



New record of seven exotic plant species to India from Puducherry region

P Uma Maheswari^{1*}, V Kumaresan¹, N Balachandran²

¹Department of Botany, Kanchi Mamunivar Government Institute for Postgraduate Studies and Research, Puducherry, India

²Department of Ecology, French Institute of Pondicherry, Puducherry, India

Abstract

The present investigation found and added seven tree species to the flora of India but they are all introduced at Auroville and Merveille, Puducherry. The seven species are *Acacia ampliceps*, *Acacia torulosa*, *Acacia tumida*, *Ateleia insularis*, *Erythrophleum suaveolens*, *Pseudosamanea guachapele*, and *Plectrocarpa arborea*. Of which six species are categorised under least concern and only one is listed as endangered. A detailed description, global distribution, special remarks if any and digital images to all the species were provided for easy identification.

Keywords: *Acacia*, *Ateleia*, *Erythrophleum*, India, new record, *Pseudosamanea*, *Plectrocarpa*

Introduction

The recent estimate of angiosperm species in India is 21984 (Mao *et al.* 2022) that drastically increased from 18043 species (Singh and Dash 2014). Every year sizable number of flowering plants have been added to the Indian flora as new to the science and new distributional record. Between 2009 and 2018 a total of 1122 (35%) species of flowering plants have been discovered. During the year 2019 a total of 253 taxa, 267 species from 2020 and 315 plants in 2021 were added as new species and new distributional record to the Indian flora. Among the additions, new distributional record in 2019 is 48, 65 from the year 2020 and 125 in 2021. Generally maximum number of discoveries were made from the three biodiversity hot-spots i.e. Western Ghats, Western Himalaya and Eastern Himalaya and from other natural habitats by the scientist of government and private (research and academic) sector. Meanwhile, since ages the exotic species have been introduced intentionally or accidentally to India in the botanical gardens or arboretum (Chowdhary and Pandey 2007) ^[2] and those were recorded in the Indian floras as cultivated taxa (Mao and Dash 2020, Narasimhan and Sheeba 2021, Ravikumar *et al.* 2021) ^[1, 9]. Specific location-based studies on this exotic / invasive species have been carried out in different occasions (Sudhakar Reddy 2008, Singh 2012) ^[13, 11].

As part of the PhD program of the first author, enumeration of the woody plant species was conducted in and around Pondicherry (Fig. 1) between August 2018 and July 2022. During the exploration a total of 763 species were recorded, included only shrubs, trees and climbers. These specimens were identified after a deep perusal of literatures (Matthew 1983, Chowdhary *et al.* 1992, Graf 2003, Lewis 2005, Chowdhary and Pandey 2007) ^[7, 5, 6] and web-links (Flowers of India: <http://www.flowersofindia.net/>, Plants of the World Online: <https://powo.science.kew.org/>, Australian National Botanical Garden:

<https://www.anbg.gov.au/acacia/>). The seven species namely *Acacia ampliceps* Maslin, *A. torulosa* Benth, *A. tumida* F. Muell. ex Benth, *Ateleia insularis* Standl, *Erythrophleum suaveolens* (Guill. & Perr.) Brenan, *Plectrocarpa arborea* (Jacq.) Christenh. & Byng and *Pseudosamanea guachapele* (Kunth) Harms, have not been recorded in the recent Indian checklist (Mao *et al.* 2020) ^[1, 14], Plant Discoveries (Mao *et al.* 2021, 2022) and the floras (Singh & Singh 1997) ^[12]. Hence, all the species are reported here forms as new additions to the flora of India and Asia too.

Materials and methods

Puducherry is one of the four regions in the Union Territory of Pondicherry. Since the freedom from the French colony to till date the biodiversity of Pondicherry has not fully known. The present study aimed to explore the “Woody Flowering Plants of Pondicherry” for which periodical survey was conducted in five communes and two municipalities. All the woody species and their floral, morphological and special characters were photographed with Nikon DSLR 5300 model camera. Voucher samples collected for every species, processed into herbarium and those were deposited and as well as consulted HIFP, AURO herbariums.

Puducherry has no prime forest however it has sacred groves, mangroves, plantations through social forestry schemes, private and government gardens, farms, avenues and parks. In which two well established gardens (Auroville Botanical Garden and Pondicherry Botanical Garden and two restoration sites (Aranya Forest and Sanctuary and Merveille) was also included in the study (Fig 1). It has been established to conserve and / increase the genetic diversity of the plants from different climatic conditions, habitats and bioregions in these gardens / restored sites.

