



## Forty new additions to the angiospermic flora of Assam, India

H.A. Barbhuiya

Botanical Survey of India, Eastern Regional Centre, Shillong – 793003, India

(Received on: 29 November, 2014; accepted on: 26 December, 2014)

### ABSTRACT

Forty species are added to the angiospermic flora of Assam, India. For each species, taxonomic information such as accepted name and basionym, key features, phenology, material examined and distributional data have been provided.

**Key Words:** Assam, Bark Valley, new records, Angiosperm.

### INTRODUCTION

The state Assam is situated at the heart of North-East India which is also known as the North-Eastern corridor. Assam comprises the Brahmaputra and the Barak river valleys along with the Karbi Anglong and the North Cachar Hills. It was for the first time Francis Buchanan-Hamilton (1762-1829) an Assistant Surgeon of Bengal Service has started the survey on forests of lower Assam in 1808 (Bhuyan & Bhahadur 1940). Later Griffith (1836) had explored the Sadiya division of Upper Assam. King (1877) listed the plants found in both Bengal and Assam. However, the systematic collection of plants and floristic studies were mainly focused through the “*Flora of British India*” (Hooker 1875-1897) and “*Flora of Assam*” (Kanjilal *et al.* 1934-1940; Bor 1940). At present *ca.* 3895 species of angiospermic taxa known to occurring in the state Assam (Chowdhury 2005). Much study has been carried out on the flora of Assam in recent past but Barak Valley seems to have received very little attention in these works.

Barak Valley or Southern Assam is located between 24°08'–25°08' N and 92°12'–93°15' E. The valley covers an area of 6951 km<sup>2</sup> and is surrounded by N.C. Hill and Jaintia Hill in the north, on the east by the Manipur hills and on the south by the

Mizoram hills. To the west the plains merge with Sylhet Plains of Bangladesh and Indian state Tripura. At present the region is divided into three administrative districts namely Cachar, Karimganj and Hailakandi. The region comprises 12 Reserve Forests and 1 Wildlife Sanctuary comprising a total forest area of about 2339 km<sup>2</sup> *i.e., ca.* 34% of the total geographical area of the valley. The drainage system of southern Assam is fed by 18 major rivers and rivulets and Barak is the chief river which flows in east-west direction through the central part of the valley. The region experiences hot summers interspersed with rains and thunderstorms from May–Sept., while Dec.–Jan. have the lowest temperatures. Rainfall varies between 2500 and 4000 mm, with average of 143 rainy days per annum; temperature ranges from 7.5°C in winter to 40°C in summer and humidity of the region varies from 60% to 91%.

The vegetation of the region predominantly consists of tropical wet evergreen to tropical semi-evergreen forest types (Champion & Seth 1968). Dominant tree species in these forests are *Artocarpus lakoocha*, *Bauhinia acuminata*, *Carallia integerrima*, *Castanopsis lanceifolia*, *Chisocheton cumingianus*, *Dipterocarpus turbinatus*, *Duabanga grandiflora*, *Gmelina arborea*, *Mallotus roxburghianus*, *Microcos paniculata*, *Saurauia roxburghii*, *Schefflera venulosa*, *Schima wallichii*, *Syzygium cumini*, *Toona*

\*Corresponding author: hussainbsi@yahoo.com

*ciliata*, *Tetrameles nudiflora* and *Xerospermum glabratum*. Besides above, shrubs, lianas, ferns and herbaceous plants are common.

## MATERIAL AND METHODS

During field explorations 2010-2013 in Southern Assam, the author has collected the samples of Angiospermic taxa from different habitats. Herbarium specimens were prepared following standard herbarium techniques (Jain & Rao 1977). The taxonomic identification of prepared Herbarium specimens were done in consultation with regional floras (Hooker 1872-1898; Brandis 1906; Kanjilal *et al.* 1934-1940; Bor 1940; Deb 1981-1983; Haridasan & Rao 1985, 1987; Hajra & Verma 1996; Singh *et al.* 2000; Singh *et al.* 2002; Giri *et al.* 2008; Chowdhery *et al.* 2009), recent taxonomic revisions (Thothathri 1982; Hajra *et al.* 1995; Jagtap & Singh 1999) and contemporary monographs. Finally the identity of the specimen was confirmed after verification with authentic herbarium material deposited at ASSAM (Herbarium of Botanical Survey of India, Eastern Regional Centre, Shillong). Information regarding geographic distribution of the species were obtained from Khanna *et al.* (1999), Press *et al.* (2000), Singh *et al.* (2001), Krees *et al.* (2003), Karthikeyan *et al.* (2009), eFloras (2014), e-monocot (2014), Global Compositae Checklist (2014), ILDIS (2014) and Tropicos (2014).

While studying all previous herbarium collections made from the areas which were already housed at ASSAM, the author found few hitherto-unreported specimen records for the state Assam and the same are also included here. All herbarium materials studied have been seen and are deposited at ASSAM except asterisked specimens (living material) which were studied and photographed at the field only. Species are listed alphabetically in enumeration and their families are recognized according to APG III Classification.

## TAXONOMIC ENUMERATION

- Acmella uliginosa* (Sw.) Cass., Dict. Sci. Nat. (ed. 2) 24: 331. 1822. *Spilanthes uliginosa* Sw., Prodr. 110. 1788. [Asteraceae]

Annual herb, up to 50 cm high. Stem erect, moderately pilose. Leaf blade lanceolate, narrowly ovate to ovate, sparsely pilose on both surfaces, base cuneate, margin sinuate to dentate, apex acute to acuminate. Capitula radiate, solitary or 2 or 3, 4-6 mm in diam., terminal; peduncles 2-3 cm long pilose. Corolla yellow to orange yellow; disk florets 4-lobed;

ray florets conspicuous. Achenes black, moderately to densely ciliate.

*Fl. & Frt.*: March-September.

**Distribution:** India (Assam, West Bengal, Bihar, Uttar Pradesh, Himachal Pradesh, Tamil Nadu, Andaman & Nicobar Islands), throughout the tropics in Asia, Africa & America.

**Specimen examined:** Cachar, Hawaitang, November 1983, R.B. Majumdar 83900A.

- Alyxia gracilis* (Wall. ex A.DC.) Hook.f., Fl. Brit. India 3: 634. 1882. *Hunteria gracilis* Wall. ex A. DC., Prodr. 8: 350. 1844. [Apocynaceae]

Glabrous twining shrub. Leaves opposite in whorls of 3, blade elliptic oblong or lanceolate, caudate at apex; lateral nerves many, faint, parallel. Inflorescence panicle. Bracts small ovate. Calyx *ca.* 2 mm, ovate, acute. Corolla-tube *ca.* 5 mm; lobes obtuse as long as the tube. Fruit ellipsoid, *ca.* 2 cm long.

