

Diversity and conservation of *Ficus* Linnaeus (Moraceae) in Chakrashila Wildlife Sanctuary, Kokrajhar District of Assam, India

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Abstract

Ficus Linnaeus (Moraceae) is considered as a keystone genus in tropical rain forests as it plays primary roles in ecosystem, due to its fruits and leaves which are eaten by insects, birds and animals throughout the year. A total of 10 species of *Ficus* Linnaeus was collected in Chakrashila Wildlife Sanctuary, Kokrajhar district of Assam. Specimens were identified through standard taxonomic literature and herbarium. The genus shows good variation in leaf and receptacle character as compared to the other character. Identification key for the recorded species emphasized on receptacle and leaf character will be helpful for easy identification of the genus. Due to the extension of human encroachments in the habitat, the species of *Ficus* are going to reduce in this protected area and needs immediate attention to conserve this keystone genus.

Key words: *Ficus*, Chakrashila WLS, Kokrajhar, Conservation.

INTRODUCTION

The genus *Ficus* Linnaeus (Moraceae) is distributed in the tropics and other warm regions of the world, especially in Indo-Malaysia to Australia, Africa and America with c. 735 species (Berg & Corner 2005). So far, 115 taxa of *Ficus* has been recorded from India (Chaudhary *et al.* 2012) and 42 species from Assam (Kanjilal *et al.* 1940). Total 47 species and 3 varieties reported by Barooah and Ahmed (2014) from Assam. Dhungana (2015) reported 28 taxa including 6 varieties with morphological details from upper Assam.

Fig plants or the genus *Ficus* provide reliable dietary resources for frugivores including birds in tropical forests (Walker 2007), and birds play important ecological roles dispersing fig seeds (Peh & Chong 2003). The present study is the first attempt to describe and identify different species of *Ficus* from Chakrashila Wildlife Sanctuary and to observe the importance of this genus to the animals especially for the Golden Langur in the Sanctuary. Figs are very important for Golden Langur as their food and shelter as well as for other animals especially for birds. During this survey it was observed that Golden Langur are dependent for their food and shelter in some species of *Ficus* like in *F. racemosa*, *F. altissima* and *F. benjamina*. Beside these, innumerable birds, insects and other type of animals are also associated to these plants for their food.

During 2015, for exploring *Ficus*, good number specimens were collected from the Chakrashila Wildlife Sanctuary (CWLS) in Assam, India. The examination of these collections

with other species of *Ficus* at major Indian herbaria (CAL and ASSAM), perusal of relevant literature (Roxburgh 1832; King 1887 – 1888 & 1888; Corner 1965; Berg & Corner 2005; Chaudhary *et al.* 2012; Kanjilal *et al.* 1940; Buragohain *et al.* 2014) and consultation with the *Ficus* expert J.V. Sudhakar for correct identification of these plants. Chakrashila Wildlife Sanctuary (26°15' – 26°26'N and 90°15' – 90°20'E; 4,500 ha) is situated in the districts of Kokrajhar and Dhubri in Assam. The Sanctuary is the only protected area for the Golden Langur in India. The hilly terrain is covered with dense forest which is mostly semi-evergreen and moist deciduous, with patches of grassland and scattered bushes (scrubland). The forest type falls in the category 3C/C.1.a(ii) of Champion and Seth's (1968) classification of forest types in India. In this paper documents the diversity of the genus *Ficus* Linnaeus in CWLS.

MATERIAL AND METHODS

A detailed survey for the genus *Ficus* Linnaeus (Moraceae) was conducted in the Chakrashila Wildlife Sanctuary during the years 2014 – 2015. The collected specimens were processed into mounted herbarium sheets (Jain & Rao, 1977) and deposited in the ASSAM Herbarium. Plants were basically identified using literature like Hooker (1888), Berg & Corner (2005), Berg *et al.*, (2006, 2011), King (1887) and Kanjilal *et al.* (1940) and then confirmed their identity by matching in ASSAM. For updating the nomenclature, www.theplantlist.org was consulted for all the recorded taxa. The recorded species are enumerated below in alphabetical order.

RESULT AND DISCUSSION

During the present survey 10 species of *Ficus* Linnaeus has been collected from the Chakrashila Wildlife Sanctuary and are enumerated below in alphabetical sequence. An artificial dichotomous identification key has been prepared using leaf and receptacle characters that will be helpful to identify these species. Brief description along with vernacular name, flowering, fruiting and distribution of each species has been provided. Three species are found in good association with Golden Langur for their food and shelter. *Ficus racemosa* is one of the most reliable species as a food since the species flowers and fruits four times in a year.

