

## TREE ADDITIONS TO THE FLORA OF EAST GODAVARI DISTRICT, ANDHRA PRADESH, INDIA

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Trees are a major component of the forest maintaining the ecological balance and creating a better environment for life on Earth. A tree is defined as a woody plant that attains a diameter of 10cm (or 30cm girth) or more at breast height (130cm above the ground) by Foresters and ecologists (Reddy et al. 2009). Gamble & Fischer (1915–1935); Pullaiah & Sandhyarani (1999); Rao et al. (1999); Sandhyarani et al. (2007); Reddy et al. (2008); Reddy et al. (2009); Rao & Rao (2014) worked on the Flora of East Godavari District. An understanding of the distribution of tree species must play an important role in elucidating the larger patterns of distribution of biodiversity.

**Material and Methods:** East Godavari District is located in Andhra Pradesh State with Visakhapatnam District and Bay of Bengal on the east, Odisha State on the north, West Godavari and Khammam districts on the west and southwest (Fig. 1). The upper hilly region of the district is located under 17°15'–18°02'N & 81°30'–82°36'E occupying a unique position in the Eastern

Ghats. The vegetation broadly is of the tropical deciduous type with a variety of microhabitats supporting rich plant diversity.

The explorations covered all seasons and the overall spectrum of vegetation. The specimens collected were identified and confirmed with the help of herbaria, floras and literature (Gamble & Fischer 1915–1935; Rao & Kumari 1977; Venkaiah 1980; Pullaiah & Sandhyarani 1999; Rao et al. 1999) and voucher specimens were deposited in the Andhra University Botany Department Herbarium (AUH). Nomenclatures, brief descriptions, locality of collection, distribution, flowering and fruiting period are provided.

**Results and Discussion:** A total of 16 species belongs to 16 genera and 14 families are being reported for the first time from East Godavari District. While Fabaceae and Verbenaceae are represented by two species each, all other families are represented only by a single species. All the species are located in mixed deciduous and semi evergreen forest patches of the study area. Photographs are provided for some important trees (Image 1).

Among the 16 newly recorded tree species *Albizia thompsoni* Brandis, *Lasiococca comberi* Haines and *Nothopegia heyneana* (Hook. f.) Gamble are significant as their occurrence is restricted to a few states in India



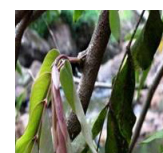
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NOT EVALUATED DATA DEFICIENT LEAST CONCERN NEAR THREATENED < VULNERABLE > ENDANGERED CRITICALLY ENDANGERED EXTINCT IN THE WILD EXTINCT  
NE DD LC NT VU EN CR EW EX

*Saraca asoca*



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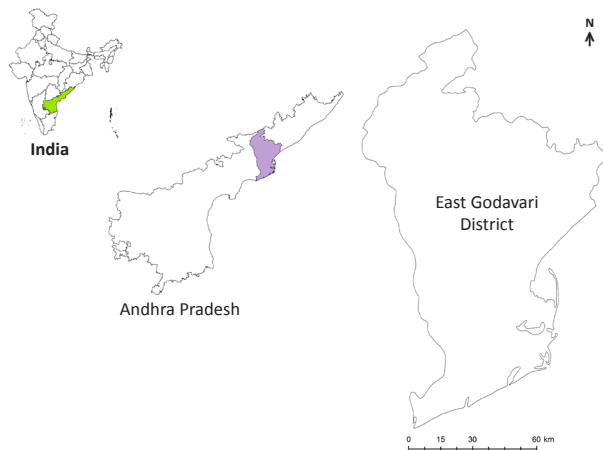


Figure 1. Map of study area

(Pullaiah & Ramamurthy 2000; Reddy et al. 2006). *Albizia thompsoni* Brandis, *Flacourtia jangomas* (Lour.) Rausch. and *Nothopegia heyneana* (Hook. f.) Gamble and *Saraca asoca* (Roxb.) de Wilde), all these four species are considered threatened by Pullaiah & Sandhyarani 1999; Reddy & Reddy 2008; Pattanaik et al 2009.

