 1880.

Ixora obtusata Miq. *ex* Hook.f., Fl. Brit. India 3: 142. 1880.

Small trees, up to 10 m tall; branchlets terete, glabrous. Leaves simple, opposite, decussate; interpetiolar stipule broadly ovate, 0.3-0.5 cm long, glabrous, apex acute; petiole 0.4-1.2 cm long, stout, glabrous; leaf blades elliptic-oblong to oblanceolate, 7-20 × 3-7 cm, apex obtuse to subacute, base attenuate to cuneate or acute, margin entire or slightly undulate, coriaceous, glabrous; midrib flat above; lateral nerves 6-20, pinnate, very slender. Inflorescence terminal, paniculate cymes; peduncle long, puberulous. Flowers small, bisexual, sessile, white, fragrant. Calyx tube minute, 4 teethed, membranous. Corolla tube 4-6 mm long, lobes 4, oblong, recurved. Stamens 4, attached to the mouth of corolla tube, anthers sagitate. Ovary 2-celled, inferior, ovules one in each cell, style filiform, stigma bifid. Fruit a berry, globose or slightly 2-lobed, 5-6 mm diameter, reddish when ripe; seeds 1 or 2, planoconvex. *Flowering & fruiting*: December-March.

Ecology: Evergreen to semi-evergreen hill forests; up to 400 m altitudes.

Distribution: Western Ghats (India).

Specimen examined: **Chattogram:** Chandranath, Sitakundo, 16 i 2017, Tajul *et al*., TAK 4243 (DACB).

Ixora polyantha Wight, Icon. Pl. Ind. Orient. 3: t. 1066. 1846. (**Fig. 63**)

Ixora grandis Miq. *ex* Hook.f., Fl. Brit. India 3: 140. 1880.

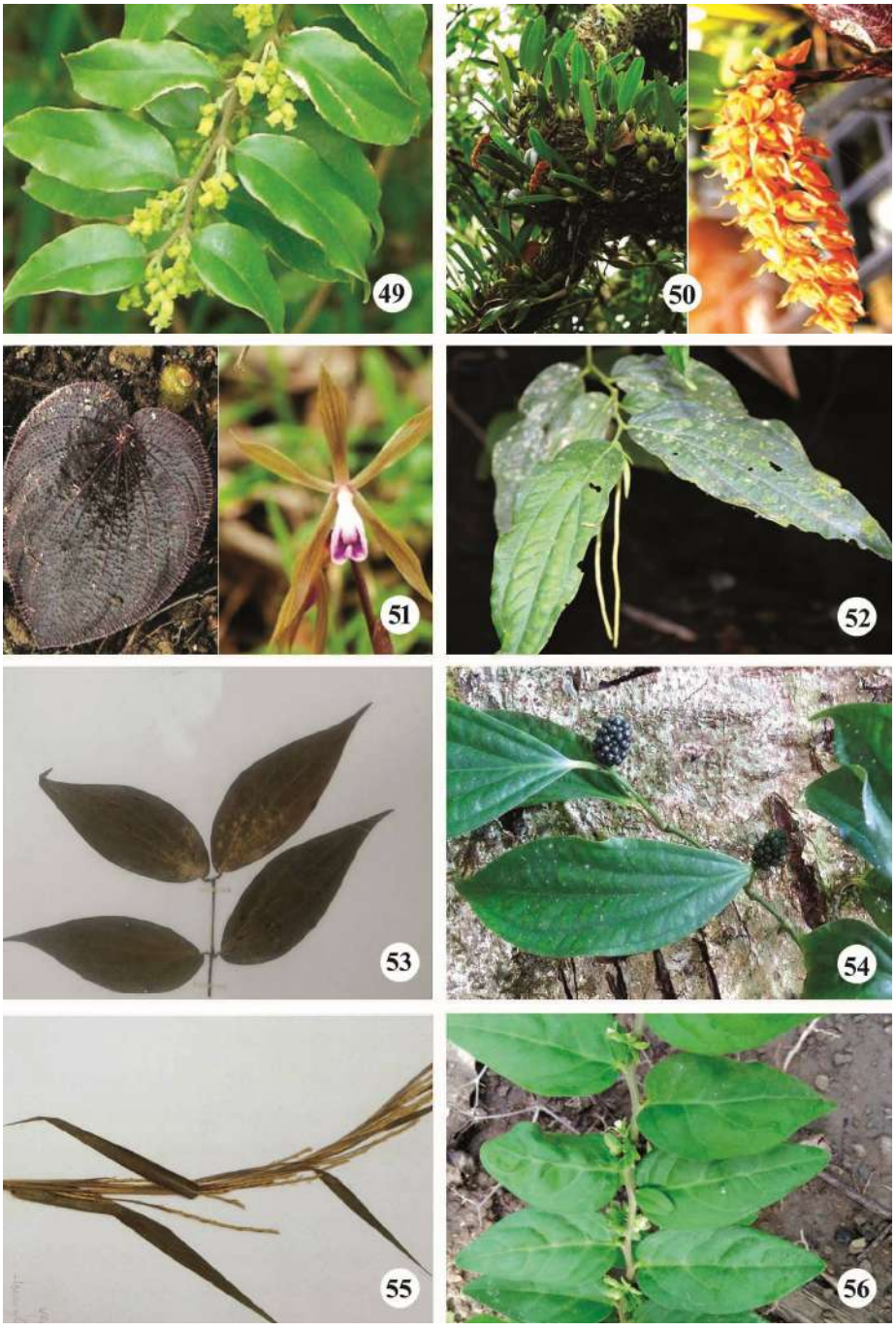
Local name: Chuang-giri; English name: Many Flowered Ixora