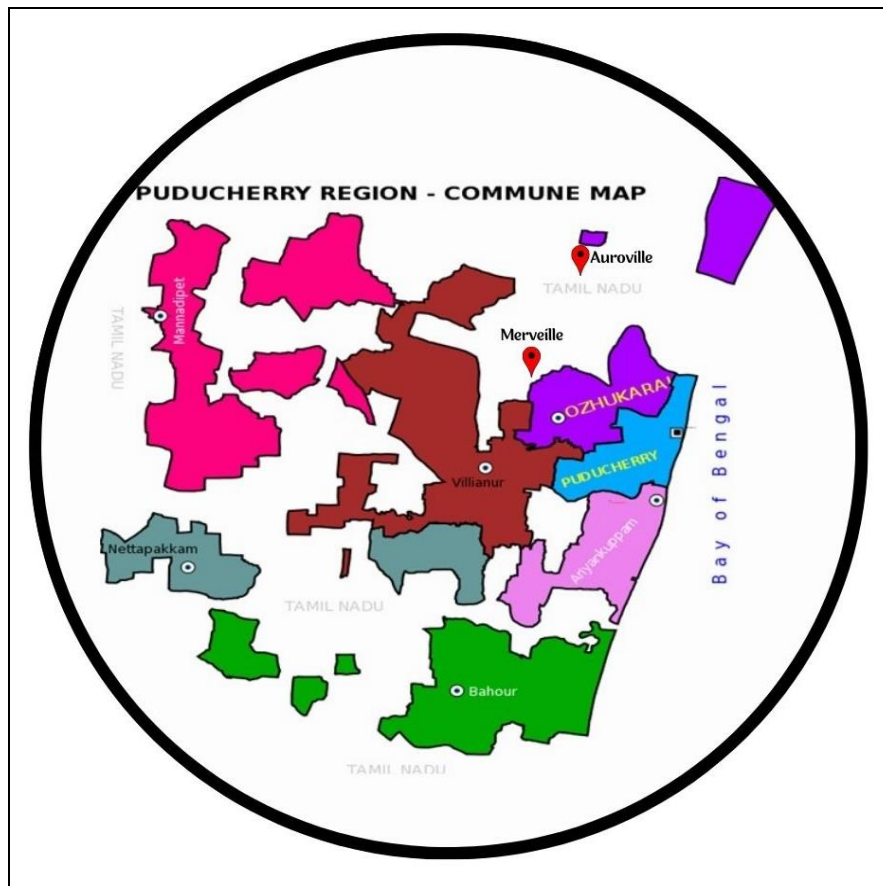


Fig 1: Study area, Puducherry region and its surroundings

Taxonomic treatment

Acacia ampliceps Maslin Nuytsia 1: 315 (1974) (Figure 2a)
Fabaceae – Mimosoideae

Bushy shrub to small tree. Stem yellowish, glabrous. Branchlets are frequently pendulous. Phyllodes are alternate, linear to lanceolate, 7-25 cm long, light green, glabrous, Primary vein 3, prominently visible, penninerved; glands 2, with lowermost prominent. Inflorescences terminal or axillary, 2-11 headed racemes, peduncles robust, glabrous; flower heads globular, white to cream. Flowers 5-merous 0.8- 1.2 cm, calyx united. Pods 6-12 cm long, 4-6 mm wide, breaking at constrictions, glabrous. Seeds longitudinal, oblong.

Specimens examined

India, Puducherry, Ousteri region, Merveille. 11 57°8.3''N, 79 45°57.2''E and 30 m alt. 5.2.2009. C. Anupama and Ponnuchamay. HIFP 024874.

IUCN status: Least concern

Flowering and fruiting: May - November.

Distribution: Global

North and north western territory of Australia. Introduced in India

Note: This species was first introduced through seeds at Pitchandikulam forest, Auroville during 1986. In the year 2002, the saplings were collected and planted at Merveille. Propagation is easy by seed and it spreads elsewhere but it requires wet field. It also works well in alkaline soil.

