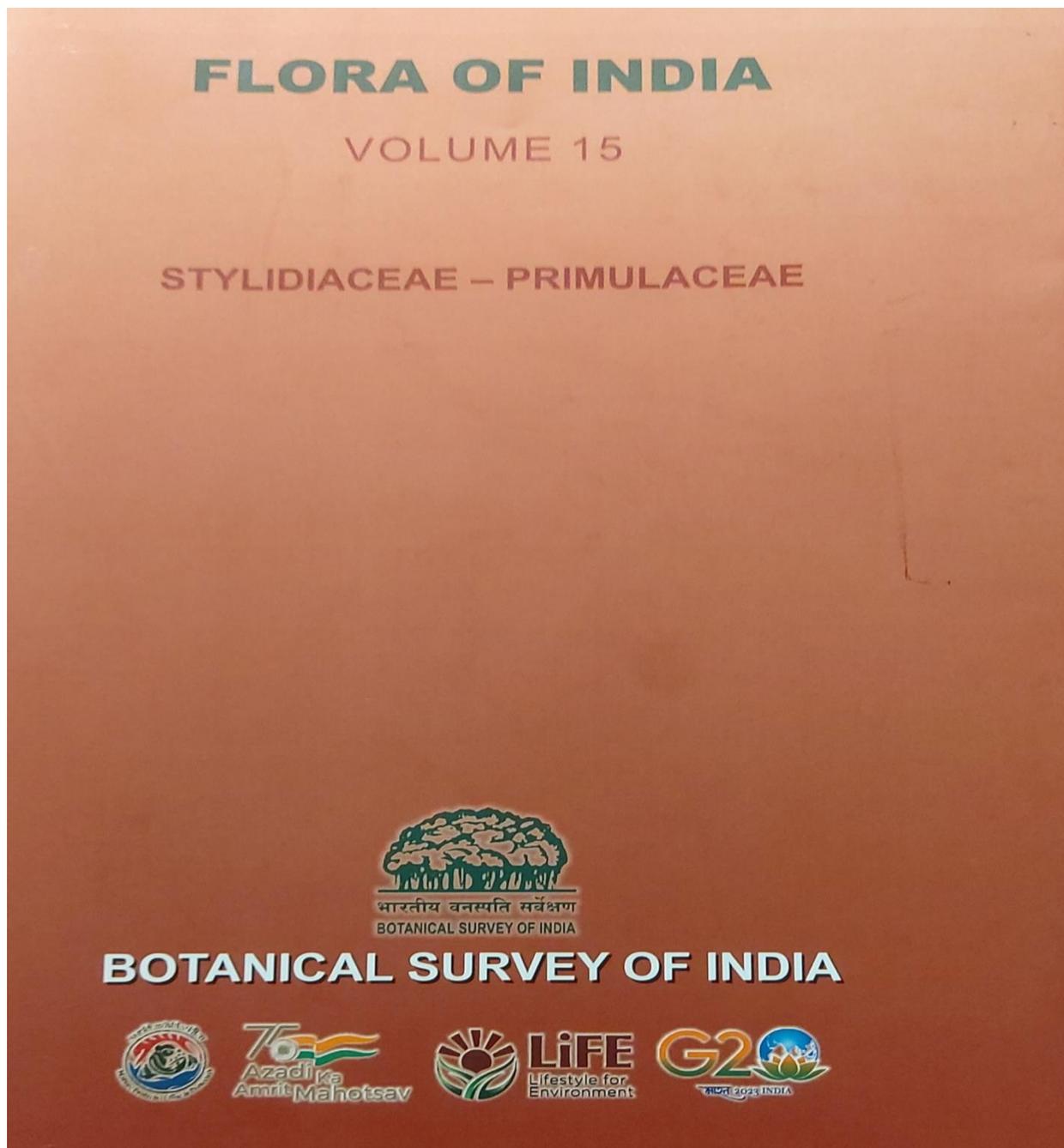


Dr. Subhasis Panda (Abbreviated as 'S. Panda'), Principal, Govt General Degree College Chapra is the Contributor of 8- Book Chapters in the following EDITED BOOK, "FLORA OF INDIA: STYLIDIACEAE-PRIMULACEAE-Vol 15" published by Botanical Survey of India, MOEF & CC, Kolkata in March 2023.



