Additions to the flora of Manipur state, North-Eastern India

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Abstract

Botanical surveys conducted at many places in Manipur state of India resulted in addition of 11 angiosperm taxa [*Celtis tetrandra* Roxb. (Cannabaceae), *Crotalaria assamica* Benth. (Leguminosae), *Leucas lavandulifolia* (Lamiaceae), *Ilex excelsa* (Wall.) Voigt (Aquifoliaceae), *Illigera khasiana* C.B. Clarke (Hernandiaceae), *Jasminum dispersum* Wall. (Oleaceae), *Maesa chisia* Buch.-Ham. ex D. Don (Primulaceae), *Mycetia radiculiflora* (C.B. Clarke) Airy Shaw (Rubiaceae), *Rotheca farinosa* (Roxb.) Govaerts (Lamiaceae), *Symplocos lucida* (Thunb.) Siebold & Zucc. (Symplocaceae) and *Trichodesma khasianum* C.B. Clarke (Boraginaceae)] to the state-flora. The information is presented here with updated nomenclature, brief botanical description, phenology, habitat, distribution, specimens examined and photographic evidence.

Key words: Angiosperm, Flora, Manipur, New additions, North-East India

INTRODUCTION

Manipur is one of the eight North-Eastern states of India. It is bordering on the north by Nagaland, on the East by Myanmar, partly on the south by Mizoram and Chin hills of Myanmar, and on the west by Cachar district of Assam. Survey and collection of medicinal plants across the country is the mandate for the Center of Excellence program supported by the Ministry of Environment and Forests & Climate Change (MoEF&CC), assigned to Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore. Under this program, botanical surveys were undertaken at different places in Manipur state namely, Agiidiikhe, Asufii, Chokhurii, Esii Phi, Kapengho, Kapenho Karale, Karong, Khole, Khungho, Kozii, Koziiir Korii, Makhan Khulloen, Punanamai, Sholitokhu, Soprie and Vanee during the years 2011 and 2017. These botanical surveys have resulted in the collection of 267 plant taxa. These plants were identified and confirmed by referring floras, revisions, monographs, research articles and recent publications (Hooker 1872-1897; Kanjilal *et al.*, 1934-1940; Balakrishnan, 1981 & 1983; Deb, 1981 & 1983; Chowdhery & Wadhwa, 1984; Haridasan & Rao, 1985 & 1987; Naithani, 1990; Sanjappa, 1992; Chaudhuri, 1993; Sharma and Sanjappa, 1993; Hajra *et al.*, 1995a & 1995b; Chauhan, 1996; Chowdhery *et al.*, 1996 & 2008; Ansari, 2008; Oleg Polunin & Adam Stainton, 1997; Singh *et al.*, 2000a & 2000b; Singh, 2001; Kumar & Singh, 2001; Singh *et al.*, 2002; Kazhuhrii Eshuo & Chaturvedi 2011; Balakrishnan *et al.*, 2012; Moaakum & Dey, 2013; Thongam *et al.*, 2013a & 2013b; Balachandran & Ravikumar,

2013; Moaakum *et al.*, 2014; Devi *et al.*, 2018). Further critical studies revealed that 11 species viz., *Celtis tetrandra* (Ulmaceae), *Crotalaria assamica* (Leguminosae), *Leucas lavandulifolia* (Lamiaceae), *Ilex excelsa* (Aquifoliaceae), *Illigera khasiana* (Hernandiaceae), *Jasminum dispernum* (Oleaceae), *Maesa chisia* (Myrsinaceae), *Mycetia radiculiflora* (Rubiaceae), *Rotheca farinosa* (Lamiaceae), *Symplocos lucida* (Symplocaceae) and *Trichodesma khasianum* (Boraginaceae) have been confirmed as new additions to the flora of Manipur. All the plant taxa were presented here in alphabetical order with updated nomenclature, family, phenology, habitat, distribution and collection details. All the voucher specimens are deposited at FRLH National Herbarium, Bangalore.