*Fl. & Frt.*: December-March.

**Distribution:** India (Assam, Meghalaya, Sikkim, West Bengal), Bangladesh.

**Specimen examined:** Cachar, Bhuban Hill, *ca.* 2500ft., 02.12.1914, U.N. Kanjilal 4802.

- Andrographis ovata* (T.Anderson ex Bedd.) Benth. & Hook.f., Gen. Pl. 2: 1100. 1876. *Gymnostachyum ovatum* T. Anderson ex Bedd., Icon. Pl. Ind. Or. 1: 60. 1874. [Acanthaceae]

Annual herb, 15-25 cm high. Stem glandular-hirsute, quadrangular. Leaves ovate, shortly attenuated into the petiole. Racemes axillary and terminal, 3-10 cm long. Corolla *ca.* 8 mm, tube curved, obscurely 2-lipped. Filaments much dilated, thinly hairy. Capsule *ca.* 2 × 0.8 cm, compressed. Seeds 8-10 subquadrate, rugose

*Fl. & Frt.*: August-November.

**Distribution:** India (Assam, West Bengal, Andhra Pradesh, Tamil Nadu), Thailand.

**Specimen examined:** Cachar, Didarkush IB, 12.09.1978, R. B. Majumdar 73237.

- Arenga westerhoutii* Griff., Calcutta J. Nat. Hist. 5: 474. 1845. [Aracaceae]

Tree, up to 12 m tall. Stems solitary *ca.* 60 cm in diam. Leaf petioles 1-1.5 m; rachis 3-4 m long; pinnae 80-150 per side of rachis, linear, with ears at bases, regularly arranged and spreading in same plane except for basal few pinnae; middle pinnae to 130 cm. Inflorescences solitary at each node, upto 3 m long; male rachillae to 60 cm long; male flowers 2-

2.5 cm; sepals 4-6 mm; petals *ca.* 2 cm; stamens numerous. Fruits greenish black, globose, to 7 cm in diam.

*Fl. & Frt.:* June-September.

*Distribution:* India (Assam, Manipur), Myanmar, China, Thailand, Laos, Cambodia, Vietnam, Malaysia.

*Specimen examined:* Cachar, Borail Wildlife Sanctuary, East Block, Nimatripahar, 17.07.2011, *H. A. Barbhuiya* 684.

**5. *Benstonea humilis*** (Lour.) Callm. & Buerki, *Candollea* 67(2): 335. 2012. *Pandanus humilis* Lour., *Fl. Cochinch.* 603. 1790. [Pandanaeae]

Small shrub. Leaves narrowly linear, to 60-75 × 0.8-1.1 cm, margin sparsely spinose, midrib abaxially spinose at the base only. Inflorescence terminal. Staminate flower reduced to one stamen, free or very slightly joined at the base. Carpels free, forming one-seeded drupes; stigmas positioned on abaxial side of the style, sharp, linear.

*Fl. & Frt.:* April-August.

*Distribution:* India (Assam, Meghalaya), Bangladesh, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia.

*Specimen examined:* Cachar, Borail Wildlife Sanctuary, West Block, Kalain Range, Kalaincherra, 27.08.2012, *H.A. Barbhuiya* 956.

**6. *Cautleya gracilis*** (Sm.) Dandy, *J. Bot.* 70(12): 328. 1932. *Roscoea gracilis* Sm., *Trans. Linn. Soc. London* 13: 460. 1822. [Zingiberaceae]

Perennial herb. Pseudostems, slender, *ca.* 60 cm high. Leaves sessile, blade lanceolate or oblong-lanceolate, glabrous, base rounded or attenuate, apex caudate-acuminate. Spikes laxly 2-10 flowered; bracts green, lanceolate, shorter than calyx. Calyx purple-red, deeply split on one side, apex minutely toothed. Corolla lobes bright yellow, lanceolate. Lateral staminodes erect, petaloid. Labellum obovate, equaling corolla lobes, apically 2-cleft to below middle. Capsule red, globose, *ca.* 8 mm in diam.

*Fl. & Frt.:* June-September.

*Distribution:* India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Jammu & Kashmir) Bhutan, Nepal, China, Myanmar, Thailand, Vietnam.

*Specimen examined:* Cachar, Bhuban Hill, October 1978, *R. B. Majumdar* 73001.

**7. *Cleome houtteana*** Schltldl., *Linnaea* 24: 669. 1851. [Cleomeaeae]

Annual herb. Stems branched, glandular pubescent. Leaflets 5-7, leaflet blades elliptic to oblanceolate, margin serrulate-denticulate. Inflorescence *ca.* 30 cm long. Pedicel glandular pubescent. Sepals green, linear-lanceolate. Petals pink oblong to ovate clawed. Stamens purple. Capsule 4.5-9 cm long and *ca.* 3 mm thick.

*Fl. & Frt.:* August-February.

*Distribution:* India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Tripura), China, S.E. Asia, Argentina, Brazil, Colombia, Ecuador, Nicaragua, Paraguay, South Africa, United States, Venezuela.

*Specimen examined:* Cachar, Lakhipur, 04.04.1940, *R.N. De* 19262; Silchar, April 1937, *N.L. Bor* 13955; Karimganj, Duhalia R.F., 10.03.2006, *P.S. Das s.n.*

*Note:* This species is native of South America and is being naturalized in India.

**8. *Colocasia fallax*** Schott, *Bonplandia* 7: 28. 1859. [Araceae]

Small stoloniferous, glabrous herb. Rhizome erect; stolons pale green. Leaves petiolate, green, blade paler or slightly glaucous abaxially, green or with dark patches between primary veins adaxially, cordate-peltate, ovate-cordate. Inflorescence 1-5 together; peduncle green, cylindric. Spathes pale green or somewhat purplish or purplish brown. Spadix shorter than spathe; female and male zones separated by a zone of synandroses.

*Fl. & Frt.:* March-October.

*Distribution:* India (Assam, Manipur, Meghalaya, Mizoram, Tripura, Sikkim, Bihar), Bangladesh, Bhutan, Nepal, China, Myanmar, Thailand, Vietnam.

*Specimen examined:* Cachar, Borail Wildlife Sanctuary, West Block, Near Sindhuri, 10.09.2010, *H.A. Barbhuiya* 32, 56, 128.