Acacia torulosa Benth. J.Proc. Linn. Soc., Bot. 3: 139 (1859). (Figure 2b)

Fabaceae – Mimosoideae

Tree, to 4-15 m high. Bark flaky; branchlets angled towards apices, become terete, glabrous. Phyllodes rigid, linear to narrowly elliptic, 5–20 x 0.4–1.8 cm, thin to moderately coriaceous, yellowish green; with 3 prominent nerves; gland 1 or 2, 2 mm above the pulvinus base; Spikes 1–4 cm long. Flowers 5-merous; calyx 0.5–0.8 mm long, free almost to base, with hyaline hairs; corolla 0.8–1.3 cm long, glabrous; ovary densely pubescent. Pods linear, moniliform, glabrous. Seeds elliptic, 4.4–6.5 mm long, dark brown; areole narrowly oblong, open.

Specimens examined

India, Puducherry, Ousteri region, Merveille. 11 57°8.3''N, 79 45°57.2''E and 40 m alt. 26.3.2014. C. Krishnakumar. AURO 14223.

IUCN status: Least concern

Flowering and fruiting: March – September.

Distribution: Global – Native to Australia, northern territory to Queensland. Introduced in India.

Note: Only 6 trees in Merveille; planted during 2002, found very poor seed setting and regeneration.

Acacia tumida F.Muell. ex Benth. Fl. Austral. 2: 409 (1864) (Figure 2c)

Fabaceae – Mimosoideae

Tree, normally with single and well-developed trunk, crown dense. Bark grey and fissured. Branchlets commonly pruinose, not flexuous. Phyllodes lanceolate-falcate, sometimes sub-falcate, c. 10–20 x 2.5–6 cm, normally grey-green to glaucous, sometimes green. Peduncles 2–12 mm long; spikes 2–7 cm long. Pods normally straight to curved, sometimes coiled, 6–11 mm wide. Seeds c. 6–7 x 3–4 mm.

Specimens examined: India, Puducherry, Ousteri region, Merveille. 11 57°8.3'N, 79 45°57.2'E and 40 m alt. 26.3.2014. C. Krishnakumar. AURO 14226.

IUCN status: Least concern

Flowering and fruiting: June – October

Distribution: Global

North to north Western Australia. Introduced in India.

Note: Looks very similar to *A. torulosa* but it could be easily differentiated by the size and shape of leaves.

Ateleia insularis Standl. Contr. U.S. Natl. Herb. 20:175 (1919). (Figure 2d)

Fabaceae –Faboideae

Tree to 7 m high; leaves compound, 14-20 cm, alternate, unipinnate, leaflets 5-9, venation pinnate, asymmetric, basal leaf 2.4-3.6 cm length, 1-1.6 cm width, terminal leaf 4-6.5 cm length, 2-2.4 cm width, glabrous, coriaceous, Inflorescence terminal raceme, flower white, corolla 1, 0.5 cm, anthers 11, fruit pod, 2-3 cm, green in colour, seeds 0.8-1 cm, red in colour.

Specimens examined

India, Puducherry, Ousteri region, Merveille. 11 57°8.3'N, 79 45°57.2'E and 40 m alt. P. Uma Maheswari and N. Balachandran. India, Tamil Nadu, Viluppuram District, Auroville Botanical Garden, 11.9866913, 79.807478. 12.2.2019 P. Uma Maheswari and N. Balachandran. HIFP 027819.

IUCN status: Endangered

Flowering and fruiting: November –March.

Distribution

Global - Mexico Southwest. Introduced in India.

Note: Only one tree in Merveille. Numerous and different honey bees used to visit the attractive white fragrant flowers while blooming to take pollen & nectar from this flower.

Erythrophleum suaveolens (Guill. & Perr.) Brenan. Taxon 9: 194 (1960). (Figure 2e)

Fabaceae – Caesalpinioideae

Medium to large sized tree, 20 -30 m high, with rough bark; Leaves compound, bipinnate, glabrous, petiole 11–35 cm. Pinnae 2–4 pairs, 9–19 cm. leaflets 7–14 per pinnae, ovate-elliptic, asymmetric, mostly long and 1.3–5.3 cm. wide,

acuminate at apex, glabrous or sometimes with spreading pubescence on midrib beneath; petiolules 3–5 mm. long. Racemes 3–8(–11) cm long, shortly pubescent or puberulous (including the flowers). Flowers yellowish-white to greenish-yellow. Calyx-lobes 1–1.5 mm long, distinctly connate below. Petals 2–3 x 0.5 mm. Stamen-filaments glabrous or nearly so. Pods often slightly curved, 8–17 x 3–5.3 cm, broadly rounded at apex; dehiscing along one suture only, 6–11-seeded, seeds brown, oblong-ellipsoid, 14–17 x 10–12 mm, with thick endosperm.