Taxonomic Enumerations

Celtis tetrandra Roxb., Fl. Ind. 2: 63. 1832; Hook.f., Fl. Brit. Ind. 5: 482. 1888; Kanjial *et al.*, Fl. Assam 4: 277. 1940; A.S. Chauhan in Hajra, Contrib. Fl. Namdapha 282. 1996. *C. trinervia* Roxb., Fl. Ind. 2: 65. 1832. *C. seretina* Planch. in Ann. Sci. Nat. ser. 3, 10: 300. 1848; Wight, Ic. Pl. Ind. Or. 6:t. 1970. 1833. [**Cannabaceae; Plate I a**]

Trees, up to 8 m tall; branchlets lenticellate, wrinkled horizontally, glabrous. Leaves simple, alternate, 5 – 14 x 2.5 – 7 cm, obliquely ovate or obliquely ovate-lanceolate, asymmetric at base, margin serrate at upper half, entire at lower half, acuminate at apex, membranous, glabrous above, puberulous beneath; 3-nerved from base, prominent; lateral nerves 1-4 pairs, pinnate, prominent; intercostae scalariform, prominent. Stipules linear-lanceolate, lateral, free; petiole 3-10 mm long, slender, pubescent, shallowly grooved above. Fruiting peduncle thick, c. 8 mm long, glabrous. Drupes globose, c. 8 mm across, orange-red when ripe, glabrous.

Fruiting: September – January.

Habitat: Rare in evergreen forest; growing with *Daphne papyracea* Wall. ex G.Don, *Galinsoga parviflora* Cav., *Oxyspora paniculata* (D.Don) DC., *Rhododendron* sp. and *Rubus moluccanus* L.

Distribution: Bangladesh, Bhutan, Indonesia, Myanmar, Nepal, Thailand, Vietnam and India. In India, it has been reported from Arunachal Pradesh, Assam and now from Manipur.

Specimens examined: INDIA: Manipur, Imphal District, way to Noney from Imphal, 1450 m, 02.09.2007, K. Ravikumar & R. Vijayasankar 107413, (FRLH).

Crotalaria assamica Benth., London J. Bot. 2: 481. 1843; Baker in Hook.f., Fl. Brit. Ind. 2: 75. 1876; Sanjappa, Leg. India 116. 1992; Ansari, Crotalaria Ind. 258. 2008. *C. sericea* Burm.f., Fl. Indica t. 48. f. 1. 1768. Type: t. 48 of protologue!. *C. burmanni* DC., Prodr. 2: 126. 1825. [**Leguminosae; Plates 1 b & III a**]

Herbs, 1.5 – 2 m tall; stem terete, densely sericeous, pale yellow-brown. Leaves simple, oblong-oblongeolate, 4.5-7 x 1.3-2.2 cm, cuneate to subacute at base, entire at margins, obtuse to apiculate at apex, glabrous above, densely sericeous beneath; lateral nerves 8-9 pairs; petioles c. 2 mm long. Stipules absent. Bracts linear-lanceolate, c. 5 mm long, sericeous. Bracteoles linear, c. 4 mm long, glabrescent. Fruiting pedicels thick, up to 1.3 cm long. Calyx deeply 5-lobed, densely hairy outside, glabrous inside. Pods cylindrical, oblongeolate, c. 6 x 2 cm long, hooked at apex, glabrous, shiny, brown when dry; seeds reniform, c. 22, each c. 5 x 4 mm, hard, shiny, black.

Fruiting: December – February.

Habitat: Common in evergreen forest; growing with *Chromolaena odorata* (L.) R.M. King & H. Rob., *Coriaria nepalensis* Wall., *Erythrina stricta* Roxb., *Hedychium spicatum* Sm., *Rorippa montana* (Wall. ex Hook. f. & Thomson) Small and *Rubus ellipticus* Sm.

PLATE - I. Voucher specimens of newly recorded plants from Maniour: a. *Celtis tetrandra*; b. *Crotalaria assamica*; c. *Leucas lavandulifolia*; d. *Ilex excelsa*; e. *Illigera khasiana*; f. *Jasminum dispersum*.

Distribution: China, Laos, Myanmar, Malaysia, Philippines, Taiwan, Thailand, Vietnam and India. In India, it has been reported from Assam, Nagaland, Meghalaya and now from Manipur.

Specimens examined: India: Manipur, Senapati District, Kopamozhu, 1650 m, 24. 02. 2017, N. Dhatchanamoorthy 120532 (FRLH).

