



RESEARCH COMMUNICATION

A new distributional record of *Ficus altissima* Blume (Moraceae) in Tripura: an occasionally confused fig species with *Ficus benghalensis* L.

Smita Debbarma, Biplab Banik*, Koushik Majumdar & Badal Kumar Datta

Plant Taxonomy and Biodiversity Laboratory, Department of Botany, Tripura University, Suryamaninagar 799 022, Tripura, India

*Email: biplab.botany@tripurauniv.in

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ABSTRACT

The present communication is the first report of new distributional record of *Ficus altissima* Blume (Moraceae) in Tripura. *F. altissima* was found to be an important feeding and nesting habitat for forest frugivores, since the genus is very rich in diversity and is considered as a keystone species. This also possesses huge scope to understand the mechanism of interactions especially for conservation of rich avifaunal diversity. Brief description and field photographs are presented for facilitating easy identification of the species.

Introduction

Ficus L. is one of the largest genus of angiosperm with about 850 species comprising trees, shrubs, climbers, and creepers distributed throughout tropics and subtropical regions (1–3). The species of *Ficus* are instantaneously recognizable by the very distinguishing inflorescence, the “syconium”. Fig wasps, Hymenoptera of the family Agaonidae, are exceptionally specialized symbiotic pollinators of *Ficus* with life cycles closely tied to the flowering and fruiting cycles of the figs. Fig trees are being keystone species and ecologically significant because they sustain populations of the many seed dispersing animals that feed on their fruits throughout the year (4).

In India, the genus is represented by about 115 taxa, of which 89 species and 26 infraspecific taxa with high species richness in the North East India (5). The first systematic account on Indian *Ficus* was prepared and published by King (6–7). He had recorded 112 species and 47 infraspecific taxa from whole British India (7), out of which only 75 species and 16 infraspecific taxa were reported from the present geographical boundary of India (5). A great number of works had been published on the systematics of *Ficus* from different regions of the world (2, 8–10) which have contributed to

identification, classification and nomenclature. The genus has been further classified into six subgenera, 19 sections and 27 subsections based on morphological characters and distribution pattern (2).

Ficus benghalensis L. (= *F. indica* L.) is believed to be the giant species of *Ficus* in India and some of its morphological characters are overlapping with *F. altissima*. As per the description (11), the main differences between *F. altissima* and *F. benghalensis*, two tall banyans with somewhat similar leaves and syconium is that, *F. benghalensis* has a much more widely spreading crown than that of *F. altissima* and infinitely more secondary trunks. Both the species commonly have two sets of large basal veins. The ripe figs of *F. benghalensis* are globose, red, velvety, smaller than those of *F. altissima*, and have three separate leafy basal bracts. *F. altissima* has glossy leaves with a conspicuous light-coloured V shaped by its single set of large basal veins, and a rounded apex bearing all abrupt acumen. The figs of *F. altissima* are ovoid, usually yellow and bare, and rest on a thick pad of united basal bracts.

The state of Tripura situated in the sub-Himalayan region of North East India. Indo-Burma biodiversity region is considered as one of the hotspots in the world and the state of Tripura is being part of it (12–13). According to the Bio-geographic classification of India, the

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state is in the "North-East" bio-geographic zone (14) and has a geographical area of 10,491 km². As per the report of the Forest Survey of India (15) total forest and tree cover in the state is 8,044 km² i.e., 76.71% of the total State's geographical area. In the North-eastern states of India, *F. altissima* is reported from Arunachal Pradesh, Assam, Mizoram, Meghalaya and Sikkim (5). An early study by Deb (16) reported 22 species of *Ficus* from Tripura and there is no literature record for the occurrence of this species in the state of Tripura so far. Moreover, habitat assessment and floristic study of this genus in Tripura are scanty and still lacking. Consequently, the floristic study led to the collection and identification of *F. altissima* from Tripura and presented it as a new distribution record.

Materials and Methods

During the floristic survey in 2019 in the state of Tripura, we recorded a total of 8 Fig trees, four from Agartala with an average girth of 87 cm, and three from Mandai with an average girth of 178 cm, one from Tripura University Campus with girth of 206 cm. The height of these trees ranged between 5–12 m. Specimens were collected from the field for taxonomical study and made into herbarium following the standard procedure (17). Critical examination of the specimens and detailed literature search (11, 18–20) confirmed its identity as *Ficus altissima*. This taxon is presented by a detailed description, details of phenology and distribution, IUCN status and field photographs (Fig. 1). The voucher specimens were deposited in the herbarium of the Department of Botany, Tripura University (TUH). A comparative account of major morphological characters of *F. altissima* and *F. benghalensis* is presented in Table 1.

Results

Taxonomic treatment

Ficus altissima Blume, Bijdr. Fl. Ned. Ind. 9: 444. 1825; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 30, t.30, 31, 82s, 82s.1. 1887 & in Hook. f., Fl. Brit. India 5: 504. 1888; Prain, Bengal Pl. 2: 734. 1903; Brandis, Indian Trees 600. 1906; Kanjilal *et al.*, Fl. Assam 4: 240. 1940; Grierson & Long, Fl. Bhutan 1(1): 97. 1983; Balakrishnan Flora of Jowai 2: 437. 1983; Haridasan & Rao, F. Fl. Megh 2: 820. 1987; Chauhan in Hajra, Contrib. Fl. Namdapha 284. 1996; Bose *et al.*, Trees of the world 1: 211. 1998; Wu *et al.*, in Wu *et al.*, Flora of China 5: 41. 2003; Berg and Corner in Nootboom, Fl. Malesiana 17(2): 625. 2005; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 399. 2008; Berg *et al.*, in Santisuk *et al.*, Fl. of Thailand 10(4): 601. 2011; Chaudhary *et al.*, Taiwania 57(2): 210. 2012.