Specimens examined

India, Puducherry, Ousteri region, Merveille. 11 57°8.3'N, 79 45°57.2'E and 40 m alt. P. Uma Maheswari and N. Balachandran. India, Tamil Nadu, Viluppuram District, Auroville Botanical Garden. 11.9866913, 79.807478. 12.12.2022 P. Uma Maheswari and N. Balachandran. HIFP 027878.

IUCN red list: Least concern

Flowering and fruiting: March – July.

Distribution: Tropical Africa

Note: Only one seedling was introduced at Pitchandikulam, Auroville during 1986. It was uprooted by the destructive cyclone “Thane”. Air layering, crafting and cutting methods were attempted, raised sapling and it was distributed in many communities of Auroville. One was planted in Merveille at 2013 and now it is flowering and fruiting.

Plectrocarpa arborea (Jacq.) Chhristenh. & Amp.; Byng Global Fl. 4: 92 (2018). (Figure 2f)

Zygophyllaceae

Tree, with spreading, dense and rounded canopy; generally multi-trunked, stronger and fast growing. Evergreen, Leaves compound, bipinnate, feather-shaped with many small, alternate leaflets. Coriaceous, venation parallel, margin entire, ovate, 15 - 18 cm, leaflets opposite, number of pinnae 16 -19. Pinnae alternate. Inflorescence panicle. Flower monoecious, spatula shaped, yellow colour, petal 5, showy, no fragrance. Capsule fruit, winged, 4-6 cm long.

Specimens examined

India, Tamil Nadu, Viluppuram District, Auroville Botanical Garden, 11.9866913, 79.807478. 9. 7.21. Sivasankaran & K Costoory. AURO 14942.

Flowering and fruiting: February – May.

Distribution

World – Colombia to Venezuela. Introduced to India.

Note: The seedlings was planted during 2019 next to AURO herbarium at Auroville Botanical Garden. Now this plant is 4 m high and started flowering and fruiting.

Pseudosamanea guachapele (Kunth) Harms Notizbl. Bot. Gart. Berlin – Dahlem 11:54 (1930). (Figure 2g)



a. *Acacia ampliceps*



b. *Acacia torulosa*



c. *Acacia tumida*



d. *Ateleia insularis*



e. *Erythrophleum suaveolens*



f. *Plectrocarpa arborea*



g. *Pseudosamanea guachapele*

Fig 2: Seven exotic additions to the flora of India

Fabaceae – Mimosoideae

Tree with single trunk, 10-20 m tall, crown rounded, brevidciduous. Leaves 25-30 cm long; petiole 5-6 cm long, villous to velutinous, rachis 5.3-16 cm long, villous to velutinous, pinnae 3-5 pairs, each 6-12 cm long, with a gland at the terminal pair of pinnae. Each pinnae 8-10 pairs of leaflets, elliptical to obovate, apex rounded, base oblique, adaxial and abaxial surfaces canescent pilose, venation pinnate. Inflorescence heteromorphic: flowers in an open

panicle of 2-3 fascicles of umbels; peduncles 5-6 cm long, pubescent; bracts linear lanceolate, 3-4 mm long, densely pubescent; corolla campanulate to tubular, mm long, peduncle; 4-5 cm, stamens c. 28 per flower, ovary pubescent, sessile. Legume green to brown, dehiscent along both sutures, valves undulating, slightly raised over the seeds; seed white colour flat and straight, apex acute, base rounded.

Specimens examined

India, Puducherry, Ossudu, Merveille, 11 57°8.3'N, 79 45°57.2'E and 40 m alt. 10.2.2020; Tamil Nadu, Viluppuram district, Auroville Botanical Garden, 11.9866913, 79.807478, P. Uma Maheswari and N. Balachandran. HIFP 027704.

IUCN red list: Least concern

Flowering and fruiting: February – May.

Distribution

World – Colombia to Venezuela. Introduced to India

Note: “Index Seminum”, a seed exchange program was functioned up to 1993 in Auroville through which seeds were shared among more than 100 countries. *P. guachepele* was one of them received from Australia, raised seedling and planted at Shakti, Auroville and Merveille.

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