**9. *Crawfordia campanulacea*** Wall. & Griff. ex C.B. Clarke in *Hook.f.*, *Fl. Brit. India*, 4: 106. 1883. [Gentianaceae]

Twining herb. Leaves elliptic, ovate, or broadly ovate, base rounded to truncate, margin crenulate, apex acuminate to caudate. Inflorescence cyme. Calyx tubular, tube *ca.* 1.5 cm, lobes ovate, 5-10 × 5-6 mm, connate at base into a cupular limb. Corolla blue to purple, campanulate, 4-5 cm, lobes *ca.* 5 mm, apex acute. Fruit ellipsoid to obovoid, *ca.* 2.5 cm long.

*Fl. & Frt.:* October-December.

*Distribution:* India (Assam, Meghalaya), China.

*Specimen examined:* Cachar, Barak River Bank, 20.12.1885, *Gustav Mann s.n.*

- 10. *Cyclocodon parviflorus*** (Wall. ex A.DC.) Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 2: 18. 1858. *Codonopsis parviflora* Wall. ex A.DC., Monogr. Campan. 123. 1830. [Campanulaceae]

Annual herb, upto 1 m high. Leaves shortly petiolate, base lanceolate, those on branches smaller, both surfaces glabrous, base cuneate, apex acuminate, margin serrate, teeth apiculate at apex. Flowers terminal. Calyx entirely free from ovary 4-lobed. Corolla white, lobes equaling tube. Stamens 4. Ovary globose, 4-locular; stigma 4-fid. Fruit globose ca. 5 mm in diam., whitish.

*Fl. & Frt.:* September-January.

**Distribution:** India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, West Bengal), Bangladesh, Bhutan, China, Myanmar, Laos.

**Specimen examined:** Cachar, Barak R.F., Bhuban Hill, 22.12.2012, H.A. Barbhuiya s.n.\*

- 11. *Derris pseudorobusta*** Thoth., Bull. Bot. Surv. India 3: 181. 1962. [Fabaceae]

A scandent shrub. Leaves alternate, imparipinnate; leaflets up to 15, minutely puberulous. Inflorescence a raceme with nodes slightly produced into stalks. Pod oblong, silky, flat, stap-shaped, distinctly winged on the upper suture only, base narrow, apex curved and pointed, 3-8 seeded.

*Fl. & Frt.:* May-August.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya) Endemic.

**Specimen examined:** Cachar, October 1978, R.B. Majumdar 73157.

- 12. *Elaeocarpus prunifolius*** Wall. ex Müll. Berol., Annot. Elaeocarp. 15. 1849. [Elaeocarpaceae]

Tree 10-15 m tall. Leaves oblong-lanceolate to elliptic-lanceolate, cuneate at base, acute to acuminate at apex, margin serrate or subentire. Flower in axillary racemes, silky pubescent, 5-10 mm across. Sepals oblong-lanceolate. Petal ca. 1 cm long, broader towards base, narrowed towards apex. Stamens 15-30, minutely puberulous; anthers awned. Drupe oblong-ovoid.

*Fl. & Frt.:* January-October.

**Distribution:** India (Assam, Manipur, Meghalaya, Mizoram, Tripura, West Bengal), Bangladesh, Myanmar.

**Specimen examined:** Cachar, Loharbond, 05.02.1941, R.N. De 20454.

- 13. *Eranthemum strictum*** Colebr. ex Roxb., Fl. Ind. 1: 114. 1820. [Acanthaceae]

Annual herb ca. 50 cm high. Leaves ovate or elliptic narrowed at both ends, glabrous, subentire. Spikes 7-20 cm, hairy or nearly glabrous. Bracts 1.3-2.5 cm, 1-flowered; bracteoles ca. 5 mm, linear-lanceolate. Calyx ca. 5 mm, divided up to half; lobes lanceolate. Corolla often pubescent.

*Fl. & Frt.:* October-March.

**Distribution:** India (Assam, Meghalaya, Tripura), Bangladesh, Myanmar.

**Specimen examined:** Cachar, Barak R.F., Bhuban Hill, 22.12.2012, H.A. Barbhuiya s.n.\*; Karimganj, Longai R. F., 19.02.1941, R. N. De 20525.

- 14. *Globba orixensis*** Roxb., Asiat. Res. 11: 358. 1810. [Zingiberaceae]

Rhizomatous herb. Pseudostem upto 80 cm high. Leaves shortly petioled, lamina oblong to elliptic-lanceolate. Inflorescence central, panicle nearly erect ca. 30 cm long. Bracts small, deciduous. Flowers small, sessile, deep orange-yellow. Calyx greenish-yellow, 3-toothed. Corolla tube longer than calyx, slightly curved. Labellum obovate, base auriculate. Anther not winged; filament long, curved. Ovary unilocular with many ovules. Capsule 1-2 cm long, globose, verrucose.

*Fl. & Frt.:* August-October.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Tripura, Sikkim, Bihar, Orissa, Andhra Pradesh), Bangladesh, Myanmar.

**Specimen examined:** Cachar, December 1934, C.S. Purkayastha 10944; Barak R.F., Bhuban Hill, 03.06.2012, H. A. Barbhuiya 934.

- 15. *Gymnostachyum venustum*** (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 506. 1867. *Cryptophragmium venustum* Nees, Pl. Asiat. Rar. 3: 100. 1832. [Acanthaceae]

Herb, up to 75 cm high. Stem with few remote very small leaves. Radical leaves, elliptic-obovate, acute, decurrent on the petiole, entire or undulate-crenate, nearly glabrous; petiole broadly winged. Panicles terminal, trichotomously branched 20-60 cm or reduced to a single spike; flowers opposite, 1-3 together; bracts small, linear; bracteoles absent. Sepals 3-4 mm, linear, hairy. Corolla 2-3 cm, pubescent; limb deep purple or blueish. Anthers oblong, glabrous. Capsule linear ca. 2 cm; seeds ovoid, compressed.

*Fl. & Frt.*: April-December.

**Distribution:** India (Assam, Meghalaya), Bangladesh.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, West Block, Near Kalaincherra, 08.10.2011, *H. A. Barbhuiya* 714.

**16. *Indigofera atropurpurea*** Buch.-Ham. ex Hornem., Hort. Bot. Hafn. 152. 1819. [Fabaceae]

Shrub, 2-3 m high. Leaves 12-24 cm long; stipules caducous; leaflets opposite, ovate, 19-21. Racemes compact, 10-20 cm long, many-flowered, ebracteate. Floral bracts linear to ovate, 1-1.5 mm broad, gradually narrowed towards apex. Pedicel up to 2 mm long. Calyx hairy ca. 2.5 mm long. Corolla dark purple; standard elliptic, glabrous. Stamens 6-7 mm; anthers globose without hairs at base. Pod cylindrical 3-5 cm, glabrous.