Leucas lavandulifolia Sm., Cycl. 20(2): 2. 1812; Mukerjee in Rec. Bot. Surv. India 14(1): 167. 1940; Singh, Ind. *Leucas* 104. 2001. *Leonurus indicus* L., Sp. Pl. ed. 2. 817. 1763. *Phlomis linifolia* Roth, Nov. Pl. Sp. 260. 1821. *Leucas linifolia* (Roth) Spreng., Syst. Veg. 2: 743. 1825; DC., Prodr. 12: 533. 1848; Hook.f., Fl. Brit. Ind. 4: 690. 1885. *Phlomis zeylanica* sensu Roxb., Fl. Ind. 3: 9. 1832, non L. 1753. *P. ceilanica* sensu Blanco, Fl. Filip. 475. 1837, non L. 1753 'zeylanica'. *Hetrepta lavandulifolia* (SM) Rafin., Fl. Tellur. 3: 88.

1837. *Leucas indica* (L.) Vatke in Oesterr. Bot. Zeits. 25: 95. 1875, *non* R.Br. ex SM. 1812 based on *Phlomis indica* L. 1753. *L. linifolia* (Roth) Spreng. var. *decipiens* Hook.f., Fl. Brit. Ind. 4: 691. 1885. *L. lavandulifolia* SM. var. *decipiens* (Hook.f.) Chandr. & Srin. in Bull. Bot. Surv. India 17: 165. 1978. [**Lamiaceae; Plate I c**]

Herbs, up to 40 cm tall; stems 4-angled, striate, pubescent. Leaves elliptic or elliptic-oblong, linear-lanceolate, 30-55 x 8-15 mm, cuneate-acute at base, serrulate at margins, obtuse at apex; lateral nerves *c.* 4 pairs; petioles flat, *c.* 5 mm long. Inflorescences verticillasters, 2-3 in terminal, many flowered. Flower-head *c.* 10 mm across. Bracts linear-lanceolate, *c.* 1 x 0.1 mm, cuspidate at apex, pubescent, brownish. Calyx unequal, 8-lobed, 8-10-ribbed; tube cylindrical or campanulate, *c.* 8 x 3 mm long; teeth lower ones short and upper one slightly long, acuminate, densely appressed pubescent. Corolla white, *c.* 10 mm, outside silky hairy, glabrous inside. Nutlets small, ovoid-ellipsoid, 3-angled, *c.* 1 mm, pale yellowish at base, purplish-black above, glabrous.

Flowering & Fruiting: Throughout the year.

Habitat: Common in evergreen forest; growing with *Brassaiopsis hainla* (Buch.-Ham.) Seem., *Chromolaena odorata* (L.) R.M. King & H. Rob. and *Oxyspora paniculata* (D. Don) DC.

Distribution: Africa, Bangladesh, Bhutan, China, Indonesia, Malesia, Mauritius, Myanmar, Philippines, Thailand and India. In India, it has been reported earlier from entire tropical regions, Western Himalaya, North-Eastern states except Manipur state.

Specimens examined: India: Manipur, Imphal District, way to Noney from Imphal, 1650 m, 02.09.2017, K. Ravikumar & R. Vijayasankar 107415 (FRLH).

Ilex excelsa (Wall.) Voigt, Hort. Suburb. Calcutt. 347. 1845; Hook.f., Fl. Brit. India. 1: 603. 1875. *Cassine excelsa* Wall., Fl. India 2: 376. 1824. *I. doniana* DC., Prodr. 2: 644. 1824; Kanjilal *et al.*, Fl. Ass. 1: 257. 1936. [**Aquifoliaceae; Plates I d & III b**]

Trees, up to 12 m tall; bark blackish, young stems sparsely pubescent. Leaves elliptic-oblong to lanceolate, 6-11 x 2.5-3.5 cm, cuneate-subacute at base, entire and margin recurved, acute-acuminate at apex; lateral nerves 8-13, glabrous above, sparsely pubescent along midrib beneath; petioles twisted, 1-1.5 cm long, minutely pubescent. Drupes ovoid-subglobose, 5-8 x *c.* 6 mm, bright red when mature; pyrenes 3-5, ellipsoid, angled, *c.* 2 striate, glabrous.

Fruiting: January – March.