Dr. S. Panda was then Research Fellow at CENTRAL NATIONAL HERBARIUM, Botanical Survey of India, Indian Botanic Garden, Howrah. Therefore, his address is mentioned as his then working place at Central National Herbarium.

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VOLUME - 15
STYLIDIACEAE-PRIMULACEAE

Editors

A.A. Mao
S.S. Dash
U.L. Tiwari

Editorial Board

A.A. Mao **D.K. Agrawala**
S.S. Dash **U.L. Tiwari**
J. Jayanthi **A.N. Shukla**
J.S. Jalal **Gopal Krishna**



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BOTANICAL SURVEY OF INDIA

BOTANICAL SURVEY OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
2023



LIFE
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STYLIDIACEAE – PRIMULACEAE**

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Dr. S. Panda worked on the Plant Family: ERICACEAE

KEY TO THE VARIETIES

- 1a. Leaves petiolate, petiole 7–15 mm long
 b. Leaves sessile

57.1. var. **variegata**

Kh.: *Jalamut*.

Fl & Fr.: Oct.–July.

Distrib.: India; Arunachal Pradesh and Meghalaya
 Bangladesh.

Notes: Banik & Sanjappa [Fasc. Fl. India 25: 304. 2014] treated *Agapetes variegata* var. *variegata* and *Agapetes macrantha* var. *grandiflora* (Hook.f.) D. Banik & Sanjappa as two distinct taxa.

57.2. var. **speciosa** (Hemsl.) Airy Shaw, Kew Bull. 1948: 89. 1948; D. Banik & Sanjappa in Sanjappa & Sastry, Fasc. Fl. India 25: 307. 2014. *Agapetes speciosa* Hemsl., Gard. Chron. Ser. 3 (4): 230, fig 101. 1907 & Feddes Repert. Spec. Nov. Regni Veg. 6: 319. 1909; Stapf, Bot. Mag. 15: t. 9040. 1925; Argent & P. Woods, *Plantsman* 8 (2): 76. 1986.

Fig. 72 f-h

Differs from var. *variegata* in having obovate-oblong, 8–10 × 3–5 cm, sessile leaves with subcordate or auricled base, acute apex and distinctly calcarate anthers.

Fl.: Oct.–Nov.

Distrib.: India; Arunachal Pradesh.

Myanmar.

2. *Cassiope* D. Don

(S. Panda & M. Sanjappa)

Prostrate to erect decumbent dwarf shrubs; stems often stout, profusely branched, glabrous; branches covered with closely appressed aciform leaves. Leaves imbricate, opposite decussate, often vertically disposed in 4 rows, appressed, lamina aciform to ovate-triangular, ciliate to serrate at margins, sessile with deeply furrowed on lower surface channel. Inflorescence in racemes. Flowers (4–) 5-merous, often drooping; pedicels usually 2–24 mm long, pilose, slightly bent; bracts basal, 4–6; ebracteolate. Calyx (4–) 5-lobed, slightly basally united, coriaceous, thickened at base, accrescent in fruits. Corolla campanulate, glabrous, (4–) 5-lobed, lobes equal, recurved. Stamens 10, loosely epipetalous; filaments short, straight, slender, slightly dilated at base, glabrous or pilose; anthers 2-lobed, ovoid, glabrous with 2 spurs at anther lobe-filament junction. Ovary globose, 5-locular, glabrous to subglabrous; disc obscure or minutely 10 globular blackish dots at the base of ovary; style slender, glabrous; stigma often truncate, rarely capitate or obtuse. Fruit a loculicidally 5-valved globose capsule, glabrous; seeds numerous, minute, ovoid to obconical.

2. *Cassiope* D. Don [BOOK CHAPTER contributed by Dr. S. Panda & his Ph.D. Supervisor, Dr. M. Sanjappa, Former Director, Botanical Survey of India]

junction. Pistil 3 mm long; ovary globose, *c.* 1 × 1.5 mm, glabrous; disc obscure; style *c.* 2 mm long, slender, glabrous; stigma often truncate to rarely capitate. Capsule loculicidally 5-valved, subglobose, *c.* 4 × 2.5 mm including *c.* 2 mm long persistent style with 21–24 mm long pilose pedicel, glabrous; seeds numerous, minute, ovoid to obconical.

Fl. & Fr.: June–Nov.

Distrib.: India; this species grows gregariously in cliffs, shallow snow clad soils, often in alpine pastures or in rocky slopes, sometimes in open moorland in alpine areas; between 3500–5800 m; Arunachal Pradesh and Sikkim.