Small shrubs, up to 2m tall; branches glabrous. Leaves opposite, ovate to obovate, elliptic to broadly oblanceate, 10-30 × 5-17 cm, apex acute or acuminate, base acute; margins entire, coriaceous, glabrous, lateral nerves 10-15 pairs; stipules long cuspidate; petiole 4-8 mm long. Inflorescence of terminal corymbiform-cymes, subcapitate, head 15-20 cm across, subsessile to peduncled; peduncle 0.5-1.2 cm long; bracts 4-13 × 0.5-1.2 mm, narrowly lanceolate. Flowers numerous in trichasia, sessile, white, sweet fragrant; bracteoles linear, acuminate. Calyx red, tube 1.2-1.5 mm long, densely hairy, lobes elliptic-lanceate to oblong-lanceate, 5-6 mm long, acute, glabrous. Corolla white, tube 3.5-5.0 cm long, slender, glabrous, lobes 4, narrowly obovate, obtuse or rounded, 5-7 mm long, reflexed, mouth glabrous. Stamens 4, epipetalous, 4-6 mm long, filament 1-2 mm long. Style 5.0-6.5 cm long, exserted; stigma pale yellow, 2-3 mm long, bifid; ovary inferior, 1.0-1.5 mm long. Fruit a globose berry, 12-15 mm diameter. *Flowering & fruiting:* March-July.

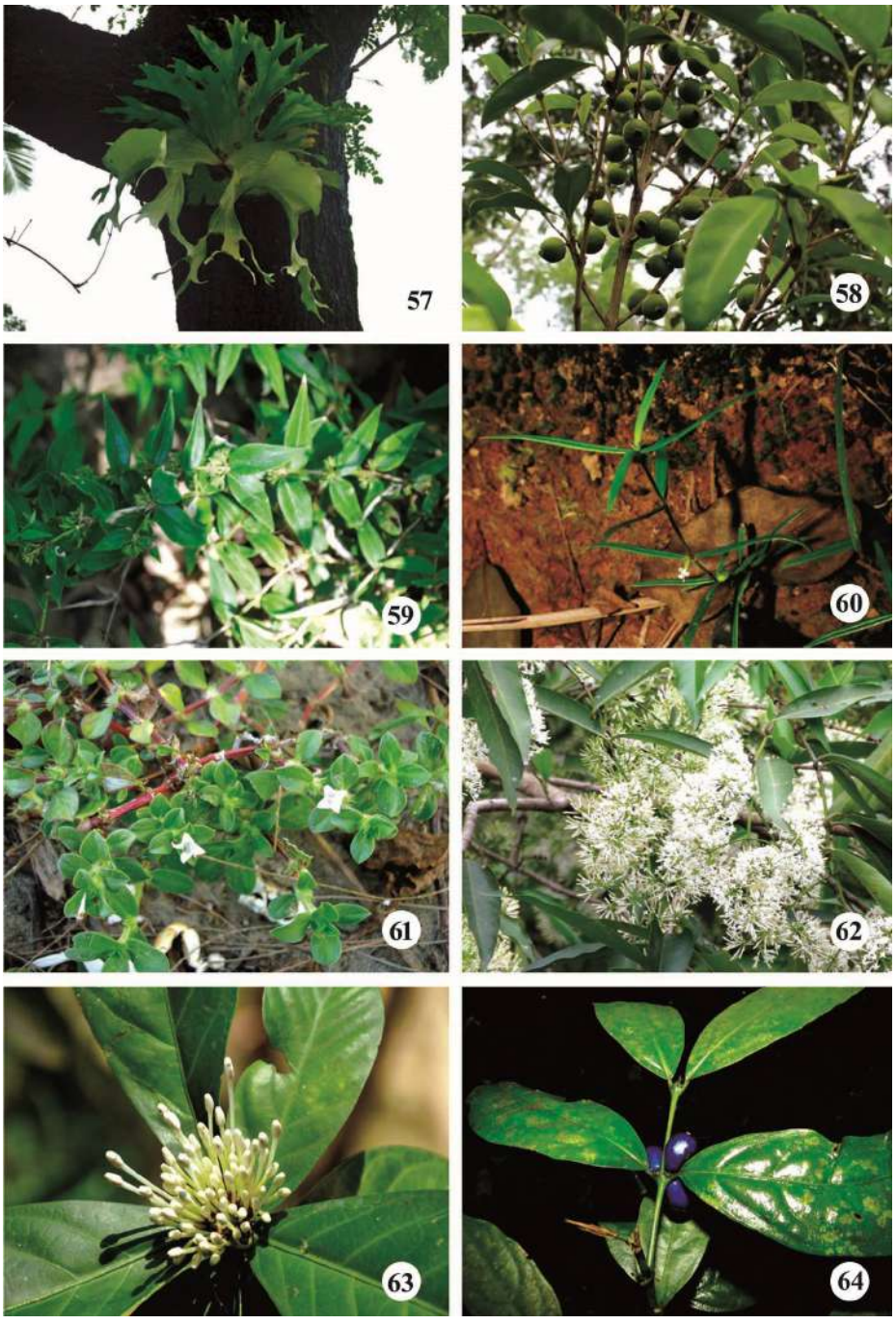
Ecology: Mixed evergreen rain forests, preferably under shady and wet places.

