

Diversity of woody parasites in Doboka, Hawaipur and Komorakata Reserve Forest of Hojai District, Assam, special reference to Loranthaceae Juss. and Santalaceae R. Br.

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Abstract

Present study evaluates 5 species of the family Loranthaceae under 4 genera and 1 species of Santalaceae under single genus within the area of Doboka, Hawaipur and Komorakata Reserve Forests of Hojai District. For taxonomic enumeration, description, photographs, distribution, habitat, host plants etc. are recorded. Geographical locations of collected specimens are provided along with the description. Taxonomic key of the genera and species is prepared among the recorded species. Study of flowering plants in this area is very less and study of parasitic plants in this area is not done earlier.

keyword: Doboka, Hawaipur, Komorakata, Loranthaceae, Santalaceae, flowering parasitic plants.

INTRODUCTION

Species belonging to the family Loranthaceae Juss. are mainly shrubby hemiparasites on woody plants. They are commonly known as showy mistletoe. The family consist of 77 genera and about 900 species throughout the world (POWO, 2024). In India, it represents 49 species under 8 genera (Rajasekaran, 2012). Within Assam, it is reported 13 species under 7 genera (Barooah & Ahmed, 2014). In Bodoland Territorial Area District (BTAD), the family is represented by 5 species under 4 genera (Borthakur *et al.* 2018).

The family Santalaceae R. Br. is also taxonomically closer to Loranthaceae Juss. But differs morphologically like floral morphology, floral anatomy, embryology etc. Earlier the family was known as Viscaceae Batsch. Now, it is treated as separate family (APG-IV). Santalaceae is represented by about 540 species under 34 accepted genera world widely. In India, it is represented by 12 species under 6 genera (Flora of India, 2012). Both the families extends their distribution in tropical and subtropical regions, also found in temperate regions. They grow on branches of higher plants and get contacted anatomically to the branches of host plants.

Parasitic angiospermic plants are found in the mid, fringes and roadside areas on selective host species.