Identification key:

- 1a. Plants shrubby or woody climbers 2
- 1b. Plants mainly small to large tree..... 4
- 2a. Lamina shape much variable *F. heterophylla*
- 2b. Lamina shape uniform 3
- 3a. Receptacle mostly subpyriform or ellipsoid, 2 – 3 cm in diameter *F. squamosa*
- 3b. Receptacle mostly subglobose, 0.5 – 1 cm in diameter *F. hederacea*
- 4a. Lamina broadly ovate to ovate-cordate 5
- 4b. Lamina broadly ovate or elliptic-oblong 6
- 5a. Acumen sharp and up to 7 cm *F. religiosa*
- 5b. Acumen short and up to 3 cm 7
- 6a. Lateral vein 5 – 7 pairs *F. rumphii*
- 6b. Lateral vein 9 – 12 pairs *F. geniculata*
- 7a. Leaves hispid *F. hispida*
- 7b. Leaves glabrous 8

- 8a. Lamina 10 – 25 cm long *F. altissima*
 8b. Lamina 8 – 13 cm long 9
 9a. Figs in pairs *F. benjamina*
 9b. Figs in clusters *F. racemosa*

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; Haridasan & Rao, For. Fl. Megh 2: 820. 1987; Wu *et al.*, in Wu *et al.*, Flora of China 5: 41. 2003; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 399. 2008; Chaudhary *et al.*, Taiwaniana 57(2): 210. 2012. [PLATE - I: Fig. A]

Vernacular name: **Dhup-bor** (Assamese, Bodo)

Spreading trees, 25 – 40 m tall; aerial roots few; d.b.h. 50 - 120 cm; bark light greenish gray, and smooth; latex watery, not so sticky; leafy twigs 6 – 8 mm thick, angular, thickly leathery, periderm persistent. Leaves spirally arranged; lamina broadly ovate to ovate-elliptic (or oblong) 10 – 25 × 8 – 11 cm, coriaceous, short acuminate, base attenuate to rounded. Figs axillary, paired, sessile, involucre bracts calyptiform or hood like, covering young figs, caduceus, receptacle ellipsoid to sub-globose, 1.5 – 2 cm in diameter when dry, glabrous, deep yellowish at maturity.

Flowers: Mar – April; *Fruits:* May – July

Specimen cited: Assam, Kokrajhar, Nalbari, Chakrasila Wildlife Sanctuary, R. Buragohain 007, dated 17.06. 2015.

Distribution: INDIA (Arunachal Pradesh, Andaman & Nicobar Islands, Assam, Deccan Peninsular, Mizoram, Meghalaya, Sikkim and West Bengal) BANGLADESH, BHUTAN, CHINA, INDONESIA, MALAYSIA, MYANMAR, NEPAL, PHILIPPINES, SRI LANKA, THAILAND, VIETNAM.

Ficus benjamina Linnaeus, Mant. Pl. 1: 129. 1767; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 43, t. 52, 83h. 1887 & in Hook. f., Fl. Brit. India 5: 508. 1888; Corner, Gard. Bull. Singapore 21: 21. 1965 & in Dass. & Forsb., Rev. Handb. Fl. Ceylon 3: 256, f. 15. 1981; Prain, Bengal Pl. 2: 734. 1903; Brandis, Indian Trees 604. 1906; Grierson & Long, Fl. Bhutan 1(1): 95. 1983; Wu *et al.*, in Wu. *et al.*, Flora of China 5: 43. 2003; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 399. 2008; Chaudhary *et al.*, Taiwaniana 57(2): 210. 2012. [PLATE - I: Fig. J]

Vernacular name: **Dhup** (Bodo)

A shady tree with pendulous branches; upto 40 m tall; bark gray or brownish; aerial roots developed from the main trunk; leafy twigs 1 – 3 mm thick, ± angular to sub-terete, glabrous; periderm not persistent often flaking off. Leaves spirally arranged to sub-distichous; lamina elliptic, oblong or ovate 7 – 10 x 3 – 4 cm, shortly acuminate, base attenuate, coriaceous. Figs axillary, paired or solitary on leafy branchlets, basal bracts 3, 2.5 mm long, unequal, glabrous, caducous. Receptacle sub-globose to ellipsoid or sometimes pear shaped, 0.8 – 1.5 cm in diameter, glabrous, yellow or dark red at maturity.