Bhutan, China, Myanmar and Nepal.

Note: The population of Sikkim (*S.S. Dash 19217*) showed dwarf shrub of 3–5 cm high and 8–14 mm long pedicels not reported earlier.

3. *Cassiope wardii* C. Marquand, J. Linn. Soc. London (Bot.) 48: 199. 1929; C.E.C. Fisch., Bull. Misc. Inform. 1940: 299. 1941; S. Panda & Sanjappa in Sanjappa & Sastry, Fasc. Fl. India 25: 169. 2014.

Massive, more or less robust, erect shrublet, up to 50 cm high, often grown in tufts; stems fastigiate, glabrous, profusely branched; branchlets crowded, grown in with closely appressed ovate-triangular leaves. Leaves closely imbricate, covered decussate, vertically disposed in 4 rows, coriaceous, lamina ovate, ovate-triangular to rarely aciform, 4–8 × 1–1.5 mm, serrulate to ciliolate along margins, obtuse to aristate at apex, glabrous, convex above with a basal channel reaching almost to middle, slightly concave beneath; venation obscure; sessile. Racemes solitary axillary. Flowers often drooping, rarely erect, 9–19 mm long; pedicels 4–10 mm long, slightly curved to rarely erect, pilose; bracts and bracteoles not seen. Calyx lobes free or slightly connate at base, ovate-triangular, *c.* 3 × 1.5 mm, acute at apex. Corolla campanulate, 5–9 mm long, 7–10 mm diam.. Stamens, pistils and fruits not seen.

Fl. & Fr.: June–Sept.

Distrib.: India; This species grows gregariously in moist rocky slopes and moss clad ridges amongst thickets of *Bambusa* spp. in association with *C. fastigiata* (*Haridasan 1675*); at altitudes ranging from 3200–3700 m; Arunachal Pradesh.

China.

Notes: The population of Arunachal Pradesh (*Haridasan 1675*) showed ovate-triangular and serrulate to serrulate-ciliate leaves without long cilia. The description is based on the type photograph (*Kingdon-Ward 5752*) and the only other collection (vegetative) made in recent years (*Haridasan 1675*, APFH).

3. *Craibiodendron* W.W. Sm.
(S. Panda & M. Sanjappa)

Stout, erect shrubs or trees, up to 20 m high; stems profusely branched, glabrous; branches glabrous or pubescent. Leaves alternate, coriaceous, lamina oblong-

Notes: Craven (2011) treated this species under the genus *Diplarche* due to its unique morphological characters. But in this work *D. multiflora* treated as a distinct species under the genus *Diplarche* due to its unique morphological characters.

2. ***Diplarche pauciflora*** Hook.f. & Thomson, Hooker's J. Bot. Kew Gard. Misc. 6: t. 11B, 383. 1854; C.B. Clarke in Hook.f., Fl. Brit. India 3: 462. 1882; W.W. Sm. & Cave, Rec. Bot. Surv. India 4 (5): 215. 1911; S. Panda & Sanjappa in Sanjappa & Sastry, Fasc. Fl. India 25: 7. 2014. **Fig. 77**

Dwarf, stout shrub; 5–10 (–19) cm high; stems robust, erect, feathery, profusely branched; branches erect or rarely prostrate, covered with closely marked appressed leaf scars. Leaves compact, lamina linear to oblong, 1–4 × 0.5–1.5 mm, cuneate at base, serrate or ciliate along margins, acute or gland-tipped at apex, glabrous; sessile. Corymb 2–8-flowered; rachis 5–7 mm long, erect, puberulous, basally covered with 5–6-ciliate sterile bracts; bracts ovate to broadly ovate, 4–6 × 3–4 mm, glabrous. Flowers 4–5 mm long; pedicels c. 1.5 mm long, glabrous. Calyx nearly equal, coriaceous, ovate to oblong, 2–2.5 × 0.5–1 mm, cuneate at base, ciliate along margins, obtuse at apex, glabrous. Corolla hypocrateriform, white, coriaceous, glabrous; tube broadly short cylindrical, c. 2 mm long; lobes c. 3 × 2 mm. Stamens 10, diplostemonous, 5 shorter, c. 1.5 mm long, 5 longer, c. 2 mm long, shorter stamens free while longer one weakly adnate for most of their length; filaments slender, 5 shorter, c. 1.5 mm long, 5 longer c. 2 mm long, viscin threads present all over the length of filaments; anthers minute, subglobose. Disc obscure. Pistil c. 2 mm long; ovary globose, c. 1 × 1 mm, glabrous; style minute; stigma-style complex expanded; stigma capitate, 5-lobed. Fruit a septifragally 5-valved globose capsule, c. 3 × 3 mm, glabrous; seeds not seen.