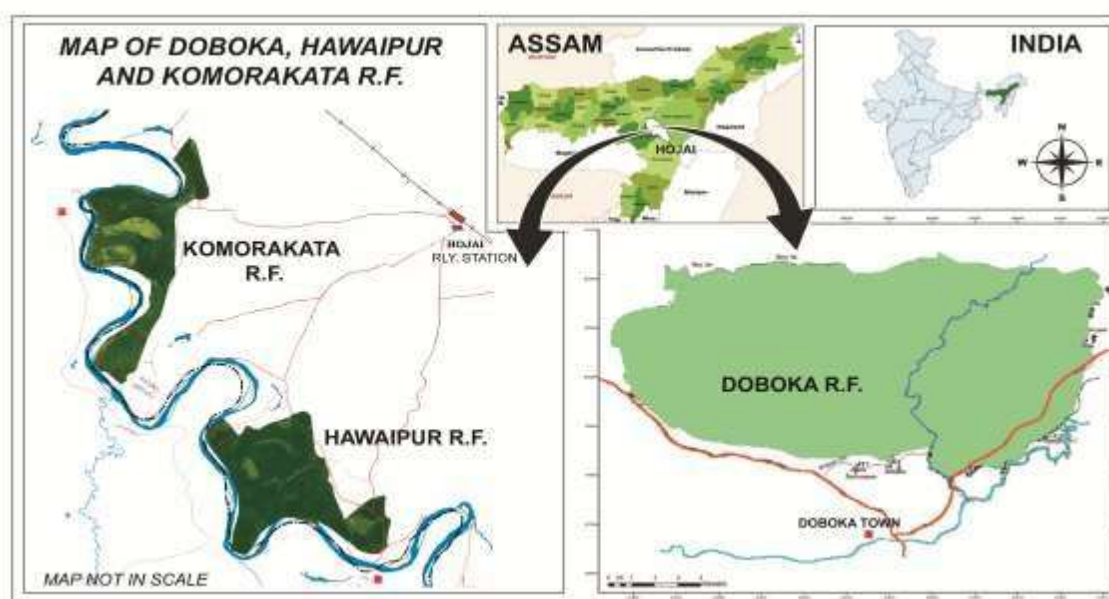


Figure 1: Map of Study Area

The present study has been carried out in three reserve forests of Hojai District of Assam. Komorakata and Hawaipur R.F. are continuous along a major river Kopili in the west of the district. The geographical area covers from the longitude of 92°45'2" - 93°15'2" E and latitude 25°45'2" - 26°15'2" N. The physical area is covered by 948.2 hectares. Doboka R.F. is located on the north of the district within the longitude of 92°46'0" - 92°57'0" E and latitude 26°6'0" - 26°13'0" N. It is covered by an area of 12,250 hectares. The natural forest area is covered with basically mixed semi-evergreen and moist deciduous forest comprises of *Albizzia lebbek*, *Albizzia lucida*, *Albizzia odoratissima*, *Albizzia procera*, *Alstonia scholaris*, *Artocarpus chaplasha*, *Bauhinia variegata*, *Bombax ceiba*, *Cassia fistula*, *Cassia siamea*, *Chukrasia tabularis*, *Duabanga grandiflora*, *Ficus bengalensis*, *Ficus benjamina*, *Gmelina arborea*, *Holarrhena antidysenterica*, *Lagerstroemia flos-reginae* etc. Few patches of monotypic plantation area like *Shorea robusta* L. *Tectona grandis* L. and *Trewia nudiflora* L. etc. are found.

MATERIALS AND METHODS

Extensive seasonal field collection is carried out time to time in various locations of study area. Collected plant parts are followed to prepare herbarium specimens according to standard method (Jain and Rao 1977). Identification is done with the help of various local and reference literatures (Kanjilal *et al.* 1940; Nath 1999; Bora and Kumar 2003; Rajasekaran 2012, Boro 2016; Borthakur *et al.* 2018), BSI, Shillong and POWO (2024). Voucher specimens are deposited in the herbarium of our university with collection proper numbers.

RESULTS AND DISCUSSION

Present study will provide the taxonomic descriptions and taxonomic keys among the genera found.

Taxonomic enumeration

Loranthaceae Juss.

Key to the genera

- 1 a. Bracts conspicuous, arranged in involucre **4. Tolypanthus**
- b. Bract small or inconspicuous, not in involucre **2**
- 2 a. Flowers 6 merous, subtended by 2-3 bracts **2. Macrosolen**
- b Flowers 4-5 merous, subtended by 1 bract **3**
- 3 a. Corolla lobe free **1. Helixanthera**
- b Corolla lobe fused in to a tube **3. Scurrula**

1. Helixanthera Lour.

Helixanthera ligustrina (Wall.) Danser in Bull. Jard. Bot. Buitenzorg, Ser. 3, 10: 317. 1929. *Loranthus ligustrinus* Wall. in Roxb., Fl. Ind., eds. Carey & Wall. 2: 219. 1824; Hook.f., Fl. Brit. India 5: 207. 1886.

Vern name : Roghumola (Ass.), Suthekmi-songepa (Garó), Makariang (Khasi).

Semiparasitic shrubs, up to 1 m tall; branches covered with velvety hairs at young, glabrous and brown when old. Leaves opposite and alternate, elliptic-ovate to narrowly ovate-lanceolate, subacute or acuminate at apex, 1.5 - 7.5 x 1.0–2.5 cm, subcoriaceous, hairy on young branches, and glabrous in old; Inflorescence axillary; Flowers 2 or 3 per peduncle, 4-merous, glabrous, 2.5 mm long; pedicels glabrous, 0 - 2 mm long; Petals 4, linear, broader at base, reddish; Stamens 4, erect; filaments 3.5 - 4 mm long; anthers linear-oblong; Ovary cupular, stigma capitate. Fruits ellipsoid and red when ripe.