***Albizia thompsoni*** Brandis in Ind. For. 25: 284. 1899; Gamble 1: 432. 1919. (Mimosaceae)

Large deciduous tree, up to 15m height, branchlets pubescent, leaves 15–20 cm long, petiole gland above middle of the petiole, rachis tomentose with a gland between the uppermost pairs of pinnae, pinnae 3–6 pairs, leaflets overlapping, oblong, slightly falcate, rounded or semi-cordate, ashy grey when dry; flowers pale yellow with pink anthers in globose heads; pod moderately thick, red.

Flowering & Fruiting: April–October.

Date of Collection 18-04-2009, Mareduhilli, JPR-20286 (AUH).

Distribution: Endemic to Andhra Pradesh, Chattisgarh, Tamil Nadu and Odisha.

***Bauhinia emarginata*** Roxb., ex G. Don, Gen. Hist. 2: 462. 1832. *B. semla* Wunderlin in Taxon 25: 362. 1976, nom. illeg, nom. superfl. *B. retusa* Buch.-Ham. ex Roxb. Fl. Ind. 2: 322. 1832; 1878, non Poir. 1811; Gamble 1: 407. 1919. (Fabaceae)

Deciduous tree; 12 m height, leaves broader than long, rigidly coriaceous, glabrous, subcordate at base, apex deeply emarginate; flowers yellow, with purple streaks; pod broad, flattened, gradually widening to an obtuse tip.

Flowering & Fruiting: Aug.-Feb.

Date of collection: 15.vii.2010, Mareduhilli Ghat

Road, JPR-20223 (AUH).

Distribution: Punjab, Himachal Pradesh, Uttar Pradesh and Bihar in the north, Odisha, residual Andhra Pradesh and Karnataka in the south.

***Callicarpa tomentosa*** (L.) L. Syst. Veg. ed. 13. 153. 1774. *Tomex tomentosa* L. Sp. Pl. 118. 1753. *Callicarpa arborea* Miq. ex C.B. Clarke in Hook. f. Fl. Brit. India. 4: 567. 1885; non Roxb. 1832; Gamble 2: 1092. 1924. *C. lanata* L. Mant. Pl. 331. 1771; Gamble 2: 1092. 1924. (Verbenaceae)

Medium-sized tree, 9m height, young branches stellate, grey tomentose; leaves ovate to ovate-lanceolate; flowers small in axillary peduncles, purple; fruit globose, brownish-black, pyrens golden-brown; 1-seeded.

Flowering & Fruiting: June–August.

Vern: Bodiga chettu.

Date of collection: 07.viii.2009, Nulakamaddi, JPR-20287 (AUH).

Distribution: West side of the Peninsula from Bombay southwards.

***Citrus medica*** L. Sp. Pl. 752. 1753; Gamble 1: 161. 1915. (Rutaceae)

Small armed tree, 6m height, young shoots glabrous, purple; leaves 1-foliolate, petiole winged, leaflets oblong, crenate-serrate; flowers white, usually tinged with red; fruit oblong or obovoid mamilla obtuse, rind usually warted, thick, pulp scanty.

Fruiting: January–February.

Vern: Madhiphalam.

Date of collection: 26.ii.2010, Pullangi, JPR-20474 (AUH).

Distribution: Considered to be a native tree, particularly in the foot hills of the Himalaya and Khasi hills. Growing near stream banks in the study area.

***Cordia wallichii*** G. Don. Gen. Hist. 4:379. 1838; Gamble 2: 887. 1923. *C. tomentosa* Wall. in Roxb. Fl. Ind. 2:339. 1824; non Roem. & Schult. 1819. *C. obliqua* Willd. var *wallichii* (G.Don.) C.B. Clarke in Hook. f. Fl. Ind. 4:137. 1883. (Boraginaceae)

A deciduous tree, 9m height, branchlets yellowish-tomentose; leaves ovate, base truncate, sub cordate, margin entire, acute-obtuse, fulvous-tomentose beneath; flowers white; drupe ovoid, glabrous, 2–4 seeded, fruiting calyx tomentose, not ribbed.

Flowering & Fruiting: March–June.

Date of collection: 15.ii.2009, Koyyalagudem near Kakavada, JPR-20164 (AUH).



Image 1. a - *Albizia thompsoni* Brandis; b - *Lasiococca comberi* Haines; c - *Nothopegia heyneana* (Hook. f.) Gamble; d - *Saraca asoca* (Roxb.) de Wilde

Distribution: Peninsular India.