Fl. & Fr.: July–Oct.

Distrib.: India; Occur on cliffs, rocky slopes and alpine pastures beside the melting snow in association with *Diapensia himalaica*, *Cassiope fastigiata*, *Rhododendron lepidotum* and *Primula atrodentata*; between 4600–5800 m; Sikkim.

China.

Notes: D. Maity & S.K. Dey (2015) merged it under *D. multiflora* mainly based on external morphological characters. Craven (2011) treated this species as *Rhododendron sophistarum* Craven based on DNA data. But in this work *D. pauciflora* treated as a distinct species under the genus *Diplarche* due to its unique morphological characters.

5. ***Enkianthus*** Lour.

(S. Panda & M. Sanjappa)

Stout shrubs or treelets, up to 10 m high; stems and branches stout, erect, glabrous; branches arising in pseudowhorls. Deciduous bud scales usually present at the base of inflorescence and pseudovercillate leaves leave a transverse striated base. Leaves usually deciduous, alternate or in pseudowhorls at the apices of the branches, lamina ovate-elliptic to ovate-lanceolate, serrulate at margins. Inflorescence axillary or terminal corymbs, often resembling pseudo-umbel, perulate, often pendulous. Flowers 5-merous, usually pendulous; pedicels erect or deflexed, pubescent; bract

5. ***Enkianthus*** Lour. [BOOK CHAPTER contributed by Dr. S. Panda & his Ph.D. Supervisor, Dr. M. Sanjappa, Former Director, Botanical Survey of India]

6. Gaultheria L.

(S. Panda & M. Sanjappa)

Stout, erect shrubs up to 4 m high, profusely branched, often drooping down from rock crevices, rarely creeping, epiphytic or on rocky soils, sometimes gynodioecious; stems and branches glabrous or pubescent. Leaves alternate to rarely opposite, often serrate, serrulate to rarely serrulate-ciliate at margins; venation brochidodromous to actinodromous or melastomaceous; short or long-petioled. Inflorescence usually axillary or terminal racemes, rarely solitary axillary to fasciculate; rachis pubescent or glabrous. Flowers 4–5-merous; bracts basal, usually 1, rarely 2 or 4; bracteoles variable in position, usually 2, rarely 4, opposite to subopposite. Calyx 4–5-lobed, lobes equal, basally united. Corolla urceolate or rarely campanulate, 4–5-lobed, lobes equal. Stamens 10, rarely 5, 8 or 9, sometimes dimorphic, loosely epipetalous; filaments straight, slender, dilated at base; anthers 2-lobed, oblong, each lobe with 2 (–1) apical awns. Ovary usually superior to rarely semi-inferior (*G. semi-infera*), globose to subglobose, 4–5-locular; style impressed; stigma usually truncate to rarely capitate or lobed. Capsule usually globose, pubescent or glabrous, loculicidally 4–5-valved; seeds minute, numerous, obconical.

Eastern and South eastern Asia including India, SE Australia, America (North, Central and South) and New Zealand, 135 species (in 10 sections, 2 subsections and 23 series); 26 taxa (23 species and 3 varieties), 4 endemic in India.

Literature: AIRY SHAW, H.K. (1941). Studies in the Ericales IV: Classification of the Asiatic species of *Gaultheria*. *Bulletin Miscellaneous Information* 1940: 306–330. MIDDLETON, D.J. (1991a). Infrageneric classification of the genus *Gaultheria* L. (Ericaceae). *Botanical Journal of the Linnean Society* 106: 229–258. MIDDLETON, D.J. (1991b). Infrageneric classification of the genus *Gaultheria* L. (Ericaceae). *Botanical Journal of the Linnean Society* 106: 235. FRITZSCH, P.W., LU, H. WANG AND LI. DE-ZHU (2015). New species, taxonomic innovations, and typifications in *Gaultheria* series *Trichophyllae* (Ericaceae). *Phytotaxa* 201 (1): 1–26.