Habitat: Rare in evergreen forest; growing with *Brassaiopsis hainla* (Buch.-Ham.) Seem., *Euodia fraxinifolia* (D. Don) Hook.f., *Terminalia bellirica* (Gaertn.) Roxb. and *Ziziphus glabrata* B. Heyne ex Roth.

Distribution: Bhutan, China, Nepal, Pakistan and India. In India, it has been reported from Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Punjab, Sikkim, Uttar Pradesh and now from Manipur state.

Specimens examined: INDIA: Manipur, Senapati District, Karale, 1760 m, 22.02.2017, N. Dhatchanamoorthy 120488 (FRLH).

Illigera khasiana C.B. Clarke in Hook.f., Fl. Brit. India. 2: 461. 1879; Gamble, Man. Ind. Timp. 350. 1902; Brandis, Ind. Trees 542. 1906; Kanjilal *et al.*, Fl. Assam 4: 103. 1940; Haridasan & Rao, Fl. Meghalaya 2: 744. 1987. [**Hernandiaceae; Plates I e & III c**]

Climbers; branches terete, densely pilose. Leaves 3-foliolate; central leaf ovate-elliptic, 8-13 x 4-6 cm, rounded, slightly oblique at base, entire at margins, acute-acuminate at apex, sparsely hairy along midrib on both sides; lateral nerves *c.* 5; lateral leaflets ovate, 7-8.5 x 3-4.5 cm, oblique, slightly rounded at base, acute-acuminate at apex; lateral nerves *c.* 6 pairs; petioles thick, striate, up to 11 cm long, glabrescent; petiolules 5-10 mm long. Fruits suborbicular, obovoid-oblong, *c.* 3 x 6 cm, 2-3-winged, two wings broad, third one is short, glabrous.

Habitat: Rare in evergreen forests; growing with *Capparis* sp., *Desmodium sequax* Wall., *Dumasia villosa* DC., *Meizotropis buteiformis* Voigt, *Oreocnide frutescens* (Thunb.) Miq. and *Tetrastigma obtectum* (Wall. ex M.A. Lawson) Planch. ex Franch.

Distribution: China, Malaysia, Myanmar and India. In India, it has been reported from Arunachal Pradesh, Assam, Meghalaya and now from Manipur.

Specimens examined: INDIA: Manipur, Senapati District, Kakhe, 1740 m, 18.02.2017, N. Dhatchanamoorthy 120430 (FRLH).

Jasminum dispersum Wall. in Roxb., Fl. Ind. 1: 99. 1820; C.B. Clarke in Hook.f., Fl. Brit. Ind. 3: 602. 1882; Kanjilal *et al.*, Fl. Assam 3: 232. 1939; Haridasan & Rao, Fl. Meghalaya 2: 586. 1987. [**Oleaceae; Plates I f & III d**]

Climbers; branches terete, glabrous. Leaves simple or 3-foliolate; simple leaf: ovate, *c.* 4.7 x 2.7 cm, truncate-subcordate at base, margin entire, acute at apex, glabrous, 3-nerved at base; lateral nerves *c.* 5; petioles *c.* 7 mm long, glabrescent; in compound leaf: lateral leaflets small, ovate, 3-5 x 1.5-2.5 cm, subcordate, truncate at base, acute, mucronate at apex, glabrous; 3-nerved at base; lateral nerves *c.* 5; petiole *c.* 4 mm long, glabrous or minutely hirsute, central leaf: broadly ovate, 6.5-9.7 x 3.6-4.2 cm, subcordate-truncate at base, margin entire, acute-acuminate, mucronate at apex; petioles twisted, thick, *c.* 2.4 cm long, minutely hirsute; petiolule *c.* 2 cm long, sparsely hirsute. Inflorescences paniculate cyme, axillary or terminal; peduncle pendulous, up to 7 cm long, minutely striate, glabrous. Flowers *c.* 2.2 cm long, white, often pinkish outside; bracts filiform-linear, 3-5 mm long, broadened at base, glabrous, black when dry; bracteoles linear-subulate, *c.* 2 mm long, slightly broadened at base, glabrous, acute at apex. Calyx 5-lobed, cup like, tube *c.* 3 mm across, glabrous, brown-blackish when dry, teeth slightly triangular at base, 1-2 mm long, sharply mucronate, *c.* 1 mm long, glabrous. Corolla salverform; tube, erect, *c.* 16 x 2 mm; lobe 5, obovate-oblong, glabrous. Stamens 2; filament flat, 1-2 mm long; anthers ovoid-oblong, *c.* 2 mm. Ovary ovoid, *c.* 1 mm; style filiform, glabrous, *c.* 1 cm; stigma 2-lobed, subequal, 1-2 mm long, glabrous. Berrys ovoid-globose, *c.* 7-10 x 5-6 mm, glabrous, purple-blackish when ripe; seeds 1-2, ovoid-suborbicular, *c.* 7 x 5 mm long, brown-blackish, glabrous.