Distribution: India and Indo-China.

Specimens examined: **Bandarban**: Gumdum, Naikhongchhari, 5 v 2017, Ukchain Chakma, UC 255 (DACB). **Cox's Bazar**: Soankhali, Inani, 25 iii 2017, Monir Ahmed, MA 28 (DACB); Dineshpur, Moheshkhali, 2 v 2017, Niyamul *et al*., NK3635 (DACB). **Rangamati**: Kachalong Forest, 12 v 2017, K.T. Chakma, KTC392 (DACB).



Figs 49-56: 49. *Cansjera rheedii* J.F. Gmelin, 50. *Bulbophyllum orientale* Seidenf., 51. *Nervilia plicata* (Andrews) Schltr., 52. *Piper boehmeriifolium* (Miq.) Wall., 53. *Piper brachyrachis* C.H.Wright, 54. *Piper mullesua* Buch.-Ham., 55. *Mnesithea merguensis* (Hook.f.) A.Camus, 56. *Polygala alphonsii* Buch.-Ham.



Figs 57-64: 57. *Platycerium wallichii* Hook., 58. *Discospermum sphaerocarpum* Dalz., 59. *Hedyotis neesiana* Arn., 60. *Hedyotis tenelliflora* Blume, 61. *Hydrophylax maritima* L.f., 62.: *Ixora brachiata* Roxb., 63. *Ixora polyantha* Wight, 64. *Lasianthus constrictus* Wight

Lasianthus constrictus Wight, Calcutta J. Nat. Hist. 6: 515. 1846. **(Fig. 64)**

Mephitidia constricta (Wight) Walp., Ann. Bot. Syst. 2: 762. 1852.

Nonatelia constricta (Wight) Kuntze, Revis. Gen. Pl. 1: 291. 1891.

Shrubs up to 3 m tall. Branchlets thinly appressed-pubescent. Leaves opposite; blades lanceolate to oblong-lanceolate, 8-13 × 3-4 cm, apex acute to shortly acuminate, base acute, coriaceous, yellowish brown when dry, glabrous above, sparsely strigose on nerves beneath, lateral nerves 3-6 pairs; petioles 4-5 mm long, sparsely strigose; stipules small, triangular, 3-4 mm long, sparsely strigose. Inflorescence, axillary cymes; bracts absent. Flowers 3-5 mm diameter, white-yellowish, sessile, small, crowded. Calyx tube obconical, 1.5-2.0 mm long, constricted at throat, minutely strigose, limb hemispherical, shortly 4-toothed or truncate, c. 1 mm long. Corolla tube about 3 mm long, hirsute or glabrous outside, lobes c. 2 mm long. Berries ovoid or ellipsoid, 5-8 mm diameter, blue-purple, glabrous, with a constricted base, crowned with cupular calyx-limbs. Seeds 2-4, furrowed on abaxial face. *Flowering & fruiting*: July-November.

Ecology: Mixed evergreen and hilly forests, along rivers and streams; up to 1000 m altitude.

Distribution: Myanmar, Thailand, Malaysia and Indonesia.

Specimens examined: **Bandarban:** Matamuhuri Forest, Alikadam, 28 xi 2017, Sahidul & Rashed, MSI 6429 (DACB). **Cox's Bazar**: Shilkhali, Teknaf, 18 ix 2017, Niyamul *et al*., NK 5718 (DACB).

Ophiorrhiza succirubra King *ex* Hook.f., Fl. Brit. India 3: 82. 1880. (**Fig. 65**)

Herbs to under shrubs, up to 60 cm tall, usually red on drying. Leaves in subequal pairs, lanceolate-elliptic, ovate-elliptic or elliptic-oblong, 5-20 × 2.5-8.0 cm; petiole 0.5-2.0 cm, stipules caducous. Inflorescence congested-cymose, many flowered, often pendulous later becoming erect, peduncle 1-3 cm long. Calyx glabrous to puberulent or densely pilosulous, hypanthium submitriform, 5-10-ribbed, lobes usually slightly unequal, with 1 gland in each sinus. Corolla pink or white, tubular-funnel form, swollen at base, glabrous outside, tube glabrous or villous inside, lobes ovate, dorsally narrowly keeled. Capsules mitriform, glabrous to puberulent or pilosulous. *Flowering & fruiting:* July-October.

Ecology: Moist shady places.

Distribution: Bhutan, China, India, Myanmar and Nepal.

Specimen examined: **Khagrachari**: Micechhari Forest, Mohalchhari, 10 vii 2017, Kowser *et al*., KH 5834 (DACB).

Uncaria cordata (Lour.) Merr., Interpr. Herb. Amboin. 479. 1917. (**Fig. 66**)

Restiaria cordata Lour., Fl. Cochinch. 639. 1790.

Uncaria grandifolia Baker, Bull. Misc. Inform. Kew 1896: 23. 1896.