KEY TO THE SPECIES

- | | |
|--|----------------------------|
| 1a. Inflorescence solitary axillary; bracts absent | 2 |
| b. Inflorescence other than the above; bracts present | 6 |
| 2a. Leaf margin setulose-ciliate; each anther lobe 1-awned | 22. <i>G. trichophylla</i> |
| b. Leaf margin eciliate; each anther lobe 2-awned | 3 |
| 3a. Pedicels long (12–19 mm) | 5. <i>G. dolichopoda</i> |
| b. Pedicels short (1–5 mm long) | 4 |
| 4a. Lamina linear to oblanceolate-linear (5–9 × 1.5–2.5 mm) | 2. <i>G. thymifolia</i> |
| b. Lamina obovate to oblong-elliptic (8–17 × 3–8 mm) | 5 |
| 5a. Lamina 2.5–5.0 mm wide; mucronulate at apex | 18. <i>G. sinensis</i> |
| b. Lamina 6–8 mm wide; rounded to obtuse-rounded at apex | 11. <i>G. hypochlora</i> |
| 6a. Racemes fasciculate; corolla campanulate | 7 |
| b. Racemes not fasciculate, varying from usual racemes to solitary axillary; corolla usually urceolate, if campanulate then raceme not fasciculate | 9 |

along margins, short acuminate at apex, glabrous. Calyx lobes ovate-triangular, *c.* 5 × 2 mm, finely white fimbriate along margins, acute at apex, glabrous. Corolla globose-urceolate, greyish-white, 3–4 × 3 mm, glabrous, lobes minute. Stamens 10, *c.* 2 mm long, loosely epipetalous; filaments *c.* 1 mm long, slender, papillose, pilose on lower surface, glabrous on upper surface, dilated at middle; anthers oblong, *c.* 1 mm long, glabrous, each lobe with 2 equal, minute, warty apical awns. Pistil *c.* 2 mm long; ovary globose, *c.* 1 × 1.5 mm, densely white tomentose, ovules numerous on axile placenta in each locule; disc minutely 10-dentate; style *c.* 1 mm long, slender, glabrous; stigma truncate. Capsule loculicidally 5-valved, enclosed in dry accrescent calyx, globose, 3–4 × 3–4 mm including *c.* 2 mm long persistent style with 4–5 mm long puberulous pedicel, densely tomentose; seeds numerous, minute, obconical, scariose.

Fl. & Fr.: Aug.–Feb.

Distrib.: India; moist humus-covered rocky slopes, sometimes hanging down from rock crevices in association with *Hypericum uralum*; between 1300–2600 m; Arunachal Pradesh.

China and Myanmar.

7. *Leucothoe* D. Don

(S. Panda & M. Sanjappa)

Stout, erect shrubs to treelets, rarely pendent; stems and branches terete, profusely branched, glabrous. Leaves alternate, coriaceous, lamina oblong-lanceolate, elliptic-lanceolate to lanceolate, entire, obscurely serrulate, serrulate or crenulate at margins, broadly cuneate at base, long acuminate to caudate-acuminate at apex, glabrous; venation brochidodromous. Racemes axillary, rarely pseudoterminal, usually eperulate, rachis densely white puberulous. Flowers pentamerous; pedicels densely white puberulous; bract 1, basal, usually ovate; bracteoles 2, opposite, usually basal or rarely apical. Calyx 5-lobed, lobes equal, basally united, persistent in fruits, ovate to ovate-triangular. Corolla tubulo-urceolate to shortly tubular, glabrous, 5-lobed. Stamens 10, loosely epipetalous; filaments short, slender, pilose, usually dilated at base; anthers 2-lobed, oblong, 1–2 mm long, each lobe with 2 equal, minute apical awns. Ovary superior, globose to subglobose, glabrous, 5-locular; disc minutely 10-dentate; style impressed, slender, glabrous; stigma usually truncate. Capsule loculicidally 5-valved with a dry persistent calyx, depressed-globose, glabrous; seeds numerous, usually flattened, sometimes winged, usually elliptic, suborbicular to scobiform, *c.* 1 mm long, scariose.

Distributed in America, Bhutan, China, Japan, India, Myanmar and Vietnam, 8 species; 1 species in India.

Literature: DON, D. (1834). An attempt at a new arrangement of the Ericaceae. *Edinburgh New Philosophical Journal* 17: 150–160. JUDD, W.S., N.C. MELVIN III, K. WASELKOV AND K.A. KRON (2013). A taxonomic revision of *Leucothoe* (Ericaceae; Tribe Gaultherieae). *Brittonia* 65 (4): 422.