Flowers: October – November; *Fruits:* December – January

Specimen cited: Assam, Kokrajhar, Horinaguri, Chakrasila Wildlife Sanctuary, R. Buragohain 008; dated 17.06. 2015.

Distribution: INDIA (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Jharkhand, Madhya Pradesh, Orissa, Sikkim, Uttar Pradesh) BANGLADESH, BHUTAN,

CHINA, MYANMAR, NEPAL, NEW GUINEA, PHILIPPINES, THAILAND AND VIETNAM.

Ficus geniculata Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42(2): 105. 1873 & For. Fl. Brit. Burma 2: 447. 1877; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 64, t. 80, 84x. 2. 1887 & in Hook. f., Fl. Brit. India 5: 516. 1888; Brandis, Indian Trees 602. 1906; Corner, Gard. Bull. Singapore 21 (1): 8. 1965. Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 394. 2008; Chaudhary *et al.*, Taiwania 57(2): 208. 2012. [PLATE - I: Fig. H]

Vernacular name: **Tenga-bor** (Assamese)

Trees to 30 m tall, terrestrial sometimes hemi-epiphytic. Leaves spirally arranged; lamina ovate, elliptic or oblong, 15 – 19 x 5 – 6.5 cm, acuminate, coriaceous. Figs axillary just below the leaves, paired, sessile or minutely pedunculate; basal bracts 3, ca. 2 cm long, minutely puberulous outside, persistent; receptacle sub-globose 0.8 – 1.2 cm diameter, tip convex to flat, ostiole 1 – 2 mm in diameter, white to pink and black at maturity.

Flowers: May – June; *Fruits:* July – August

Specimen cited: Assam, Kokrajhar, Goyjora, Chakrasila Wildlife Sanctuary, R. Buragohain 009, dated 17.06. 2015.

Distribution: INDIA (Andaman & Nicobar Islands, Arunachal Pradaesh, Assam, Bihar, Jharkand, Meghalaya, Orissa, Sikkim, Tamil Nadu, West Bengal), BANGLADESH, CHINA, MYANMAR, NEPAL, THAILAND.

Ficus hedaracea Roxburgh, Fl. Ind. 3: 538. 1832; Wight, Icon. Pl. Ind. Orient. 2: t. 653. 1843; Deb, Fl. Tripura 1: 214. 1981; Grierson & Long, Fl. Bhutan 1(1): 98. 1983; Haridasan & Rao, For. Fl. Meghalaya 2: 826. 1987; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 395. 2008; Chaudhary *et al.*, Taiwania 57(2): 200. 2012. [PLATE - I: Fig. G]

Vernacular name: **Lota dimaru** (Assamese)

Root-climber. Branchlets drying brown to blackish. Leafy twigs 1 – 2 mm thick, solid, minutely whitish puberulous. Leaves distichous; lamina elliptic to ovate, 7 – 12 x 4 – 5.5 cm, symmetrical Figs axillary, in pairs or solitary; basal bracts 1 – 2 mm long, persistent, sometimes reflexed; receptacle sub-globose, ca. 3.5 cm long, 0.5 – 1 cm in diameter; peduncle 2.5 cm long. Brick red on maturity.

Flowers: January – March; *Fruits:* March – June

Specimen cited: Assam, Kokrajhar, Kowari, Chakrasila Wildlife Sanctuary, R. Buragohain 010; dated 10.07. 2015.

Distribution: INDIA (Andaman Islands, Arunachal Pradesh, Assam, West Bengal, Bihar, Himachal Pradesh, Jharkhand, Madhya Pradesh, Meghalaya, Orissa, Sikkim, Tripura, Uttarakhand), BANGLADESH, BHUTAN, CHINA, LAOS, MYANMAR, NEPAL, THAILAND.