Uncaria speciosa Wall. *ex* G.Don, Gen. Hist. 3: 471. 1834.

Uncaria sclerophylla (Hunter) Roxb., Fl. Ind. 2: 130. 1824.

Slender, woody climbers, upto 10 m long. Stems square, densely hairy; woody hooks present at axils of leaf pairs. Leaves opposite, leaf-blades leathery, elliptic to ovate, apex acute, 8-17 × 6-10 cm, lateral nerves 8-11 pairs; petioles 1.0-1.2 cm long; stipules bifid to about half length, narrowly to broadly ovate, about 15 mm long. Infloresences axillary head, 4-5 cm diameter, on short hooked stalks which later form the climbing hooks. Peduncles 5-7 cm long; bracts 10-13 mm long, densely hairs. Pedicels 9-10 mm long. Calyx tube 6-8 mm long; lobes 1.5-2.0 mm long with a pair of glands at the base. Epicalyx lobes much smaller. Corolla tube 10-12 mm long, hairy; lobes 2-4 mm long. Anthers sessile. Style 18-20 mm long; stigma clavate, 2 mm long. Capsules

spindle-shaped, 13-15 × 4-5 mm, ridged, hairy, split open and expose many small seeds, fruiting pedicels 20-25 mm long. Seeds 0.3 mm diam., with filiform wing. *Flowering & fruiting:* Throughout the year.

Ecology: Open places and edges of inland forests or swamp forest; up to 500 m altitudes.

Distribution: Indo-China through to New Guinea.

Specimens examined: **Bandarban**: Naikhongchhari Forest Range, 20 ii 2017, Imam *et al*., IH 4262 (DACB). **Cox's Bazar**: Kudum Guha, Teknaf, 10 x 2017, Niyamul *et al*., NK 5980 (DACB); Kudum Guha, Teknaf, 18 xii 2017, Niyamul *et al*., NK 6663 (DACB).

FAMILY**: SABIACEAE**

Meliosma rhoifolia Maxim., Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg. 6: 262. 1868. (**Fig. 67**)

Medium-sized, evergreen trees. Leaves odd pinnate, axis pilose abaxially; petiolules about 1 cm long; leaflets 11-15, narrowly ovate, ovate-lanceolate, or oblong-elliptic, 5-15 × 2-4 cm, base rounded or cuneate, apex acuminate or caudate-acuminate, margins sparsely spinose-serrulate or entire, leathery, lower surface gray or pale green, upper surface dark green, both surfaces glabrous, lateral nerves 6-13 pairs, slightly ascending, anastomosing 2-5 mm from margin. Inflorescence terminal or axillary panicle, 15-25 cm long, ferruginous pubescent, turning glabrescent, 3 or 4 times branched, axis triangular, lateral branches flat. Pedicel short. Sepals 5, ovate, 0.8-1.0 mm long, outer ones narrower, ciliate. Petals white, outer 3 flat-orbicular, 1.8-2.0 × 2.0-2.2 mm; 2 inner ones about half as long as filaments, bifid, lobes fringed. Fertile stamens 1.3-1.5 mm long. Disk shallowly cup-shaped, 5-toothed. Pistil 1.5-1.7 mm long; ovary pubescent; style slightly longer than ovary. Drupe subglobose, 4-6 mm in diameter; midrib slightly prominent. *Flowering & fruiting:* May-October.

Ecology: Rare in evergreen forests; between 500-1000 m altitudes.

Distribution: China and Japan.

Specimen(s) examined: **Khagrachari**: Achalong Reserve Forest, Matiranga, 22 v 2017, Kowser *et al*., KH 5059 (DACB). **Rangamati**: Fringkheong Forest Beat, Kaptai, 03 viii 2010, Sarder Nasir Uddin N4344 (DACB).

FAMILY**: SAPOTACEAE**

Xantolis assamica (Clarke) van Royen, Blumea 8: 230. 1957. (**Fig. 68**)

Sideroxylon assamicum Clarke in Hook.f., Fl. Brit. India 3: 537. 1882.

Planchonella assamica (Clarke) Pierre, Not. Bot. Sapot.: 36. 1890.

Sideroxylon tomentosum Wall., Cat. 4153. 1828.

Pouteria assamica (Clarke) Baehni 364. 1942.

Planchonella assamica (Clarke) Fletch., Kew Bull. 1937, 327. 1938.

Trees. Branchlets terete or angular, yellowish or ferruginously villous. Leaves ovate, elliptic or broadly lanceolate, 6-16 × 2-7 cm, apex acute or acuminate, base broadly cuneate or shortly decurrent; chartaceous, glabrous, brownish villous below, secondary nerves 9-15; petioles 5-15 mm long, canaliculate, yellowish tomentose. Flowers dull white, in few-flowered clusters, pendulous; pedicels angular, 4-7 mm long, yellowish tomentose. Sepals oblong-lanceolate, 4-5 × 1- 2 mm, apex acute, densely brownish tomentose, sericeous within. Corolla 4-8 mm long, lobes lanceolate, 3-4 × 1.0-1.5 mm, obtuse or truncate at apex. Stamens 2.5-4.5 mm long, filaments subulate, 1.0-1.5 mm long, anthers sagittate, 2.0-2.5 mm long, apex mucronate. Staminodes

lanceolate, 2.5-3.5 mm long, apex long aristate. Ovary ovoid-globose, 1-2 mm diameter, 5-lobed, yellowish pilose; style subulate, 8-10 mm long. Fruits ellipsoid or ovoid, 2-3 × 0.8-1.5 cm, 1 or 2-seeded, crowned by remnant of the style, yellowish or ferruginously villous, pericarp fleshy. Seeds ellipsoid, 10-12 × 3-4 × 2-3 cm, acute at either end. *Flowering & fruiting*: January-May.