7. *Leucothoe* D. Don [BOOK CHAPTER contributed by Dr. S. Panda & his Ph.D. Supervisor, Dr. M. Sanjappa, Former Director, Botanical Survey of India]

Leucothoe griffithiana C.B. Clarke in Hook.f., Fl. Brit. India 3: 460. 1882; W.W. Sm., Notes Roy. Bot. Gard. Edinburgh 13: 164. 1921; K.S. Sriniv., Rec. Bot. Surv. India 17 (2): 26. 1959; Rae in Grierson & D.G. Long (eds.), Fl. Bhutan 2 (1): 396. 1991; S. Panda, J. Bombay Nat. Hist. Soc. 104 (3): 371. 2007; Judd & al., Brittonia 65 (4): 434. 2013; S. Panda & Sanjappa in Sanjappa & Sastry, Fasc. Fl. India 25: 225. 2014. *Gaultheria* sp. Griff., Itin. Pl. Khasyah Mts. (Posth. Pap. 2): 138. 1848. *Pieris griffithiana* Hook.f. ex C.B. Clarke in Hook.f., Fl. Brit. India 3: 460. 1882.

Fig. 102; Pl. 48B

Stout, pendent shrub; 1–3 m high; stems blackish-brown, profusely branched, glabrous; branches cinnamon brown, pendent, glabrous; branchlets pinkish, glabrous, often flexuous. Leaves coriaceous, lamina oblong-lanceolate, elliptic-lanceolate to lanceolate, (9–) 12–16 × 3.5–4.5 cm broadly cuneate at base, , subtire to obscurely serrulate at margins, long acuminate to caudate-acuminate at apex, acumen up to 15 mm long; glabrous, dark green or pinkish-green above, light green beneath; venation brochidodromous with 7–9 pairs lateral veinss, conspicuous above, obscure beneath; petioles stout, 5–8 mm long, glabrous. Racemes axillary or rarely pseudoterminal, eperulate; rachis light green to greyish-white, 6–13 cm long, 20–40-flowered, densely white puberulous. Flowers 8–14 mm long; pedicels greyish-white, 3–5 mm long, densely white puberulous; bract 1, basal, greyish-white, ovate to broadly ovate, *c.* 3 × 2 mm, ciliolate along margins, acute at apex, glabrous; bracteoles 2, opposite, basal, greyishwhite, ovate to broadly ovate, *c.* 1 × 1 mm, ciliolate along margins, acute at apex, glabrous. Calyx lobes greyish-white, ovate-triangular, *c.* 2 × 1.5 mm, ciliolate along margins, acute at apex, glabrous. Corolla tubulo-urceolate to short tubular, white, 5–6 × 4 mm, glabrous, lobes ovate, *c.* 1 × 1 mm. Stamens 10, *c.* 3 mm long, loosely epipetalous; filaments *c.* 1.5 mm long, slender, papillose, pilose, dilated at base; anthers oblong, *c.* 1 mm long, glabrous, each lobe with 2 equal minute apical awns. Pistil *c.* 5 mm long; ovary globose, *c.* 2 × 3 mm, glabrous, ovules numerous on axile placenta in each locule; disc minutely 10-dentate; style *c.* 3 mm long, slender, glabrous; stigma truncate. Capsule loculicidally 5-valved, depressed-globose, yellowish, *c.* 3 × 7 mm with 5–7 mm long pedicel, glabrous; seeds numerous, winged, flattened, elliptic to suborbicular, *c.* 1 mm long, margin covered with greyish-white scale-like papillae, scariose.

Fl. & Fr.: Apr.–Dec.

Distrib.: India; at moist and humus-covered rocky slopes, sometimes drooping from rock crevices; between 2300–2800 m; Arunachal Pradesh.

Bhutan, China and Myanmar.

8. Lyonia Nutt.

(S. Panda & M. Sanjappa)

Stout, erect shrubs, treelets to medium-sized trees; stems grey to reddish-brown with longitudinally furrowed bark, profusely branched, glabrous or sparsely hairy; branches usually glabrous or covered with peltate scales and glandular hairs.