Fl. & Fr. : February - July.

Occurrence : Commonly found near open scrub land.

Host Plant : *Ziziphus mauritiana* Lour. and *Ficus spp.*

Distribution : India, Nepal, Bhutan, Bangladesh, Myanmar, S. China, Indo-china, Thailand.

Specimen Examined : Roadside, along the eastern boundary of Komorakata R. F., Phukan RTUH-10, 16.05.2024, at latitude 25°99'62" & longitude 92°78'25".

2. Macrosolen (Blume) Rchb.

Macrosolen cochinchinensis (Lour.) Tiegh. in Bull. Soc. Bot. France 41: 122. 1984; Barlow in Fl. Malesiana, Ser. I, 13: 366, f. 35. 1997. *Loranthus cochinchinensis* Lour., Fl. Cochinch. 1: 195. 1790. *L. ampullaceus* Roxb., Fl. Ind., eds. Carey & Wall. 1: 189. 1820 & 2: 209. 1824; Hook.f., Fl. Brit. India 5:

220. 1886. *Elytranthe ampullacea* (Roxb.) G.Don, Gen. Hist. 3: 425. 1834. *E. cochinchinensis* (Lour.) G. Don, l. c. 426. 1834.

Vern name : Raghumala (Ass), Banda (Hind).

Stem parasite, 0.5 - 1 m tall; branches brown and terete. Leaves opposite and alternate, elliptic or ovate, shortly acuminate or subacute at apex, 5 - 10 x 2 - 7 cm, coriaceous, shiny above; Inflorescences axillary, centrifugal cymose; peduncles 3 - 5-flowered; Flowers 6-merous, 1.5 - 2 cm long; bracts ovate; Petals 6, united; tube terete; Stamens 6, filaments 2.5 - 3.5 mm long; anthers linear- basifixed. Ovary oblong, 2 - 3 mm long; style articulated above base, 10 mm long; Fruits globose or ellipsoid, pale yellow when riped.

Fl. & Fr. : April-July.

Occurrence : Commonly found.

Host Plant : *Ficus religiosa* Forssk.

Distribution : India, Sri Lanka, Bhutan, Bangladesh, Myanmar. China, Vietnam and Thailand.

Specimen Examined : Roadside, Hawaipur R. F., Phukan RTUH-11, 16.05.2024., at latitude 25°03'70" & longitude 92°03'59".

3. *Scurrula* L.

Key to the species

1 a Leaves subsessile, lateral nerves curvipinnate; inflorescence centrifugal pseudoraceme..... **1. *S. parasitica***

b Leaves subopposite or opposite, petiolate, midrib extending up to apex, inflorescence pedunculate..... **2. *S. pulverulenta***

1. *Scurrula parasitica* L., Sp. Pl. 110. 1753; Danser in Bull. Jard. Bot. Buitenzorg, Ser. 3, 10: 352. 1929. *Loranthus scurrula* L., Sp. Pl., ed. 2, 472. 1762; Hook.f., Fl. Brit. India 5: 208. 1886. *L. laevigatus* Wall. ex DC., Prodr. 4: 302. 1830. *L. scurrula* L. var. *laevigatus* (Wall. ex DC.) Hook.f., l. c. 209. *L. scurrula* L. var. *bengalensis* Hook.f., l. c. 209.

Vern name : Dieng-mang-kariang (Khasi), Aijiru (Nep).

Semiparasite, shrubs, 1 - 3 m tall; branches and leaves covered with rusty hairs. Leaves opposite, oblong-elliptic or ovate, acute at apex, 7 - 11 x 3 - 6 cm, coriaceous; petioles up to 1 cm long. Inflorescences axillary centrifugal; peduncles 1 or 2 in each axil, each 2 - 7-flowered, 4 - 6 mm long, hairy; Flowers 2 - 2.5 cm long; bracts ovate or elliptic; calyx annular and rusty hairy. Petals united; dark reddish brown outside, purplish inside; Stamens with 1.5 - 2.5 mm long filaments, purplish at base, reddish above; anthers oblong, 1.3 - 1.8 mm long. Ovary clavate, 2 - 2.34 mm long; stigma broadly conical. Fruits pyriform, pale green covered with hairs.