Ecology: Evergreen Forests at low altitudes.

Distribution: India.

Use: Wood is suitable for house posts, cabinet making and turnery works.

Specimen examined: **Chittagong**: Hazarikhil Wildlife Sanctuary, Fatikchari, 15 iv 2017, Tajul *et al*., TAK 3984 (DACB).

FAMILY**: URTICACEAE**

Elatostema platyphyllum Wedd., Arch. Mus. Hist. Nat. 9: 301. 1856. (**Fig. 69**)

Local name: *Failajhara*

Dioecious undershrubs, 80-140 cm tall, glabrous. Stems erect, branched. Leaves alternate; stipules lanceolate; petiole 2-5 mm long; leaf blade obliquely elliptic or narrowly elliptic, 15-30 × 5-10 cm, base with broader half auriculate, margin denticulate, apex acuminate, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base. Male inflorescences solitary or in pairs, simple, 10-25 × 5-15 mm; peduncle 0.5-1.0 mm long; receptacle nearly papilionaceous, 10-25 × 5-16 mm; bracts narrowly ovate; bracteoles spatulate-oblong. Female inflorescences solitary, nearly oblong, 5-7 × 2-5 mm; peduncle 5 mm long; receptacle 5-7 × 2-5 mm; bracts narrowly ovate; bracteoles spatulate. Male flowers 4-merous. *Flowering & fruiting*: Throughout the year.

Ecology: Rare in evergreen hilly forests, shaded areas along streamsides; between 500-1000 m altitude.

Distribution: Bhutan, China, India, Japan, Nepal and Philippines.

Specimens examined: **Bandarban**: Tankaboti Forest Range, Bandarban Sadar, 28 xii 2016, Imam *et al*., IH 2773 (DACB); Lama Forest, Lama, 3 iv 2017, Imam *et al*., IH 5206 (DACB). **Chittagong**: Hazarikhil, Fatikchari, 03 iii 2017, Md. Mannan, MM 44 (DACB). **Khagrachari**: Michchari Reserve Forest, Mahalchari, 11 vii 2017, Kowser *et al*., KH 5859 (DACB). **Rangamati**: Mora Alikhiong, Bilaichhari, 9 iii 2017, Joyanta *et al*., JCR 4403 (DACB).

FAMILY**: VITACEAE**

Cissus hastata Miq., Fl. Ned. Ind., Eerste Bijv. 517. 1861. (**Fig. 70**)

Vitis hastata (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 85. 1863.

Vitis glaberrima Wall. in Roxb., Fl. Ind. 2: 476. 1824.

English name: White-stemmed Button Vine

Weak, herbaceous climbers. Stems sub-compressed, 4-angled and slightly winged glaucous; bark dark when dry; tendrils slender, forked. Leaves ovate-lanceolate, 5-10 × 3-5 cm, base broadly sagittate-cordate, sub-hastate or sub-truncate, apex attenuated to acute, margins minutely and remotely bristle-serrate-crenulate; main nerves 4 or 5 pairs, faint, spreading, lower branching outward; petiole 1.5-2.0 cm long. Inflorescence of small, umbellate cymes, 7-15 mm diameter; peduncle 1-2 cm long. Flowers 4-merous; pedicels 2-3 mm long. Calyx saucer-shaped, subtruncate. Petals oblong-ovate, 1-2 × 1.0-1.2 mm, acute, slightly hooded. Stamens 1.2-1.5 mm long; anthers oblong. Disc 4-lobed, enclosing ovary. Ovary 0.9-1.2 mm across; style stout; stigma minute. Berry obovoid, 2-seeded, 3-4 mm diameter. Seeds obtriangular; 5-7 × 4-5 mm, adaxial side with a

longitudinal ridge and a linear shallow groove on either side; abaxial side with 3 longitudinal ridges, transversely rugose. *Flowering & fruiting*: September-January.

Ecology: Hilly, broad-leaved primary forests; between 300-900 m altitudes.

Distribution: From India to Indo-China, Thailand, throughout South-East Asia to the east coast of Australia.

Specimen(s) examined: **Bandarban:** Rowangchhari Forest, 06 xi 2017, Sahidul & Rashed, MSI 6147 (DACB).

FAMILY**: ZINGIBERACEAE**

Globba wengeri (C.E.C.Fisch.) K.J.Williams, Amer. J. Bot. 91: 114. 2004. (**Fig. 71**)

Mantisia wengeri C.E.C. Fisch., Bull. Misc. Inform. Kew 1931: 283. 1931.