Flowering & Fruiting: February – April.

Habitat: Rare in evergreen forests; growing with *Ainsliaea latifolia* (D.Don) Sch.Bip., *Artemisia vulgaris* L., *Cyclea bicristata* (Griff.) Diels, *Phlogacanthus pubinervius* T. Anderson and *Senecio scandens* Buch.-Ham. ex D.Don

Distribution: Bhutan, Kashmir, Nepal and India. In India, it has been reported from Arunachal Pradesh, Assam, Meghalaya and now from Manipur.

Specimens examined: INDIA: Manipur, Senapati District, Khangho, 2405 m, 17. 02. 2017, N. Dhatchanamoorthy 120381 (FRLH).

Maesa chisia Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 148. 1825; C.B. Clarke in Hook.f., Fl. Brit. Ind. 3: 509. 1882; Kanjilal *et al.*, Fl. Assam 3: 1939; Giri *et al.*, Fl. Arunachal Pradesh 2: 121. 2008. [**Primulaceae; Plates II g & III e**]

Shrubs, up to 3 m tall; branches slender, lenticellate. Leaves narrowly lanceolate, 6.5 - 11.5 x 2-2.5 cm, cuneate-acute at base, serrulate at margin, acuminate-caudate at apex, glabrous; lateral nerves *c.* 6 pairs; petioles thick, 5-10 mm long. Inflorescences axillary, on leafless branches, paniculate raceme, up to 2.8 cm long; pedicels thin, *c.* 2 mm long, grey pubescent. Bracts and bracteoles very similar, shortly ovate, *c.* 1 mm long, minutely grey pubescent. Calyx 5-lobed, minutely puberulous outside, glabrous inside; 2 outer sepals ovate, 1-3 mm, ciliate at margins; 3 inner sepals ovate, 1-2 mm long, ciliate at margin, acute at apex. Petals 5 equal; outer and inner similar, *c.* 1.2 mm, 3-5-nerved at base, ciliate at margin, obtuse at apex. Stamens 5; filaments equal, *c.* 1 mm, glabrous; anthers obovoid, *c.* 1 mm, glabrous.

PLATE - III. Photographs of newly recorded plant from Manipur: a. *Crotalaria assamica*; b. *Ilex excels*; c. *Illigera khasiana*; d. *Jasminum dispersum*; e. *Maesa chisia*; f & g. *Mycetia radicyflora*; h. *Symplocos lucida*; i. *Trichodesma khasianum*

Ovary ovoid-obovoid, *c.* 2 mm, glabrous, dark brown when dry; style flat, *c.* 1 mm long, glabrous; stigma truncate, glabrous, brownish.

Flowering: February – May.

Habitat: Less common in evergreen forest; growing with *Clerodendrum wallichii* Merr., *Cynoglossum micranthum* Poir., *Flemingia macrophylla* (Willd.) Merr., *Osyris arborea* Wall. ex A.DC. and *Solanum erianthum* D. Don

Distribution: Bhutan, Myanmar, Nepal and India. In India, it has been reported from Arunachal Pradesh, Assam, Nagaland and now from Manipur.

Specimens examined: INDIA: Manipur, Senapati District, Kgrong, 1830 m, 26.02.2017, N. Dhatchanamoorthy 120554 (FRLH).