8. Lyonia Nutt. [BOOK CHAPTER contributed by Dr. S. Panda & his Ph.D. Supervisor, Dr. M. Sanjappa, Former Director, Botanical Survey of India]

18 mm long, scented; pedicels light green, 5–7 mm long, sparsely white puberulous, pedicellar bract 1, basal, dark green to light green with pinkish stripes, oblanceolate to obovate-elliptic, 7–30 × 3–10 mm, ciliolate along margins, mucronulate at apex, sparsely villous outside, glabrous inside; bracteoles not seen. Calyx lobes equal, basally united, light green with pinkish stripes, oblong to oblong-obovate, c. 3.5 × 1 mm, ciliolate along margins, acute at apex, sparsely villous outside, glabrous inside. Corolla tubular to rarely tubulo-urceolate, pinkish-white, 7–11 × 4–7 mm, villous outside, glabrous inside, lobes ovate, c. 1 × 1 mm. Stamens 10, c. 6 mm long, villous epipetalous; filaments greyish-white, c. 4.5 mm long, slender, geniculate, loosely slightly dilated near base, anther-filament junction spurless; anthers orange brown, oblong, c. 1.5 mm long, glabrous. Pistil c. 7 mm long; ovary globose to subglobose, light green, c. 2 × 2.5 mm, glabrous, ovules numerous on axile placenta in each locule; disc minutely 10-dentate; style greyish-white, c. 5 mm long, slender, columnar, straight, slightly swollen near middle, glabrous; stigma truncate. Capsule loculicidally 5-valved with dry persistent calyx, globose, dark brown, c. 4 × 4 mm including c. 7 mm long puberulous pedicel, glabrous; seeds numerous, blackish-brown, cylindrical, acicular to sickle-shaped with pointed ends, c. 1 mm long, scarious.

Fl. & Fr.: May–Sept.

Distrib.: India; at moist rocky slopes, sometimes in loose humus-covered rocky soils in association with *Enkianthus deflexus*, *Gaultheria hookeri* and *Vaccinium glaucoalbum*; between 2500–4400 m; Arunachal Pradesh, Sikkim, Uttarakhand and West Bengal.

Bhutan, China, Myanmar and Nepal.

Uses: Tender leaf juice applied in scabies, severe skin diseases, boils and pimples by the Nepalese of Chungthang in North Sikkim. Leaves reported to be toxic to cattle.

9. *Pieris* D. Don

(S. Panda & M. Sanjappa)

Stout, erect shrub or treelet; stems and branches glabrous to sparsely glandular hairy. Leaves alternate to pseudovercillate, or in whorls of 3, coriaceous, lamina oblong-lanceolate, elliptic-lanceolate, elliptic to obovate, serrulate, serrate at margins, attenuate to cuneate at base, acute, acuminate, obtuse to mucronate at apex, glabrous to sparsely glandular hairy; petioles stout, glabrous or puberulous. Racemes axillary or pseudoterminal, sometimes paniculate, eperulate. Flowers numerous, 5–22 mm long, often pendulous; pedicels 2–9 mm long, sparsely to densely puberulous; bract 1, basal, usually elliptic, puberulous; bracteoles 2, opposite to alternate, subbasal to subapical on pedicel. Calyx 5-lobed, lobes equal, slightly united basally, usually ovate-triangular, persistent in fruits. Corolla urceolate to tubulo-urceolate, white, greyish to light green, 3–13 mm long. Stamens 10, loosely epipetalous; filaments slender, pilose, dilated near base, with 2 equal spurs at anther-filament junction; anthers 2-lobed, oblong to ovoid, glabrous. Ovary superior, globose to ovoid, glabrous, 5-locular; style impressed, glabrous; stigma truncate. Capsule loculicidally 5-valved with a dry

DOUBTFUL SPECIES

1. **Rhododendron adenosum** (Cowan & Davidian) Davidian, Quart. Bull. Amer. Rhodod. Soc. 32: 81. 1978; Mingyuan & DC. Chamb. in Wu & al., 14: 358. 2005. *Rhododendron glischrum* var. *adenosum* Cowan & Davidian, Notes Roy. Bot. Gard. Edinburgh 21: 147. 1953. *Rhododendron kuluense* D.F. Chamb., Notes Roy. Bot. Gard. Edinburgh 36: 116. 1978.

China.

2. **Rhododendron ciliicalyx** var. *lyi* (H. Lev.) R.C. Fang, Fl. Reipubl. Popularis Sin. 57(1): 48. 1999; Ruizheng & DC. Chamb. in Wu & al., 14: 272. 2005.