Fl. & Fr. : June-December.

Occurrence : Rarely found.

Host Plant : *Ziziphus mauritiana* Lour.

Distribution : India (throughout the country), Sri Lanka, Bhutan, Bangladesh, Myanmar. China, Vietnam and Thailand.

Specimen Examined : Roadside, along the eastern boundary of Komorakata R. F., Phukan RTUH-19, 22.11.2024., at latitude 25°08'73" & longitude 92°08'21".

2. *Scurrula pulverulenta* (Wall.) G.Don, Gen. Hist. 3: 421. 1834; Danser in Bull. Jard. Bot. Buitenzorg, Ser. 3, 10: 353. 1929. *Loranthus pulverulentus* Wall. in Roxb., Fl. Ind., eds. Carey & Wall. 2: 221. 1824; Hook.f., Fl. Brit. India 5: 311. 1886.

Semiparasite and branches shrub; young internodes flattened, widening at top, covered with white stellate hairy. Leaves opposite or subopposite, elliptic-ovate, acute or obtuse at apex, usually crisped margined, 8-12 x 4-5 cm, subcoriaceous, white stellate hairs on both surfaces at young and glabrous when old. Inflorescences centrifugal and pseudoracemes; 6-10 flowers in each peduncle; flowers 2.7-3 cm long; bract scaly. Calyx brown and annulated. Petals united; tube ventricose at the neck; lobes linear. Stamens erect; filaments 5 - 6 mm long; anthers linear-oblong, 3.5-4.2 mm long. Ovary obconical, 2-2.2 mm long; style filiform, 2-3 cm long; stigma small, subcapitate. Fruits pyriform, white stellate hairy.

Fl. & Fr. : June-December.

Occurrence : Rarely found.

Host Plant : *Malotus* spp.

Distribution : India (throughout the country), Sri Lanka, Bhutan, Bangladesh, Myanmar. China, Vietnam and Thailand.

Specimen Examined : Roadside, along the eastern boundary of Komorakata R. F., Phukan RTUH-20, 25.11.2024, at latitude 25°09'67" & longitude 92°08'27".

4. *Tolypanthus* (Blume) Rchb.

Tolypanthus involucratus (Roxb.) Tiegh., Bull. Soc. Bot. France 42: 248, in obs. 1895. *T. involucratus* Blume, Syst. Veg. ed. 15, bis (Roemer & Schult.f.) 7(2): 1731. 1830, nom. inval. *Loranthus involucratus* Roxb. [Hort. Bengal. 87. 1814, nom. nud.] Fl. Ind., eds. Carey & Wall. 2: 208. 1824; Hook.f., Fl. Brit. India 5: 218. 1886.

Vern name : Birikhamara (Ass).

Shrub, semiparasitic, up to 1.5 m tall. Stem brown, terete, arising from a tuft of main stalk. Leaves opposite to sub-opposite, rarely alternate, ovate or ovate-elliptic, 4–5 × 9–10 cm, margin entire, apex acute, upper and lower surface pubescent. Petiole 1–1.5 cm long. Inflorescence cymose, axillary, crowded or solitary, 2–2.5 cm long, flowers enclosed by involucre bracts. Involucre bracts ovate, 2–2.3 × 1–1.3 cm, pubescent, apex acute. Flowers 2–2.2 cm long. Calyx tubular, densely pubescent, minutely 5-lobed. Corolla tube 5-lobed, 1.6–1.8 cm long, reddish lined. Stamens 5, epipetalous; filament 3 mm long. Gynoecium 2 cm long. Ovary about 2 mm. Stigma red. Berry ellipsoid, yellow when ripe.