*Fl. & Frt.*: August-November.

**Distribution:** India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, West Bengal, Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Haryana, Punjab), Bangladesh, Bhutan, Nepal, Pakistan, Afghanistan, China, Sri Lanka, Myanmar, Vietnam, Mauritius.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, West Block, Kalaincherra, 27.08.2012, *H.A. Barbhuiya* 957.

**17. *Isachne clarkei*** Hook.f., Fl. Brit. India 7: 24. 1896. [Poaceae]

Annual herb ca. 30 cm high. Culms very slender, laxly ascending, base often decumbent, rooting at lower nodes. Leaf sheaths pilose, sometimes sparsely, outer margin ciliate; leaf blades linear-lanceolate, thin, 2-6 cm, glabrous or pilose, margins firm, apex acute. Panicle open, ovate to pyramidal in outline, 1.5-8 cm; branches and pedicels regularly spaced, divaricate at maturity, capillary, smooth. Pedicels longer than spikelets, often with a gland halfway along their length. Spikelets subglobose, ca. 1.5 mm, green; glumes subequal, ovate.

*Fl. & Frt.*: August-December.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Nagaland, Sikkim), China, Myanmar, Vietnam, Malaysia, Indonesia, Philippines.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, Near Gumra, 12.09.2010, *H.A. Barbhuiya* 218.

**18. *Jasminum flexile*** Vahl., Symb. Bot.3: 1. 1794. [Oleaceae]

A scandent shrub. Leaves opposite, trifoliolate, more or less chartaceous, petioles slender, lateral leaflets 2/3 to 3/4 the length of the terminal, apex acuminate to long-acuminate, rarely just acute, leaflets ovate to lanceolate. Inflorescences mostly axillary, sometimes terminal on side shoots, glabrous. Calyx lobes almost imperceptible to 0.25 mm long. Corolla tube 2-3 cm long, slender, lobes 1-1.5 cm long.

*Fl. & Frt.*: November-February.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Uttar Pradesh, Karnataka, Tamil Nadu, Andaman & Nicobar Islands), China, Myanmar, Sri Lanka.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, Near Sindhuri, 11.09.2010, *H. A. Barbhuiya* 123.

**19. *Justicia virgata*** T. Anderson, J. Linn. Soc., Bot. 9: 516. 1867. [Acanthaceae]

Slender herb, upto 1 m high. Leaves elliptic, acuminate, punctulate on both surfaces. Bracts ovate or elliptic acute as long as the calyx. Spikes 8-15 cm linear, slender, interrupted, terminal, 1-3 together, or sometimes paniced; bracts ca. 4 mm, flowers opposite, ca. 6 mm, white or slightly yellow-tinged. Anther-cells completely superposed. Capsule c. 1.2 cm, clavate, puberulous. Seeds glabrous, tubercular-verrucose.

*Fl. & Frt.*: November-February.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Mizoram, Sikkim), Bhutan, Myanmar, Thailand.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, West Block, 15 No. Hill, 09.11.2011, *H. A. Barbhuiya* 767.

**20. *Kleinhovia hospita*** L., Sp. Pl. (ed. 2) 2: 1365. 1763. [Malvaceae]

Medium sized tree; branchlets gray-green, sparsely pilose. Leaf blade broadly ovate, abaxially puberulent when young, adaxially glabrous, base cordate, margin entire or sparsely dentate in upper part, acute to acuminate at apex. Inflorescence a thyrse. Flower dense. Sepals pink, petaloid. Petals pink, shorter than sepals. Capsule broadly pyriform to almost globose 5-angled.

*Fl. & Frt.*: October-January.

**Distribution:** India (Assam, Tripura, Bihar, Uttar Pradesh, Orissa, Maharashtra, South India), China, Sri Lanka, Myanmar, Thailand, Vietnam, Philippines, Papua New Guinea, Honduras, Madagascar, Panama.

**Specimen examined:** Cachar, Silchar, 01.02.1953, *G.K. Deka s.n.*

**21. *Kokoona littoralis*** M.A.Lawson in Hook.f., Fl. Brit. India 1: 617. 1875. [Celastraceae]

Medium sized tree. Leaves elliptic, ovate or lanceolate, acuminate, base cuneate, margins entire; lateral nerves 5-8 pairs. Flower in axillary racemes. Sepals 5-lobed, slightly denticulate. Petals ovate-elliptic. Stamens filamentous. Ovary triangular. Fruits capsular, loculicidally dehiscent, 3-valved. Seeds winged.

*Fl. & Frt.*: September-January.

*Distribution*: India (Assam, Meghalaya, Maharashtra), Myanmar, Thailand, Malaysia, Indonesia.

*Specimen examined*: Cachar, Loharbong, 18.11.1932, A. Das 10765.

**22. *Lasianthus lancifolius*** Hook.f., Fl. Brit. India 3: 187. 1880. [Rubiaceae]

Shrubs, ca. 1.5 m tall; young branches puberulent. Leaves lanceolate to elliptic-lanceolate, lateral veins 8-9 pairs, veinlets subreticulate with forks very slender; branches and leaf nerves abaxially sparsely appressed puberulent. Stipules triangular, less than 3 mm, puberulent. Flowers in sessile fascicles. Calyx puberulent, hypanthium campanulate, lobes subulate. Fruit globose, white, ca. 5 mm in diam.

*Fl. & Frt.*: September-December.

*Distribution*: India (Assam, Meghalaya), Bangladesh, Bhutan, China, Myanmar, Thailand, Vietnam.

*Specimen examined*: Cachar, Barak R.F., Bhuban Hill, 22.12.2012, H.A. Barbhuiya 990.

**23. *Lindernia setulosa*** (Maxim.) Tuyama ex H. Hara, J. Jap. Bot. 19(7): 207. 1943. *Torenia setulosa* Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg 31(1): 72. 1887. [Linderniaceae]

An annual herb. Stems mostly procumbent. Leaves broadly ovate to deltoid-orbicular, 0.4-1.3 cm long. Flowers axillary and solitary. Calyx ca. 5 mm long. Corolla white or light purple ca. 6 mm; lower lip spreading flat; upper lip ovate. Stamens 4. Capsule fusiform-ovoid to ellipsoid-oblong. Seeds ellipsoid.

*Fl. & Frt.*: May-November.