China, Laos, Myanmar, Thailand and Vietnam.

3. **Rhododendron pemakoense** Kingdon-Ward, Gard. Chron. 88: 298. 1930; Hutch. in J.B. Stev., Sp. Rhodod.: 302A. 1930; Cullen, Notes Roy. Bot. Gard. Edinburgh 39: 121. 1980. *Rhododendron patulum* Kingdon-Ward, Gard. Chron. 88: 298. 1930.

China.

4. **Rhododendron sikkimense** Pradhan & Lachungpa, Sikkim-Himalayan Rhodod. 74. 1990.

Nep.: *Sikkimae Gurans*.

Note: No specimens found in any herbaria in India.

11. **Vaccinium** L.

(S. Panda & M. Sanjappa)

Shrubs or treelets, sometimes epiphytic; stems often lenticillate, profusely branched; branches sparsely to densely hispid or covered with scales. Leaves alternate to pseudovercillate, coriaceous to papery, lamina glabrous or rarely punctate to hispid-setose beneath. Inflorescence usually axillary or pseudoterminal racemes, sometimes fasciculate, corymbose-umbellate or solitary axillary. Flowers (4-) 5-merous; bract 1, basal; bracteoles 2, opposite to alternate, basal to subbasal, caducous. Calyx (4-) 5-lobed, lobes usually ovate-triangular, accrescent in fruits. Corolla usually urceolate, rarely tubular or campanulate, glabrous or pilose, (4-) 5-lobed. Stamens (8-) 10, free or loosely epipetalous; filaments slender, straight, usually short, papillose, slightly dilated at base; anthers 2-lobed, usually oblong, each lobe usually with a single tubule and with or without 2 equal lateral spurs at or above anther lobe-tubule junction. Ovary inferior, globose to subglobose, glabrous, (4-) 5-locular, style impressed, slender, glabrous; stigma usually truncate or rarely lobed. Fruit a globose berry; seeds in usually 20-30, rarely numerous.

America, Tropical Asia, Europe, Madagascar and South-East Africa, 140 species under 33 sections; 30 taxa (26 species; 01 subspecies and 03 variety; incl. 6 endemic) in India.

18 mm long, scented; pedicels light green, 5–7 mm long, sparsely white puberulous, pedicellar bract 1, basal, dark green to light green with pinkish stripes, oblanceolate to obovate-elliptic, 7–30 × 3–10 mm, ciliolate along margins, mucronulate at apex, sparsely villous outside, glabrous inside; bracteoles not seen. Calyx lobes equal, basally united, light green with pinkish stripes, oblong to oblong-obovate, c. 3.5 × 1 mm, ciliolate along margins, acute at apex, sparsely villous outside, glabrous inside. Corolla tubular to rarely tubulo-urceolate, pinkish-white, 7–11 × 4–7 mm, villous outside, glabrous inside, lobes ovate, c. 1 × 1 mm. Stamens 10, c. 6 mm long, villous epipetalous; filaments greyish-white, c. 4.5 mm long, slender, geniculate, loosely slightly dilated near base, anther-filament junction spurless; anthers orange brown, oblong, c. 1.5 mm long, glabrous. Pistil c. 7 mm long; ovary globose to subglobose, light green, c. 2 × 2.5 mm, glabrous, ovules numerous on axile placenta in each locule; disc minutely 10-dentate; style greyish-white, c. 5 mm long, slender, columnar, straight, slightly swollen near middle, glabrous; stigma truncate. Capsule loculicidally 5-valved with dry persistent calyx, globose, dark brown, c. 4 × 4 mm including c. 7 mm long puberulous pedicel, glabrous; seeds numerous, blackish-brown, cylindrical, acicular to sickle-shaped with pointed ends, c. 1 mm long, scarious.

Fl. & Fr.: May–Sept.

Distrib.: India; at moist rocky slopes, sometimes in loose humus-covered rocky soils in association with *Enkianthus deflexus*, *Gaultheria hookeri* and *Vaccinium glaucoalbum*; between 2500–4400 m; Arunachal Pradesh, Sikkim, Uttarakhand and West Bengal.

Bhutan, China, Myanmar and Nepal.

Uses: Tender leaf juice applied in scabies, severe skin diseases, boils and pimples by the Nepalese of Chungthang in North Sikkim. Leaves reported to be toxic to cattle.

9. *Pieris* D. Don

(S. Panda & M. Sanjappa)

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