Mycetia radicleflora (C.B. Clarke) Airy Shaw in Kew Bull. 19(3): 509. 1965; Deb in Bull. Bot. Surv. India 28(1-4): 124. 1988. *Silavianthus radicleflora* C.B. Clarke in J. Linn. Soc. Bot. 25: 32. 1889; Burkill in Rec. Bot. Surv. India 10: 51, 78, 79, 297. 1925; Chowdhery *et al.*, Fl. Arunachal Pradesh 1: 591. 1996. [**Rubiaceae; Plates II h & III f, g**]

Shrubs, up to 1.5 m tall; branches many; stems 4-angled, striate, shiny. Leaves elliptic-lanceolate, 12-14.5 x 3.5-5.5 cm, cuneate at base, entire at margins, acute-acuminate at apex, upper side sparsely puberulous, glaucous beneath; lateral nerves *c.* 13 pairs; petioles *c.* 6 mm long, glabrous. Stipules ovate-obovate, *c.* 7 x 5 mm long, subacute at apex, glabrous. Fruiting peduncle 5-15 cm long, twisted when dry. Drupes subglobose, *c.* 8 x 5 mm across, white, glabrous.

Fruiting: January – March

Habitat: Rare in evergreen forest; growing with *Coriaria nepalensis* Wall., *Drymaria cordata* (L.) Willd. ex Schult., *Eurya acuminata* DC., *Hedera nepalensis* K. Koch, *Lasianthus sikkimensis* Hook.f., *Urtica ardens* Link and *Youngia japonica* (L.) DC.

Distribution: China, Myanmar and India. In India, it has been reported only from Arunachal Pradesh and now from Manipur state.

Specimens examined: INDIA: Manipur, Senapati district, Koziir Korii, 2036 m, 28.02.2017, N. Dhatchanamoorthy 120415 (FRLH).

Rothea farinosa (Roxb.) Govaerts in World Checkl. Seed Pl. 3(1): 15. 1999. *Clerodendrum farinosum* (Roxb.) Wall. in [Numer. List 49, No. 1810. 1829, *nom. nud.*] ex Steudel, Nomencl. Bot. ed. 2, 1: 382. 1840; Daniel & Rajendran in Taxon 42: 670. 1993 & in Bull. Bot. Surv. India 35: 110, f. 1. 1997; Rajendran & Daniel, Indian Verbenaceae, 102. 2002. *Volkameria farinosa* Roxburg, (Hort. Bengal. 46. 1814, *nom. nud.*), Fl. Ind. 3: 64. 1832. *Clerodendrum venosum* Wall. ex C.B. Clarke in Hook.f., Fl. Brit. India 4: 592. 1885, *nom. illeg.* incl. type of *Volkameria farinosa* Roxburgh (as '*Clerodendron*'); Kanjilal *et al.*, Fl. Assam 3: 490. 1939. [**Lamiaceae; Plate II i**]

Shrubs, up to 3 m tall; branches obtusely 4-angular, young stems sparsely pubescent, mature stems glabrous. Leaves opposite-decussate, 12.5-25 x 6.3-9.7 cm, elliptic or elliptic-oblong to lanceolate, sharply serrate, acuminate at apex, glabrous, membranous; lateral nerves 7-10; petioles 1.5-2 cm long. Fruiting inflorescences terminal, thyrses, up to 25 cm long, pubescent; pedicels flat, *c.* 3 mm long, with persistent bracts. Bracts ovate, *c.* 7 x 2 mm long, minutely hairy. Fruiting calyx cup shaped, *c.* 4 mm across, glabrous. Drupes sub-globose, 2-lobed, purplish-black.

Fruiting: September – February.

Habitat: Common in Evergreen forest; growing with *Artemisia vulgaris* L., *Litsea* sp., *Persicaria orientalis* (L.) Spach, *Rhododendron* sp., *Rhaphidospora* sp. and *Symplocos* sp.

Distribution: Burma, Thailand and India. In India, it has been reported from Arunachal Pradesh, Assam, Nagaland, Meghalaya, Mizoram and now from Manipur state.

Specimens examined: INDIA: Manipur, Imphal District, way to Noney from Imphal, 1450 m, 02.09.2007, K. Ravikumar & R. Vijayasankar 107402 (FRLH).