*Distribution*: India (Assam, Arunachal Pradesh), China, Japan.

*Specimen examined*: Cachar, On the way to Bhuban Hill, 08.09.1978, R. B. Majumdar 73005.

**24. *Mallotus nepalensis*** Müll.Arg., Linnaea 34: 188. 1865. [Euphorbiaceae]

Middle sized trees up to 10 m high; bark grayish-brown, finely reticulately fissured. Leaves ovate, ovate-orbicular, caudate, acuminate, base truncate or subcordate, stellate tomentose and gland-dotted beneath when young. Racemes up to 25 cm long; female shorter; flowers 0.5-0.7 cm across; capsules 1-1.5 cm across, bristly tomentose.

*Fl. & Frt.*: May-October.

*Distribution*: India (Assam, Meghalaya, Arunachal Pradesh, Sikkim), Bhutan, Nepal, China, Myanmar.

*Specimen examined*: Cachar, On the way to Amraghat from Moinkhal, 10.09.1978, R. B. Majumdar 73187; Amraghat, 10.09.1978, R. B. Majumdar 73168.

**25. *Neolitsea foliosa*** (Nees) Gamble, Fl. Madras 1240. 1925. *Tetradenia foliosa* Nees, Pl. Asiat. Rar. 2: 64. 1831. [Lauraceae]

Small tree; bark dark-brown, with vertical lines of small warts. Leaves 7.5-15 × 3-6 cm, elliptic-acuminate, rigidly coriaceous, glabrous, subtriplinerved at the base; lateral nerves small, 2-3 on either half; base cuneate or acute; petiole 1-2.5 cm long. Flowers heads in shortly peduncled fascicles of 3-4.

*Fl. & Frt.*: November-January.

*Distribution*: India (Assam, Meghalaya, Sikkim, Uttar Pradesh, Tamil Nadu), Bangladesh.

*Specimen examined*: Karimganj, Patheria R.F., 19.08.2013, H.A. Barbhuiya 112253.

**26. *Nymphaea alba*** L., Sp. Pl. 1: 510. 1753. [Nymphaeaceae]

A perennial aquatic herb. Rhizome repent, sparsely branched. Leaves suborbicular, rounded or retuse at apex, margin entire. Flower floating; receptacle cylindrical. Sepals lanceolate, as long as or shorter than petals, caducous. Petals white, ovate-oblong. Filaments of innermost stamens filiform, narrower than anthers. Stigma almost flat with a hemispheric central projection.

*Fl. & Frt.*: April-October.

*Distribution*: India (Assam, Jammu & Kashmir), China, SW Asia, Europe, Africa.

*Specimen examined*: Cachar, Devipur, 20.09.1978, R.B. Majumdar 73447.

**27. *Ophiorrhiza repens*** (Wall. ex G. Don) Bennet, Indian Forester 108: 302. 1982. *Mussaenda repens* Wall. ex G. Don, Gen. Hist. 3: 491. 1834. [Rubiaceae]

A perennial herb. Stem slender creeping 25–46 cm long. Leaves elliptic-lanceolate, acuminate, glabrous above. Stipules lanceolate entire or 2-fid. Cymes 8–20 flowered; branches short ascending; bracteoles much shorter than the flowers, linear pubescent. Calyx-teeth lanceolate. Corolla 2–2.5 cm, tube narrow, puberulous or tomentose, white, throat hardly dilated; lobes erect, much shorter than their recurved hispid dorsal spur, glabrous within.

*Fl. & Frt.*: September–March.

**Distribution**: India (Assam, Arunachal Pradesh, Meghalaya, Mizoram, West Bengal), Bhutan, Myanmar.

**Specimen examined**: Cachar, Amraghat, 10.09.1978, R.B. Majumdar 73181; Bhuban Hill, 03.06.2012, H. A. Barbhuiya 914.

**28. *Peliosanthes griffithii*** Baker in J. Linn. Soc., Bot. 17: 506. 1879. [Asparagaceae]

Perennial, rhizomatous herb. Leaves elliptic-lanceolate, thin subcaudately acuminate, 5-7 nerved; petiole slender. Scape very short, raceme short, bracts subulate-lanceolate all or the lower much longer than the small pedicelled flowers. Pedicels sometimes ca. 6 mm long and lower bracts nearly 1.3 cm long. Perianth ca. 3 mm in diameter, green or lurid purple. Seeds small, oblong

*Fl. & Frt.*: June–October.

**Distribution**: India (Assam, Arunachal Pradesh, Meghalaya, Sikkim, West Bengal) Nepal.

**Specimen examined**: Cachar, Borail Wildlife Sanctuary, West Block, Kalain Range, Near Kalaincherra, 08.10.2011, H.A. Barbhuiya 727.

**29. *Pentapetes phoenicea*** L. Sp. Pl. 2: 698. 1753. [Malvaceae]

Annual herbs to 1 m tall, sparsely stellate hairy. Leaf blade linear-lanceolate, base broadly cuneate, rounded or truncate, margin crenate, apex acuminate. Flowers 1-3 in axillary fascicles. Sepals up to 1 cm long, connate at base, lobes lanceolate, stellate-hairy. Petals ca. 1 cm long, obovate, truncate. Capsule subglobose to oblong, 5-valved, stellate-tomentose.

*Fl. & Frt.*: August–January.

**Distribution**: India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, West Bengal, Bihar, Orissa, Uttar Pradesh, Punjab, Andhra Pradesh, Tamil Nadu), Bangladesh, Nepal, China, Japan, Sri Lanka, Myanmar, Thailand, Vietnam, Malaysia, Philippines, Colombia, Belize, United States.

**Specimen examined**: Hailakandi, Katakhal R.F., Bilaipur, 14.11.1983, R.B. Majumdar 84209.

**30. *Pergularia roylei*** (Wight) D. Dietr., Syn. Pl. 2: 894. 1840. *Marsdenia roylei* Wight, Contr. Bot. India 40. 1834. [Apocynaceae]

Twining shrub. Stems softly tomentose. Leaves opposite, lamina broadly ovate, acuminate or acute at apex, cordate at abase; lateral nerves 4-6 pairs. Flowers axillary in branched corymbose cyme, many flowered. Corolla sub-campanulate, tube ca. 2.5 mm long, 5-lobed, lobes pubescent on both sides. Corona staminal, linear, acute. Stigma not protruding beyond anthers, apex conical or dome shaped.

*Fl. & Frt.*: May–October.

**Distribution**: India (Assam, Arunachal Pradesh, Sikkim, Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Punjab), Nepal, Pakistan.