English name: Broad winged Swan Flower

Rhizomatous, perennial herbs. Leafy shoot 30-35 cm high, green, swollen at base; sheaths 10-15 cm broad at base. Leaves simple, alternate, broadly lanceolate, 5-17 × 1.5-3.0 cm, subsessile, base cuneate, apex caudate, margin entire, glabrous; midrib prominent with 8-15 parallel nerves; ligules 1-3 mm long, green with ciliate margin. Panicles 25-35 cm long, arise before leaves; bracts lanceolate, 5-7 × 2-3 mm, apex acute, deciduous. Flowers 4-5 cm long, orange-yellow. Calyx infundibuliform, 0.5-1.0 × 0.2-0.3 cm, glabrous, yellow; teeth minute, tridendate. Corolla tube c. 1.5 cm long, slender, 3-lobed; lobes subequal, 6-8 × c. 3 mm, orange-yellow. Staminodes 2, spread out arm-like, subequal, 3-5 × 1-2 mm, petaloid, orange-yellow with deflexed lip; labellum narrow, shallowly bifid, glabrous, orange-yellow with reddish brown spots at throat; anther 2-celled, oblong, c. 2 mm long, nearly acute at apex, pale-yellow, dorsifixed. Ovary unilocular; ovules many on parietal placenta; style linear, 2.0-2.5 cm long, glabrous, white; stigma cupular with ciliate mouth; nectar glands linear, 4-5 mm long. Infructescence 6-7 cm long, dark maroon at base with persistent calyx. Capsules globose, 7-10 mm in diameter, warted. Seeds numerous, brownish red, arillate, faintly ciliate at margin; aril black. *Flowering & fruiting*: July-October.

Ecology: Rock faces near streams, in shady and wet places.

Distribution: India (Assam) to Myanmar.

Use: Rhizomes used to treat bone fracture and gastro-intestinal disorder.

Specimens examined: **Bandarban:** Poly Forest, Ruma, 14 xi 2017, Sahidul & Rashed, MSI 6295 (DACB).

Hemiorchis burmanica Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42(2): 108. 1873. **(Fig. 72)**

Perennial, rarely annual herbs, rhizome stout, creeping, white, hypogynous. Leaves few, oblong, acute. Inflorescence spike, peduncle with spike 15-30 cm long, spike dense upwards, very pubescent. Flowers with bracts small, lanceolate, deciduous, calyx funnel-shaped, very pubescent, reddish-brown, c 0.8 cm long, cleft below the middle, corolla-lobes reddish-brown, staminodes about 1.2 cm long, greenish-white, lip whitish, minutely dotted with red-brown. Stamen half as long as the corolla-segments. Fruit a capsule, globose, 10-grooved, crowned by the persistent acute calyx-lobes. *Flowering & fruiting*: September-December.

Ecology: Shady forest floors of broad-leaves evergreen forests; up to 500 m altitude.

Distribution: Myanmar.

Specimen examined: **Rangamati**: Simanachari, Sitapahar, Kaptai, 13 v 2010, Sarder Nasir Uddin, N4313 (DACB).

Figs 65-72. 65: *Ophiorrhiza succirubra* King, 66: *Uncaria cordata* (Lour.) Merr., 67: *Meliosma rhoifolia* Maxim., 68: *Xantolis assamica* (Clarke) van Royen, 69: *Elatostema platyphyllum* Wedd., 70: *Cissus hastata* Miq., 71: *Globba wengeri* K.J.Williams, 72: *Hemiorchis burmanica* Kurz.

Discussion

This study added seventy three new and rare plants to the flora of Bangladesh. The significance of such taxonomic research is the detection of novel additions to a floristic region, which subsequently improve our understanding of plant biogeography as well as species diversity of the country. Floristic survey and diversity assessments at regional levels are essential to understand the present diversity status and conservation of forest biodiversity. The purpose of the survey was to gather data on the floristic and ecological diversity of Chittagong and the Chittagong Hill Tracts, which can be used by the academician, forests managers, conservationists, natural scientists, ecologists and policy makers for the sustainable management of the biodiversity of the areas.

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References

Alam, M.K. 1988. Annotated checklist of the woody flora of Sylhet forests. Bulletin 5, Plant Taxonomy Series. Forest Research Institute, Chittagong, pp. 1-153.

Alam, M.K. 2007. Commelinaceae. In: Siddiqui, K,U., Islam, M.A., Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A., Khondker, M., Rahman, M.M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A., Rahman, A.K.A. & Haque, E.U. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, Vol.-11. Asiatic Society of Bangladesh, Dhaka. pp. 142-162.

Alam, M.S., Hassan, M.A. & Uddin, M.Z. 2006. A preliminary checklist of the angiospermic flora of Ghagotia union under Kapasia upazila in Gazipur district, Bangladesh. *Bangladesh J. Plant Taxon.* 13(2): 155-170.

Anonymous. 1960. Working Plan of the Chittagong Hill Tracts North and South Forest Division for the period from 1953-54 to 1972-73, vol. 2. Working Plan Division, Forest Department, the Government of East Pakistan.

Arefin, M.K., Rahman, M.M., Uddin, M.Z., and Hassan, M.A. 2010. Angiosperm flora of Satchari National Park, Habiganj, Bangladesh. *Bangladesh J. Plant Taxon.* 18 (2): 117-140.

Bingtao, L., Gilbert, M.G., and Schatz, G. 2011. Annonaceae & Euphorbiaceae. In: Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.). *Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae)*. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. pp. 180, 687-688.