F. laccifera Roxb., Fl. Ind. 3: 545. 1832; Wight, Icon. Pl. Ind. Orient. 2: t. 656. 1843.

F. altissima var. *laccifera* (Roxb.) Prain. in Bengal Pl. 2: 734. 1903.

Urostigma lacciferum (Roxb.) Miq. in London J. Bot. 6: 575. 1847.

Urostigma altissimum (Blume) Miq. in H. Zollinger, Syst. Verz. Ind. Archip. 2: 90. 1854.

Spreading tree, 25–30 m tall. Bark light greenish gray smooth. Branchlets green, ca. 1 cm thick, pubescent; scars of leaves and figs prominent. Stipules 1.7–7.0 cm long thick, leathery with grey silky hairs. Petiole 2–5 cm long; lamina deep green, broadly ovate to broadly ovate-elliptic, 16–20 × 10–12 cm, thick, leathery, glabrous, broadly cuneate at base, entire at margin, apex acute; midrib prominent; secondary veins 6–12 pairs, reticulate venation clearly defined in dry leaf. Figs axillary on leafy branchlets, paired, sessile, ellipsoid-ovoid, 2–3 × 1.5–2.0 cm, light green, white dotted, pubescent when young, apical pore navel-like, concave, reddish orange when mature; involucre bracts hoodlike, covering young fig, caducous, apex broadly obtuse, scar ringlike. Male, gall and female flowers within same fig. Male flowers: scattered; perianth lobes 4, transparent; stamen 1. Gall flowers: perianth lobes 4; style subapical, long. Female flowers: sessile; perianth lobes; style elongated. Achenes tuberculate.

Specimen examined: India, Tripura, West Tripura District, Agartala, ±14 m, 23°49'52.2", 91°17'09.7"; Mandai, ±72 m, 23°51'39.4", 91°28'46.7"; Tripura University Campus, ±18 m, 23°45'41.7", 91°15'54.8"; Datta and Debbarma 2748 (TUH) (Fig. 2).

Distribution: India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Deccan Peninsular region, Meghalaya, Mizoram, Sikkim, Tripura and West Bengal), Bangladesh, Bhutan, China, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Flowering and Fruiting: Flowering - March to April; Fruiting - May to July.

IUCN Red List status: Least concern, ver. 3.1. (21).

Discussion

The identification of specimen was determined by a critical examination and turned out it as a new distributional record for the "flora of Tripura". The state of Tripura possesses special significance in the biogeography of the North-eastern region because of its unique location and habitat heterogeneity. Since the state Tripura, the third smallest state of Northeast India holds rich floristic diversity in wide range of vegetation types along with their varied composition and structure, environmental factors such as humidity, temperature and rainfall. *Ficus* forms a unique group within the subset of plants with bird eaten fruit because of their numerical abundance, intra-crown synchrony of fruit ripening, relatively short intervals between fruiting, large crop sizes and intrapopulation fruiting asynchrony. Fig trees often survive in human-dominated landscapes because of their cultural significance. It was found that *F. benghalensis*, *F. religiosa* and *F. altissima* have considerable religious associations in Hinduism and Buddhism, and these cultural factors contribute to the safeguarding of mature trees. However, with agricultural intensification, people cut down trees when they interfered with their daily activities. Extensive conversion of forests for cash crop plantation in this region has resulted in the emergence of landscape tracts that are a heterogeneous mixture of agriculture, human-settlement and forest fragments.



Fig. 1. *Ficus altissima* Blume. **A.** Habit. **B.** Twig with figs. **C.** Mature figs. **D.** Trunk and branching. **E.** Immature figs covered by calyptra. **F.** Mature syconia (l.s.). **G.** Microscopic view of syconium (l.s.).

Table 1. Comparison of major morphological characters of *F. altissima* and *F. benghalensis*.

Characters	<i>Ficus altissima</i>	<i>Ficus benghalensis</i>
Leaves	16–20 × 10–12 cm, secondary veins 6–12 pairs	10–17 × 5–12 cm; secondary veins 4–8 pairs
Stipules	Linear-lanceolate, greenish-cream in colour; 1.7–7.0 cm long	Triangular, cream in colour; 1.0–4.0 cm long
Syconium	Ellipsoid to sub-globose, 2–3 × 1.5–2.0 cm; white dots present; bright red at maturity	Depressed globular, 1.0–1.7 × 1.4–2.2 cm; short white hairs present; crimson red at maturity
Ostiole	Naval shape or concave	Convex

**Fig. 2.** Herbarium sheet of *Ficus altissima* Blume

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Authors' contributions

SD and BB carried out field visits, collections, identifications, and initial drafting of the manuscript. KM and BB analysed and finalised the manuscript for publication. The whole work was revised and supervised by BKD.

Conflict of interests

The authors don't have any competing interests.

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