**Specimen examined**: Karimganj, Longai R.F., 24.12.1914, U. N. Kanjilal 4920.

**31. *Periploca calophylla*** (Wight) Falc., Proc. Linn. Soc. Lond. 1: 115. 1841. *Streptocaulon calophyllum* Wight, Contr. Bot. India 65. 1834. [Apocynaceae]

Leafy twining shrub. Leaves linear-lanceolate, less than 6 mm broad, gradually acuminate with pointed tip. Flowers axillary, sessile in dichotomously branched cymes. Calyx five-lobed, lobes free. Corolla rotate, ca. 5 mm across, 5-lobed. Corona corolline, uniseriate, 5-lobed, lobes filiform.

*Fl. & Frt.*: March–October.

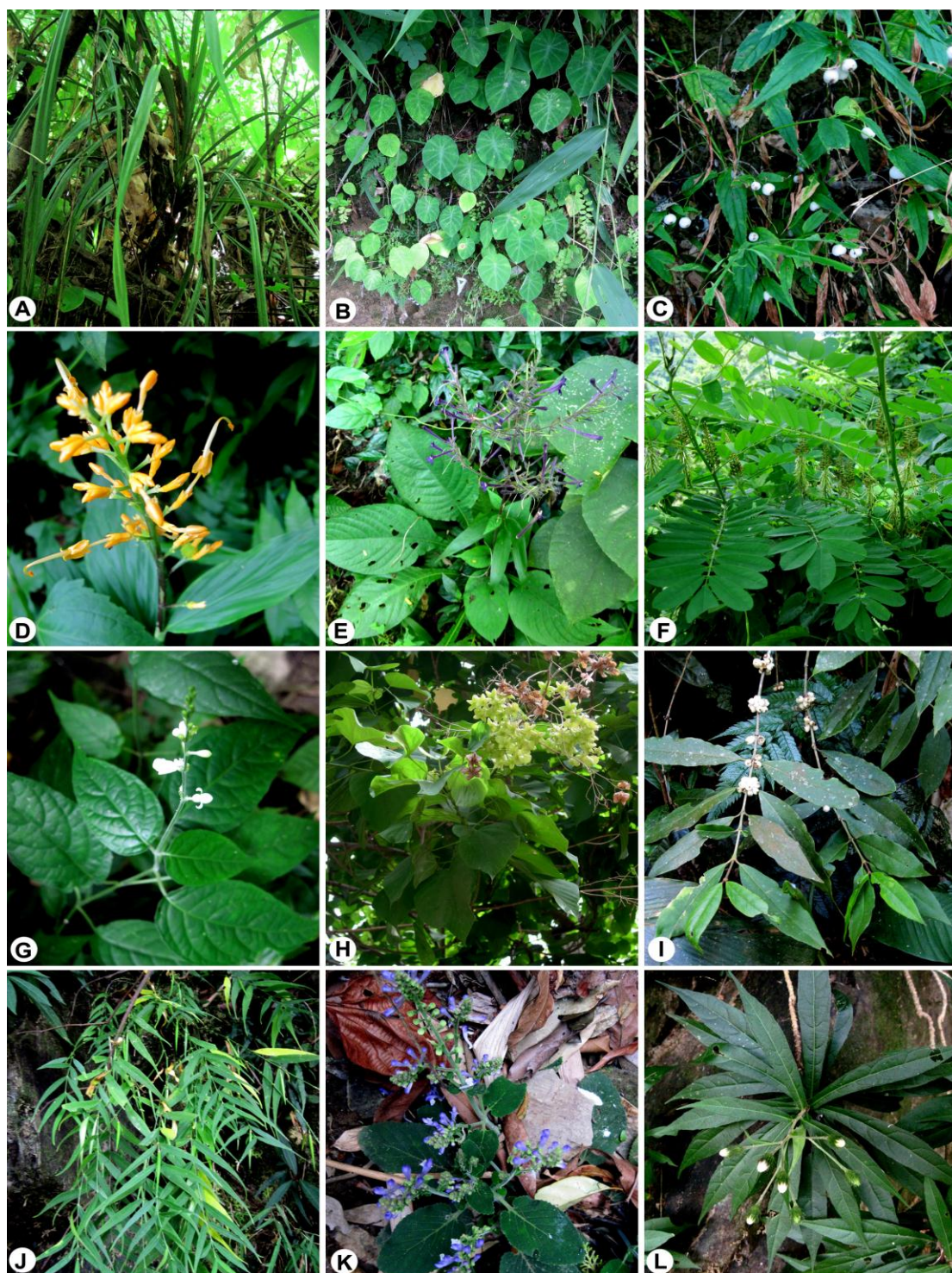
**Distribution**: India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Punjab), Nepal, Pakistan, Myanmar.

**Specimen examined**: Cachar, Borail Wildlife Sanctuary, West Block, 15 No. Hill, 12.11.2011, H.A. Barbhuiya 833, 834.

**32. *Schisandra neglecta*** A.C. Sm., Sargentia 7: 127. 1947. [Schisandraceae]

An woody vine. Stem glabrous; young branches lacking wings. Leaf blade elliptic, not glaucous, venation dark after drying, lateral nerves 4-7 pairs, abaxially without trichomes. Flowers axillary, solitary. Tepals 6-10, white, yellow. Staminate flowers with 12-40 stamens; apical stamens generally connate. Pistillate flower with 20-45 carpels. Fruit apocarpous red. Seed testa smooth, rugulose, or rarely tuberculate

*Fl. & Frt.*: April–September.



**Fig.1.** A. *Benstonea humilis* (Lour.) Callm. & Buerki; B. *Colocasia fallax* Schott; C. *Cyclocodon parviflorus* (Wall. ex A.DC.) Hook.f. & Thomson; D. *Globba orixensis* Roxb.; E. *Gymnostachyum venustum* (Nees) T. Anderson; F. *Indigofera atropurpurea* Buch.-Ham. ex Hornem.; G. *Justicia virgata* T. Anderson; H. *Kleinhovia hospita* L.; I. *Lasianthus lancifolius* Hook.f.; J. *Periploca calophylla* (Wight) Falc.; K. *Scutellaria discolor* Wall. ex Benth.; L. *Vernonia subsessilis* DC.