Symplocos lucida (Thunb.) Siebold & Zucc., Fl. Jap. 1: 55, t. 24. 1835, p.p. *excl. syn.* *Myrtus laevis* Thunb.; Noot. in Steenis, Fl. Males. 8(2): 264. 1977. *Laurus lucida* Thunb., Fl. Jap. 174. 1784. *Symplocos theaeifolia* D. Don, Prodr. Fl. Nep. 145. 1825; C. B. Clarke in Hook. f., Fl. Brit. Ind. 3: 575. 1882; Kanjilal *et al.*, Fl. Assam 3: 218. 1939. [**Symplocaceae; Plates II j & III h**]

Trees, up to 7 m tall; bark whitish, branches slender, greenish when dry, glabrous. Leaves elliptic-lanceolate, 6-9.5 x 2.5-3.5 cm, cuneate, retuse-rounded at base, shortly serrate at margins, acute-acuminate to mucronate at apex; lateral nerves c. 11 pairs; petioles twisted, up to 1.6 cm long, glabrous. Flowers in axillary fascicles, c. 11-flowered, sessile to subsessile. Calyx 5-lobed; lobes obovoid, c. 1 mm long, obtuse at apex, glabrous. Petals 5, pale white, obovoid-suborbicular, acute at base, c. 5 x 3 mm, glabrous. Stamens c. 20; filaments unequal, flat, filiform, c. 5 mm long, glabrous; anthers ovoid, c. 0.1 mm, yellowish. Ovary obovoid, c. 1 mm, glabrous; styles slender, c. 5 mm long, glabrous; stigma subcapitate, black when dry, glabrous.

Flowering: January – February.

Habitat: Common in Evergreen forest; growing with *Agapetes borii* Airy Shaw, *Ardisia crenata* Sims, *Cleisostoma filiforme* (Lindl.) Garay, *Piper hymenophyllum* (Miq.) Wight and *Schefflera hypoleuca* (Kurz) Harms.

Distribution: Bhutan, China, Cambodia, Indonesia, Japan, Laos, Malaysia, Myanmar, Thailand, Vietnam and India; In India, it has been reported from Arunachal Pradesh, Assam, Meghalaya and now from Manipur state.

Specimens examined: INDIA: Manipur, Senapati District, Khangho, 2405 m, 17.02.2017, N. Dhatchanamoorthy 120371 (FRLH).

Trichodesma khasianum C.B. Clarke in Hook.f., Brit. Ind 4: 154. 1883; Kanjilal *et al.*, Fl. Assam 3: 338. 1939; R.N. Banerjee & Pramanik in Bull. Bot. Surv. India 17(1-4): 118. 1978; A.S. Chauhan in Hajra, Contrib. Fl. Namdapha 226. 1996. [**Boraginaceae; Plates II k & III i**]

Small trees, up to 5 m tall; young stems 4-angled, densely scabrous and sparingly hairy. Leaves elliptic-lanceolate, 7-20 x 2-7 cm, cuneate at base, entire at margins, acuminate at apex, densely scabrous and tuberculate above, sparsely tubercled beneath; lateral nerves 8-11; petioles thick, c. 1 cm long, broaden at base, hispid hairy. Inflorescences corymbose racemes, terminal, 7.5-14.5 cm long, sparingly hairy. Flowers erect or pendulous; primary peduncles, up to 5 cm long; secondary peduncles, up to 3 cm long; pedicels thin, 1-2 cm long, pubescent pale brownish. Calyx 5-lobed, tube shorter than corolla tube, c. 5 mm, lobe lanceolate, c. 18 x 2 mm, acuminate at apex, rusty pubescent outer and inside. Corolla 5-lobed, creamy white with light violet; lobes linear-lanceolate, c. 19 x 5 mm long, acuminate at

apex, glabrous. Stamens 5; anther flat, elongate, connectives inserted from corolla, *c.* 9 mm long, patently white hairy. Ovary 4-celled, *c.* 3 mm long, *c.* 3.2 mm long, sparsely hairy.

Flowering: February-May.

Habitat: Rare in evergreen forest; growing with *Balanophora fungosa* J.R.Forst. & G.Forst., *Clerodendrum wallichii* Merr., *Elaeagnus conferta* Roxb., *Maesa montana* A. DC., *Rubia sikkimensis* Kurz, *Sarcopyramis napalensis* Wall., *Sarcococca coriacea* Sweet and *Stephania elegans* Hook.f. & Thomson

Distribution: Myanmar, China, Vietnam and India. In India, it has been reported from Arunachal Pradesh, Assam and now from Manipur.

Specimens examined: INDIA: Manipur, Senapati District, Kakhe, 1740 m, 18.02.2017, N. Dhatchanamoorthy 120428 (FRLH).

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