***Elaeocarpus tectorius*** (Lour.) Poir. in Lam. Encycl. Suppl. 2: 704. 1812. Subbarao & Kumari, Fl. Visakhapatnam Distr. 119.2002. *Craspedum tectorium* Lour. Fl. Cochin. 336. 1790. *Elaeocarpus oblongus* auct. Non Gaertn. 1788 Gamble 1: 124. 1915. (Elaeocarpaceae)

Tall tree, 16m height, branches terete; leaves coriaceous, ovate-lanceolate or oblong-lanceolate, glandular beneath, serrate; flowers white in racemes; fruit drup, oblong, softly grey-puberulos; rugose, pitted.

Flowering & Fruiting: August–November.

Vern: Guttemanu.

Date of collection: 18.iv.2009, Pullangi, JPR-20477 (AUH).

Distribution: Eastern Himalaya, Sikkim, Assam, Meghalaya.

***Ficus auriculata*** Lour. Fl. Cochin. 666. 1790. *F. roxburghii* Wall. ex Steud. in Ann. Mus. Lugd.-Bat. 3: 296. 1867; FBI 5: 534. 1888. *F. macrophylla* Roxb. &

Buch.-Ham. ex Sm. Cycl. 14: 32. 1810. non Desf. 1804. (Moraceae)

Medium sized tree, 10m height, bark smooth; leaves broadly ovate, base broadly truncate or sub-cordate, coriaceous, thinly hispid above; figs paired, obovoid, pubescent; achene granulate.

Flowering & Fruiting: February–May.

Vern: Bodda.

Date of collection: 20.i.2010, Dummakoda hill top, JPR-20375 (AUH).

Distribution: Himalaya from Punjab, Chota Nagpur, Odisha.

***Flacourtia jangomas*** (Lour.) Raeusch. Nomencl. Bot. ed. 3: 290. 1797. *Stigmarota jangomas* Lour. Fl. Cochin. 2: 634. 1790. *Flocourtia cataphracta* Roxb. ex Buch.-Ham. ex Sm. Willd. Sp. Pl. 4: 830. 1806; Gamble 1: 54. 1915. (Salicaceae)

Small armed tree, 6m height, spines compound; leaves oblong or oblong-lanceolate, flowers dioecious; fruit purple.



Flowering & Fruiting: March–August.  
 Vern: Kuragai.  
 Date of collection: 25.iv.2010, Maredumilli, JPR-20260 (AUH).

Distribution: Assam, West Bengal, Andhra Pradesh and Maharashtra.

***Lasiococca comberi*** Haines in Bull. Misc. Inform. Kew 1920: 70. 1920; Gamble 2: 1334. 1925. *Homonium comberi* (Haine) Merr. in Lingnan Sci. J. 19 : 188. 1940. (Euphorbiaceae)

Medium sized tree, up to 9m height, branchlets tomentose; leaves subverticillate, obovate, cordate at base, wavy-cartilaginous, caudate, male flowers in axillaryracemes, female flowers solitary in axils of terminal leaves or sub-corymbose in axils of bracts; capsule covered with conical tubercles ending in hair; seeds globose, brown.

Flowering & Fruiting: August–September.

Date of collection: 16.v.2010, Gorabunda, JPR-20209 (AUH).

Distribution: Odisha, Maharashtra and Andhra Pradesh (Visakhapatnam district and Chittoor districts).

***Milusa velutina*** (A.DC.) Hook. f. & Thomson. Fl. Ind. 151. 1855; Gamble 21. 1915. *Gutteria velutina* A.DC. Mém. Soc. Phys. Genève 5: 218. 1832. *Uvaria velutina* Dunal Monogr. Fam. Annon. 91. 1817. (Annonaceae)

Deciduous tree, 7m height, young branchlets densely tomentose; leaves ovate or oblong, flowers yellow; fruitlets subglobose, purple.

Flowering & Fruiting: February–July.

Vern: Chilaka duduga

Date of collection: 19.iv.2009, Bodlanka, JPR-20451 (AUH).