**Distribution:** India (Assam, Meghalaya, Mizoram, Sikkim, West Bengal), Bhutan, Nepal, China, Myanmar.

**Specimen examined:** Cachar, Ramnagar, 14.09.1978, R. B. Majumdar 73329.

**33. *Schizostachyum mannii*** R.B.Majumdar, Fl. Ind. Enum.: Monocot. 281. 1989. [Poaceae]

An arborescent bamboo. Culms 10-13 m tall, 2.5-4.5 cm in diameter, arising singly from a creeping rhizome; nodes not prominent, internodes 12-36 cm long, wall 0.2-0.7 cm thick. Culm sheaths 12-15 cm long, 10-12 cm broad, striate, covered with dense tawny appressed hairs, straight, truncate at the top; imperfect blade as long as or longer than the sheaths, narrow at the base, central portion thickened, cuspidately acuminate, the sides widened out into large, inflated, membranous wings, broadly rounded on the sheath; ligule narrow, 1 mm long. Leaves membranous, pale, 10-20 cm long, 2-2.8 cm broad, lanceolate or oblong-lanceolate, rounded at the base into a short petiole, tip acuminate, glabrous on both surface; main veins prominent, secondary veins 6-8, inconspicuous.

**Fl. & Frt.:** Not known yet.

**Distribution:** India (Assam, Manipur, Meghalaya, Mizoram, Nagaland) Endemic.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, West Block, Near Malidar, 23.04.2011, H.A. Barbhuiya s.n.\*

**34. *Scutellaria discolor*** Wall. ex Benth., Pl. Asiat. Rar. 1: 66. 1830. [Lamiaceae]

Perennial rhizomatous, herbs. Stem erect ca. 30 cm tall, densely puberulent. Leaves elliptic-ovate to broadly elliptic, papery, adaxially densely puberulent to hirsute, abaxially green or purplish, cordate at base, margin undulate-crenate, apex obtuse. Flower in terminal racemes, alternate or opposite. Pedicel purplish densely pubescent. Calyx ca. 2 mm, pubescent; scutellum spreading, orbicular. Corolla purple, tube ca. 1 cm long. Nutlets brown, ovoid-ellipsoid.

**Fl. & Frt.:** September-February.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Bihar, Uttar Pradesh), Bangladesh, Bhutan, Nepal, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, West Block, 15 No. Hill, 10.11.2011, H.A. Barbhuiya 784; 15 No. Hill, 12.11.2011, H.A. Barbhuiya 818.

**35. *Smilax aspericaulis*** Wall. ex A.DC. Monogr. Phan. 1: 196. 1878. [Smilacaceae]

A climbing woody vine. Stem sometimes sparsely prickly. Petiole 1-1.5 cm, narrowly winged; tendrils usually present. Leaf blade broadly ovate-elliptic, base rounded, apex subacute. Inflorescence a raceme of 3-7 umbels; base slightly thickened. Male flowers: outer tepals ca. 5 × 1.2 mm, inner ones much narrower.

**Fl. & Frt.:** October-May.

**Distribution:** India (Assam, Meghalaya, Sikkim, Andaman & Nicobar Island), Bangladesh, China, Myanmar, Thailand, Vietnam, Malaysia, Philippines.

**Specimen examined:** Karimganj, Longai R.F., 18.2.1941, R.N. De 20718.

**36. *Stauroanthera grandifolia*** Benth. Scroph. Ind. 57. 1835. [Gesneriaceae]

A succulent herb, up to 40 cm high; dusky pubescent. Leaves opposite, broadly elliptic ca. 25 × 11 cm, margin obscurely toothed; petiole 1-2.5 cm. Flowers in axillary cymes, pendent, blue, spurred at base. Corolla blue, with yellow marks in the tube within. Ovary thinly pubescent or glabrous. Capsule ca. 8 mm, depressed globose.

**Fl. & Frt.:** June-September.

**Distribution:** India (Assam, Arunachal Pradesh, Meghalaya, Mizoram), Myanmar.

**Specimen examined:** Cachar, Borail Wildlife Sanctuary, Near Bihara, 09.10.2011, H. A. Barbhuiya 756.

**37. *Stuednera colocasiifolia*** K.Koch, Wochenschr. Vereines Beförd. Gartenbaues Königl. Preuss. Staaten 5: 114. 1862. [Araceae]

A small herb. Stem short creeping and ascending; persistent cataphylls brown, not netted. Petiole green, cylindrical, ca. 30 cm, slender, base sheathing; leaf blade paler abaxially, green adaxially, ovate or obovate, subleathery, base obtuse, apex acuminate or acute. Peduncle green much shorter than petioles, 8-15 cm. Spathe reflexed, concolorous yellow, ovate-lanceolate or oblong-lanceolate, apex long acuminate. Spadix 3-4 cm; female zone cylindrical; ovary subglobose, stigma 4 or 5 lobed, mixed with clavate staminodes.

**Fl. & Frt.:** March-June.

**Distribution:** India (Assam, Meghalaya, Tripura), Bangladesh, China, Myanmar, Thailand, Laos, Vietnam.

**Specimen examined:** Karimganj, Duhalia R.F., 17.10.2010, H.A. Barbhuiya 444.

**38. *Stuednera discolor*** W.Bull, Gard. Chron., n.s., 1875: 708. 1875. [Araceae]

Medium sized robust evergreen herb. Stem erect, densely covered with tattered cataphyll and leaf remains. Leaves several, peltate, ovate, apex acuminate, emarginate basally, sinus very shallow, posterior lobes almost absent; lamina membranaceous, deep olive green adaxially, pale green abaxially. Inflorescence solitary; peduncle 6-12 cm long, terete, pale green. Spathe 10-14 cm long, ovate-lanceolate, long acuminate, reflexing on opening, exterior pale yellow, interior dark yellow, lower part persistent into fruiting stage, exterior pale yellow, interior red-purple. Spadix 4-6 cm long, male flower zone clavate, free, female flower zone cylindrical, dorsally adnate to spathe.

*Fl. & Frt.:* March-June.

*Distribution:* India (Assam, Arunachal Pradesh, Meghalaya, Tripura), Bangladesh, Myanmar, Thailand.

*Specimen examined:* Karimganj, Duhalia R.F., 17.10.2010, H.A. Barbhuiya 435.

**39. *Trichosanthes cucumeroides*** var. *dicoelosperma* (C.B. Clarke) S.K. Chen, Bull. Bot. Res., Harbin 5(2): 118. 1985. *Trichosanthes dicoelosperma* C.B. Clarke in Hook.f., Fl. Brit. India 2: 609. 1879. [Cucurbitaceae]

A climbing herb. Stem slender, grooved, pubescent. Leaf blade broadly ovate or orbicular, adaxially tomentose, usually shortly 3-5 lobed; lobes triangular or ovate to obovate-oblong, margin denticulate or serrate. Male peduncle ca. 10 cm long; calyx tube 6-7 cm long, lobes linear-lanceolate. Female flowers solitary; ovary oblong. Fruit globose or oblong, with 10 longitudinal bands. Seeds brown, compressed, triangular-ovate, 3-loculed, 2 lateral locules suboblong.