Choudhury, J.K., Biswas, S.R., Islam, M.S., Rahman, O. and Uddin, S.N. 2004. Biodiversity of Dulahazara Safari Park, Cox's Bazar. IUCN, Bangladesh. pp. 1-30.

Cowan, A.M. and Cowan, J.M. 1929. The trees of Northern Bengal-Including shrubs, woody climbers, bamboos, palms and tree ferns. Bengal Secretariat Book Depot., Calcutta. pp. 1-178

Cowan, J.M. 1926. The flora of Chakaria Sundarbans. *Rec. Bot. Survey India* 11 (2): 119-125.

Cuizhi, G., Tsuechih, K., Peng, C. and Turland, N.J. 2007. Begoniaceae. Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.). *Flora of China. Vol. 13 (Clusiaceae through Araliaceae)*. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. p. 153.

Das, D.K. & Alam, M.K. 2001. Trees of Bangladesh. Bangladesh Forest Research Institute, Chittagong. pp. 1-342.

Datta, R.M. and Mitra, J.N. 1953. Common plants in and around Dacca city. *Bull. Bot. Soc. Beng.* **7**(1&2): 1-110.

Habib, M.A. 2009. Malpighiaceae. In: Ahmed, Z.U., Hassan, M.A., Begum, Z.N.T., Khondker, M., Kabir, S.M.H., Ahmed, M. & Ahmed, A.T.A. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, Vol. 9. Asiatic Society of Bangladesh, Dhaka. pp. 9-16.

Heinig, R.L. 1925. List of Plants of Chittagong Hill Tracts. The Bengal Government Branch Press, Darjeeling, pp. 1-84.

Hooker, J.D. 1872-1897. The Flora of British India, Vol.1-7. Bishen Singh Mahendra Pal Singh, Dehra Dun, India.

Huq, A.M. & Begum, M. 1984. An annotated list of climbers of Dacca. Bangladesh National Herbarium, BARC, Dhaka. pp. 1-7.

Huq, A.M. 1988. A preliminary taxonomic report on the angiospermic flora of Hatia Island, Noakhali district. Bull. Bangladesh National Herbarium, no. 1.

Islam, M.R., Uddin, M.Z. & Hassan, M.A. 2009. An assessment of the angiospermic flora of Ramgarh upazila of Khagrachari district, Bangladesh. *Bangladesh J. Plant Taxon.* 16(2): 115-140.

Kanjilal, U.N., Das, A., Kanjilal, P.C. & De, R.N. 1939 (Reprint 1982). Flora of Assam, vol. 3. A Von Book Company, Delhi, India. pp. 1-578.

Kanjilal, U.N., Kanjilal, P.C. & Das, A. 1934 (Reprint 1982). Flora of Assam, vol. 1. A Von Book Company, Delhi, India. pp. 1-386.

Kanjilal, U.N., Kanjilal, P.C. & Das, A. 1938 (Reprint. 1982). Flora of Assam, vol. 2. A Von Book Company, Delhi, India. pp. 1-409.

Kanjilal, U.N., Kanjilal, P.C., De, R.N. & Das, A. 1940 (Reprint 1982). Flora of Assam, vol. 4. A Von Book Company, Delhi, India. pp. 1-377.

Khan, M.S. and Banu, F. 1972. A taxonomic report on the angiospermic flora of Chittagong Hill Tracts-2. J. Asia. Soc. Bangladesh 17(2): 59-88.

Khan, M.S. and Hassan, M.A. 1984. A taxonomic report on the angiospermic flora of St. Martin's Island. Dhaka Univ. Stud. B. 32(1): 71-84.

Khan, M.S. and Huq, A.M. 2001. The vascular flora of Chunati Wildlife Sanctuary in south Chittagong, Bangladesh. *Bangladesh J. Plant. Taxon.* 8(1): 47-64.

Khan, M.S., Rahman, M.M., Huq. A.M., Mia. M.M.K. & Hassan, M.A. 1994. Assessment of Biodiversity of Teknaf Game Reserve in Bangladesh focussing on economically and ecologically important plant species. *Bangladesh J. Plant Taxon.* 1 (1): 21-33.

Khanam, B.M.R. and Afroz, S. 2008. Begoniaceae. In: Ahmed, Z.U., Hassan, M.A., Begum, Z.N.T., Khondker, M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A., Rahman, A.K.A. & Haque, E.U. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, vol.-7. Asiatic Society of Bangladesh, Dhaka. pp. 7-13.

Khanam, M. and Rahman, M.M. 2008. Mitrephora. In: Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A., Khondker, M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A., Rahman, A.K.A. & Haque, E.U. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, Vol.-6. Asiatic Society of Bangladesh, Dhaka. pp. 142-144.

Kurz, S. 1877 (Reprint 1974). Forest Flora of British Burma, Vol. 1 & 2. Bishen Singh Mahendra Pal Singh and Periodical Experts, India. pp. 1-549.

Liu, Q and Funston, M. 2008. Celastraceae. In: Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.). *Flora of China. Vol. 11 (Oxalidaceae through Aceraceae).* Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. p. 477.

Meyer, A.E. 2000. Commelinaceae. In: Wu, Z.Y. and Raven, P.H. (eds.). *Flora of China. Vol. 24 (Flagellariaceae through Marantaceae).* Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. p. 32.