Distribution: Jammu & Kashmir, Uttar Pradesh, Bihar, West Bengal, Assam, Meghalaya, Odisha and Madhya Pradesh.

***Nothopegia heyneana*** (Hook.f.) Gamble Fl. Pres. Madras 1: 265. 1918. *N. colebrookeana* (Wight) Blume var. *heyneana* Hook.f. Fl. Brit. India. 2: 40. 1876. (Anacardiaceae)

Medium-sized tree; 10m height, leaves elliptic-oblong or elliptic-lanceolate, shining above, white beneath; flowers polygamous, yellowish-white; drupe blue, top depressed.

Flowering & Fruiting: January–May.

Date of collection: 10.iii.2011, Gorabunda, JPR-20233 (AUH).

Distribution: Maharashtra, Odisha, Tamil Nadu and

Andhra Pradesh (Visakhapatnam East Godavari districts). Rare in the Eastern Ghats.

***Putranjiva roxburghii*** Wall. Tent. Fl. Nap. 61. 1826; Gamble 2: 1331(917). 1925. *Dryptes roxburghii* (Wall.) Hurus. in J. Fac. Sci. Univ. Tokyo Sect. 3, Bot. 6: 335. 1954. (Putranjivaceae)

Tree, 12m height, dioecious, branchlets puberulous; leaves elliptic-oblong or lanceolate, serrulate; flowers axillary clusters; drupe ellipsoid, pubescent; seeds crustaceous.

Flowering & Fruiting: July–December.

Vern: Puttaranjivika.

Date of collection: 01.ix.2010, Y. Ramavaram, JPR-20295 (AUH).

Distribution: Peninsular India.

***Saraca asoca*** (Roxb.) de Wilde in Blumea 15: 393. 1968. *Jonesia asoca* Roxb. in Asiat. Res. 4: 365. 1799. *Saraca indica* auct. non L. 1769; Gamble 2: 409. 1919. (Fabaceae)

Small tree, 9m height, leaves even pinnate, leaflets 4-6 pairs, oblong, coriaceous; flowers brilliant orange-yellow, pink with age in short dense often lateral corymbose panicles; pod flate, oblong, coriaceous, woody; seeds obovate-orbicular, compressed.

Flowering & Fruiting: January–December.

Vern: Asoka.

Date of collection: 20.vi.2009, Gorabunda, JPR-20204 (AUH).

Distribution: Andhra Pradesh, Odisha, Western Ghats, northeastern India, often cultivated throughout India.

***Solanum giganteum*** Jacq. Collectanea 4: 125. 1790; Gamble 2: 937. 1923. (Solanaceae)

An armed small tree, up to 6m tall; leaves oblong-lanceolate, glabrescent above, pubescent below; flowers blue-purple; berry red when ripe; seeds compressed.

Flowering & Fruiting: June-January.

Date of collection 25.viii.2009, Satlavada, JPR-20280 (AUH).

Distribution: Southern India.

***Toona ciliata*** Roem. Syn. Hesper. 139. 1846. *Cedrela toona* Roxb. ex. Rottl. Ges. Nuturf. Freunde Berlin Neue Schriften 4: 198. 1903; Gamble 1: 186. 1915. (Meliaceae)

A large tree, 20m height, branchlets tomentose; leaves imparipinnate, leaflets 6–9 pairs, lanceolate or ovate-lanceolate, glabrous, base oblique, margin entire, apex acuminate; flowers white; capsule septifragal,

5-valved, oblong winged.

Flowering & Fruiting: December–March.

Date of collection: 25.iv.2010, Nulakamaddi, JPR-20245 (AUH).

Distribution: Himalaya from the eastwards, central and southern India.

***Vitex leucoxylo*** L.f. Suppl. Pl. 293. 1781; Gamble 2: 1103. 1924. *Wallrothia leucoxylo* (L.f.) Roth, Nov. Pl. Sp. 391. 1821. (Verbenaceae)

Large tree ; 15m height, leaves coriaceous, 3-5-foliate, leaflets oblanceolate, glabrescent, petiole not winged; flowers white; drupe ellipsoid, dark purple.

Flowering & Fruiting: February–April.

Vern: Kokki

Date of collection: 21.viii.2009, Gurtedu, JPR-20288 (AUH).

Distribution: Peninsular India.

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