*Fl. & Frt.:* August-November.

*Distribution:* India (Assam, Meghalaya, Sikkim, West Bengal, Bihar, Uttar Pradesh), Nepal, China.

*Specimen examined:* Karimganj, Duhalia R.F., 17.10.2010, H. A. Barbhuiya 459.

**40. *Vernonia subsessilis*** DC., Prodr. 5: 62. 1836. [Asteraceae]

Undershrub. Leaves narrowly lanceolate or oblanceolate, acute or acuminate, obscurely or distantly toothed or sinuate, chartaceous, glabrescent above, pubescent beneath; lateral nerves 7-10 pairs. Inflorescence in corymbose heads; peduncles pubescent; bracts foliaceous, linear-oblong. Heads

about 40-flowered; involucre bracts subulate, pubescent, often recurved. Flowers purple, fading white. Corolla glabrous. Fruit ribbed. Pappus reddish, unequal, persistent.

*Fl. & Frt.:* October-December.

*Distribution:* India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram), Bangladesh, Nepal, Myanmar.

*Specimen examined:* Cachar, Borail Wildlife Sanctuary, West Block, Kalain Range, 15 No Hill, 12.11.2011, H. A. Barbhuiya 830.

## REFERENCES

- Bhuyan SK and Bhahadur R. 1940. An account of Assam, with some notices concerning the neighbouring territories. First compiled in 1807-1814. Govt. of Assam, Gauhati.
- Bor NL. 1940. Flora of Assam, Vol.-V. Government of Assam, Shillong.
- Brandis D. 1906. Indian Trees: An Account of Trees, Shrubs, Woody Climbers, Bamboos and Palms Indigenous or Commonly Cultivated in the British Indian Empire. Archibald Constable & Co. Ltd, London.
- Champion HG and Seth AK. 1968. A revised survey of the forest types of India. Manager of Publications, Govt. of India, New Delhi.
- Chowdhery HJ, Giri GS and Pramanik A. 2009. Materials for the flora of Arunachal Pradesh Vol. III. Botanical Survey of India, Kolkata.
- Chowdhury S. 2005. Assam's Flora, Present Status of Vascular Plants. Assam Science Technology and Environmental Council, Guwahati.
- Deb DB. 1981-1983. The Flora of Tripura State, Vol. I & II. Today and Tomorrow's Printers and Publishers, New Delhi.
- eFloras. 2014. Published on the Internet, <http://www.efloras.org> by Missouri Botanical Garden, St. Louis, Missouri & Harvard University Herbaria, Cambridge.
- e-monocot. 2014. An online resource for monocot plants. <http://e-monocot.org/>
- Giri GS, Pramanik A and Chowdhery HJ. 2008. Materials for the flora of Arunachal Pradesh Vol. II. Botanical Survey of India, Kolkata.
- Global Compositae Checklist 2014. [http://dixon.iplantcollaborative.org/composita\\_e-web/Default.aspx](http://dixon.iplantcollaborative.org/composita_e-web/Default.aspx)

- Griffith W. 1836. Remarks on a collection of plants made at Sadiya, Upper Assam, from April to September, 1836. *Journal Asiatic Society Bengal* 5: 806-813.
- Hajra PK and Verma PK. 1996. *Flora of Sikkim Vol. I. Botanical Survey of India, Calcutta.*
- Hajra PK, Sashtry ARK and Sanjappa M. 1995. *Fascicles of Flora of India. Fascicle: 21. Leguminosae-Papilionoideae: Tribe-Indigofereae. Botanical Survey of India, Calcutta.*
- Haridasan K and Rao RR. 1985-1987. *Forest flora of Meghalaya Vol. I & II. Bishen Singh Mahandra Pal Singh, Dehra Dun.*
- Hooker JD. 1872-1897. *The Flora of British India, Vol. I-VII. L. Reeve & Co., London.*
- ILDIS. 2014. *International Legume Database & Information Service* <http://www.ildis.org/>
- Jagtap AP and Singh NP. 1999. *Fascicles of Flora of India. Fascicle: 24. Asclepiadaceae & Periplocaceae. Botanical Survey of India, Calcutta.*
- Jain SK and Rao RR. 1977. *A Handbook of Field and Herbarium Methods. Today and Tomorrows Printers and Publishers, New Delhi.*
- Kanjilal UN, Kanjilal PC, Das A, and De RN. 1934-1940. *Flora of Assam, Vols I-IV. Government of Assam, Shillong.*
- Karthikeyan S, Sanjappa M and Moorthy S. 2009. *Flowering plants of India. Dicotyledons Vol. I. (Acanthaceae-Avicenniaceae). Botanical Survey of India, Kolkata.*
- Khanna KK, Mudgal V, Uniyal BP and Sharma JR. 1999. *Dicotyledonous plants of Uttar Pradesh: A check-list. Bishen Singh Mahendra Pal Singh, Dehra Dun.*
- King C. 1877. *List of plants found in Bengal and Assam. In: Hunter WW. (ed.) A statistical account of Bengal. Vol. 20. Trubner, London.*
- Kress WJ, DeFilipps RA, Farr E and Kyi DYY. 2003. *A Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar. Contributions from the United States National Herbarium* 45: 1-590.
- Press JR, Shrestha KK and Sutton DA. 2000. *Annotated checklist of the flowering plants of Nepal. The Natural History Museum, London.*
- Singh NP, Chauhan AS and Mondal MS. 2000. *Flora of Manipur, Vol. I. Botanical Survey of India, Calcutta.*
- Singh NP, Mudgal V, Khanna KK, Srivastava SC, Sahoo AK, Bandopadhyay S, Aziz N, Das M, Bhattacharya RP and Hajra PK. 2001. *Flora of Bihar: Analysis. Botanical Survey of India, Culcutta.*
- Singh NP, Singh KP and Singh DK. 2002. *Flora of Mizoram Vol. I. Botanical Survey of India, Kolkata.*
- Thothathri K. 1982. *Fascicles of Flora of India. Fascicle: 8. Leguminosae: Genus-Derris. Botanical Survey of India, Howrah.*
- Tropicos 2014. *Missouri Botanical Garden, Shaw Boulevard, St. Louis, Missouri.* <http://www.tropicos.org>.