Mia, M.M.K. & Huq, A.M. 1988. A preliminary ethnobotanical survey in the Jointiapur, Tamabil and Jaflong area, Sylhet. Bull. 3, pp. 1-10. Bangladesh National Herbarium, Dhaka.

Mia, M.M.K. & Huq, A.M. 2009. Lauraceae. Ahmed, Z.U., Hassan, M.A., Begum, Z.N.T., Khondker, M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A. & Rahman, A.K.A. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, Vol.-8. *Asiatic Society of Bangladesh*, Dhaka. pp. 332-364.

Mia, M.M.K. and Khan, B. 1995. First list of angiospermic taxa of Bangladesh not included in Hooker's Flora of British India and Prain's Bengal Plants. *Bangladesh J. Plant Taxon.* 2(1&2): 24-45.

Prain, D. 1903 (Reprint ed. 1963). Bengal Plants. Vol. 1 & 2. Botanical Survey of India, Calcutta.

Rahman, M.A. and Uddin, S.B. 1997. Angiospermic flora of Sitakund in Chittagong, Bangladesh. *Bangladesh J. Plant Taxon*. 4(I): 17-36.

Rahman, M.O. 2004a. Second list of angiospermic taxa not included in Hooker's 'Flora of British India' and Prain's 'Bengal Plants'-Series I. *Bangladesh J. Plant Taxon*. 1l(I): 77-82

Rahman, M.O. 2004b. Second list of angiospermic taxa not included in Hooker's 'Flora of British India' and Prain's 'Bengal Plants'-Series II. *Bangladesh J. Plant Taxon.* 11(2): 49-56.

Rahman, M.O. 2008. Phyllanthus. In: Ahmed, Z.U., Hassan, M.A., Begum, Z.N.T., Khondker, M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A., Rahman, A.K.A. & Haque, E.U. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, Vol. 7. *Asiatic Society of Bangladesh*, Dhaka. pp. 463-473.

Rahman, M.O. and Hassan, M.A. 1995. Angiospermic flora of Bhawal National Park, Gazipur, Bangladesh. *Bangladesh J. Plant Taxon.* 2(1&2): 47-79.

Raizada, M.B. 1941. On the Flora of Chittagong. *Indian Forester* 67(5): 245-254.

Rashid, S.H. and Mia, M.M.K. 2001. Angiosperm flora of Madhupur National Park, Tangail, Bangladesh. Bangladesh J. Plant Taxon. 8 (2): 63-82.

Shukun, C. and Funston, A.M. 2008. Malpighiaceae. In: Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.). *Flora of China. Vol. 11 (Oxalidaceae through Aceraceae)*. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. p. 132.

Sinclair, J. 1956. Flora of Cox's Bazar, East Pakistan. *Bull. Bot. Soc. Beng.* 9(2): 84-116.

Tutul, E., Uddin, M.Z., Rahman, M.O. & Hassan, M.A. 2009. Angiospermic flora of Runctia sal forest, Bangladesh-1. Liliopsida (Monocots). *Bangladesh J. Plant Taxon*. 16(1): 83-90.

Tutul, E., Uddin, M.Z., Rahman, M.O. & Hassan, M.A. 2010. Angiospermic flora of Runctia sal forest, Bangladesh-II. Magnoliopsida (Dicots). *Bangladesh J. Plant Taxon*. 17(1): 33-53.

Uddin, M.Z. and M.A. Hassan 2004. Flora of Rema-Kalenga Wildlife Sanctuary. IUCN Bangladesh Country Office, Dhaka, Bangladesh. pp.120

Uddin, M.Z. and M.A. Hassan 2010. Angiosperm diversity of Lawachara National Park (Bangladesh): a preliminary assessment. Bangladesh J. Plant Taxon. 17(1): 9-22.

Uddin, M.Z., M.A. Hassan and M.M. Hosen. 2005. A checklist of angiospermic flora of Lalmai Hills, Comilla, Bangladesh. *Bangladesh J. plant Taxon.*12(2): 85-96.

Uddin, S.B. and Rahman, M.A. 1999. Angiospermic flora of Himchari National Park, Cox's Bazar. *Bangladesh J. Plant Taxon.* 6(1): 31-68.

Uddin, S.N. 2008. Celastraceae. In: Ahmed, Z.U., Hassan, M.A., Begum, Z.N.T., Khondker, M., Kabir, S.M.H., Ahmed, M., Ahmed, A.T.A., Rahman, A.K.A. & Haque, E.U. (eds.). Encyclopedia of Flora and Fauna of Bangladesh, vol. 7. *Asiatic Society of Bangladesh*, Dhaka. pp. 187-199.

Uddin, S.N. 2012. Floristic studies on Rampahar and Sitapahar reserve forests, Rangamati, Bangladesh. The University of Dhaka, Dhaka. Ph.D. Thesis (unpublished). pp. 1-553.

Uddin, S.N., Khan, M.S., Hassan, M.A. and Alam, M.K. 1998. An annotated checklist of angiospermic flora of Sitapahar at Kaptai in Bangladesh. *Bangladesh J. Plant Taxon.* **5**(1): 13-46.

Xiwen, L., Hsi-wen, L., Jie, L., Puhua, H., Fa'nan, W., Hongbin, C. and van der Werff, H. 2008. Lauraceae. In: Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.). *Flora of China. Vol. 7(Menispermaceae through Capparaceae).* Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. p. 232.