Fl. & Fr. : January-June.

Occurrence : Commonly found.

Host Plant : *Syzygium formosum* (Wall.) Mason., *Mallotus spp.*

Distribution : India (North East), Bangladesh, Myanmar, Nepal.

Specimen Examined : Doboka R. F., Phukan RTUH-12, 17.05.2024, at latitude 26°15'10" & longitude 92°02'10".

Santalaceae R. Br.

Viscum monoicum Roxb. ex DC., Prodr. 4: 278. 1830; Hook.f., Fl. Brit. India 5: 224. 1886. *V. benghalense* Roxb. ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 379. 1834. *V. edgeworthii* Brandis, Ind. Trees 552. 1906. *V. orientale* Talbot, Forest Fl. Bombay & Sind 2: 421. 1911 (non Willd., 1806).

Plant evergreen, semiparasitic shrubs, drooping up to 30 to 70 cm., much branched; Leaves subsessile, opposite, asymmetric, almost lanceolate, acute apex, coriaceous, entire and wavy along the margins, shiny, 5-nerved from the base. Inflorescence dense cymose at the nodes, sessile or subsessile; bracts connate and acute, 1 mm length, enclosing a cluster of 3 flowers; Male flowers: sessile, perianth lobes 4, about 1.2 × 1 mm; stamens 4, anthers 2-loculed, Female flowers: obovate, about 2.5 × 1 mm; perianth 4, about 1 × 0.7 mm; ovary inferior; style short; stigma capitate. Fruits usually oblong, green, shiny, 4 - 6 × 2 - 3 mm.

Fl. & Fr. : April-July.

Occurrence : Rarely found.

Host Plant : *Ziziphus mauritiana* Lour.

Distribution : India, Sri Lanka, Bhutan, Bangladesh, Myanmar. China, Vietnam and Thailand.

Specimen Examined : Roadside, along the boundary of Komorakata R. F., Phukan RTUH-14, 16.05.2024, at latitude 25°03'70" & longitude 92°03'59".

DISCUSSION AND CONCLUSION

The study area is still rich in plant diversity. Specially Doboka R.F. has dense mixed semievergreen and deciduous forests. The forest comprises of climbers, lianas, terrestrial saprophytes to trees with diverse epiphytic habits. Other two reserve forests are situated at the western boundary of the district and surrounded by number of revenue villages. Therefore, these two forests are under stress of human pressure. Still vegetation cover is prevailing its diversity. Continuous efforts have been rendered by the forest department. Specially wild elephant roaming is high in this area.

Distribution of Loranthaceae and Santalaceae is found scattered on the trees and shrubs. Mainly it is found in the trees and shrubs of edges of the forest, fringes and shrublands. All together 5 species recorded in the study area occurs commonly and few of in rare like *Scurrulaparasitica*, *S. pulverulenta* and *Viscummonoicum*. Probable carrier of seed of these plants may be the birds like Black-hooked Oriole

(*Oriolusxanthornus*), Grey headed Canary-flycatcher (*Culicapaceylonensis*), Bayaeaver (*Ploceusphilippinus*) etc. Roaming of these birds seen on such host plants during field visit. This study is the first attempt to enumerate angiospermic parasitic plant in the area. Along with this, various wild economic and medicinal plants are also there and needs exploration. Few dead river course wetlands, Seasonal wetlands constitutes diverse habitat inside the forest. Since the area is under anthropogenic pressure, afforestation is going on time to time.

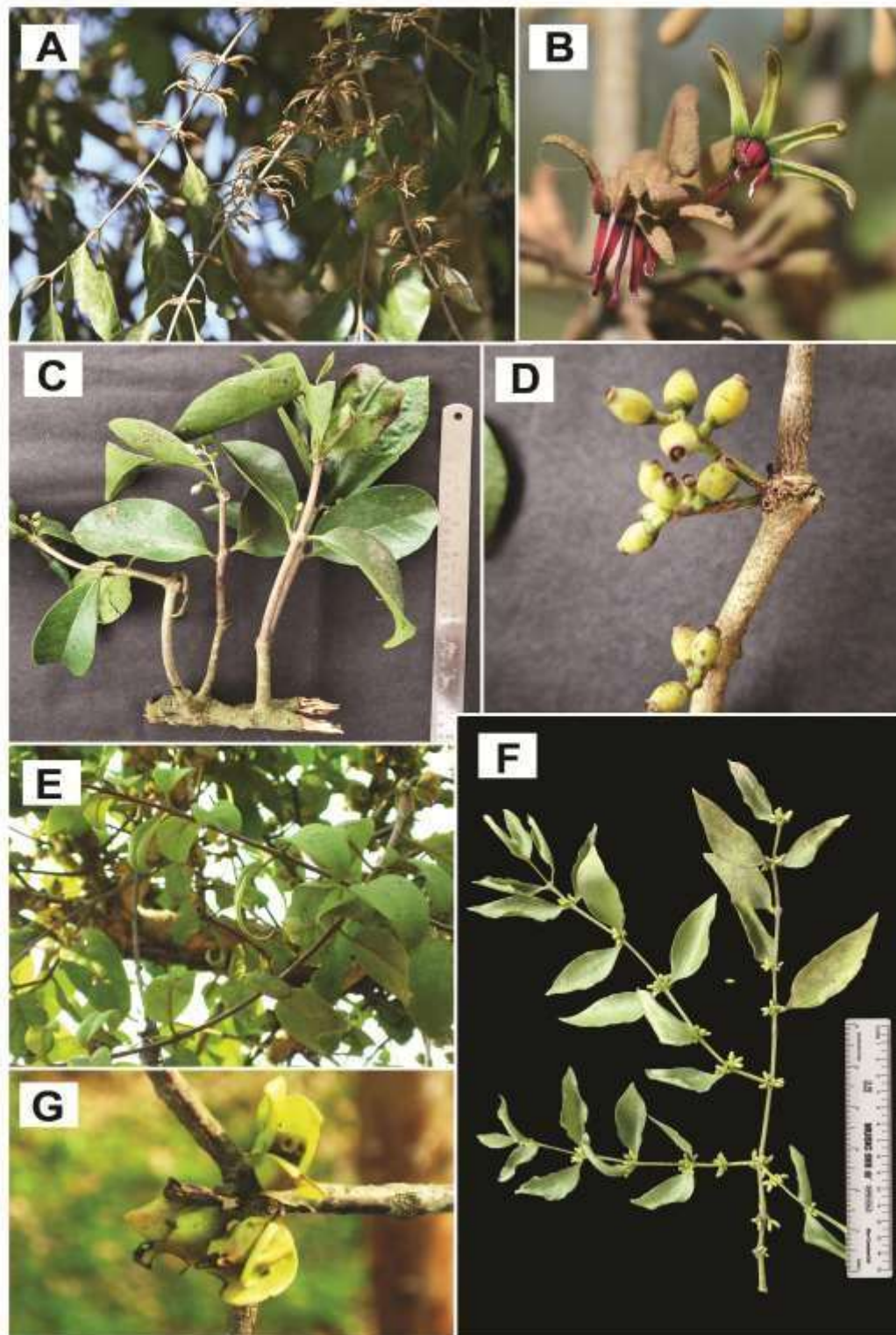


Figure 2 : [A & B]- Branches & flowers of *Scurrula parasitica* L.; [C & D] - Twigs and fruits of *Macrosolen cochinchinensis* (Lour.) Tiegh. [E, G]- Branch and fruits with involucre bract of *Tolypanthus involucreatus* (Roxb.) Tiegh., [F]- Branches with fruits of *Viscum monoicum* Roxb. ex DC.

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