Ficus heterophylla Linnaeus f., Suppl. Pl. 442. 1781; Roxburgh, Fl. Ind. 3: 532. 1832; Wight, Icon. Pl. Ind. Orient. 2: t. 659. 1843; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 75. t. 94. 1888 & in Hooker f., Fl. Brit. India 5: 518. 1888; Trimen, Handb. Fl. Ceylon 4: 93. 1898; Prain, Bengal Pl. 2: 736. 1903; Brandis, Indian Trees 606. 1906; Corner, Gard. Bull. Singapore 21: 73. 1965 & in Dass. & Forsb., Rev. Handb. Fl. Ceylon 3: 272, f. 24. 1981; Grierson & Long, Fl. Bhutan 1(1): 92. 1983; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 395. 2008; Chaudhary *et al.*, Taiwania 57(2): 201. 2012. [PLATE - I: Fig. B]



Vernacular name: Damru pithai (Bodo)

Shrubs, 3 – 4 m tall, often prostrate and rooting from branches, mainly on riverside or terrestrial, sometimes climbing. Leaves distichous; lamina oblong to subovate, 8 – 11 x 3.5 – 5 cm, ± asymmetrical to almost symmetrical, dentate, often ± revolute, acuminate to subcaudate, base inequilateral, cordate to rounded at the broad side, cuneate to obtuse at the narrower side, chartaceous; young leaves often pinnately lobed or palmately 3 lobate. Figs solitary, axillary, produces just below the leaves; peduncle 0.5 – 1.5 cm long; receptacle subglobose to ellipsoid, ca. 2.5 cm long, 0.6 – 1.5 cm in diameter, brick-red on maturity.

Flowers: April – May ; *Fruits:* June – July.

Specimen cited: Assam, Kokrajhar, Salbari, Chakrasila Wildlife Sanctuary, *R. Buragohain 011*; dated 10.07. 2015.

Distribution: INDIA (Throughout the hotter parts), CHINA, MALESIA, MYANMAR, SRI LANKA.

Ficus hispida Linnaeus f., Suppl. Pl. 442. 1782; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 116, t. 154, 155. 1888 & in Hooker f., Fl. Brit. India 5: 522. 1888; Prain, Bengal Pl. 2: 736. 1903; Brandis, Indian Trees 606. 1906; Kanjilal *et al.*, Fl. Assam 4: 253. 1940; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 397. 2008; Chaudhary *et al.*, Taiwania 57(2): 205. 2012. **[PLATE - I: Fig. E]**

Vernacular name: **Aadumra** (Bodo)

Medium trees to 10 m tall; internodes hollow. Leaves sub-opposite or opposite and sometimes spirally arranged (or distichous); lamina oblong or elliptic to subobovate to subovate 12 – 24 x 6.5 – 11 cm. Figs axillary, solitary or cauliflorous on branchlets to 1.5 m long arising in clusters from the main branches or trunk, rarely at the base of trunk; peduncle 1.5 – 2 cm long; basal bracts 3, usually verticillate, 0.5 – 2.5 mm long; receptacle subglobose to depressed globose, ca. 4 cm long or more, 1.5 – 3.5 cm in diameter, often ribbed, whitish puberulous, pale yellow at maturity.

Flowers: January – March; *Fruits:* April – May

Specimen cited: Assam, Kokrajhar, Rajapahar, Chakrasila Wildlife Sanctuary, *R. Buragohain 012*; dated 10.07. 2015.

Distribution: INDIA (Throughout up to 3,500 m), BHUTAN, CHINA, MALESIA, NEPAL, AUSTRALIA, SRI LANKA, THAILAND.

Ficus racemosa Linnaeus, Sp. Pl. 2: 1060. 1753; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 183. 1888; Corner, Gard. Bull. Singapore 21: 34. 1965 & in Dass. & Forsb., Rev. Handb. Fl. Ceylon 3: 267, f. 21. 1981; Deb, Fl. Tripura 1: 217. 1981; Grierson & Long, Fl. Bhutan 1(1): 93. 1983; Upadhyay & Srivastava, Taxon 59(6): 1881, f. 1, 3. 2010; Chaudhary *et al.*, Taiwania 57(2): 203. 2012.

F. glomerata Roxburgh, Pl. Coromandel. 2: 13, t. 123. 1799; Wight, Icon. Pl. Ind. Orient. 2: t. 667. 1843; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 173, t. 218. 1888 & in Hooker f., Fl. Brit. India 5: 535. 1888; Prain, Bengal Pl. 2: 737. 1903; Brandis, Indian Trees 609. 1906; Kanjilal *et al.*, Fl. Assam 4: 264. 1940. **[PLATE - I: Fig. D]**

Vernacular name: **Aadumbra** (Bodo); **Mou-dimaru** (Assamese)

Trees, 20 – 30 m tall, buttressed, deciduous; latex white, cream or pinkish. Leaves spirally arranged; lamina oblong or sub-obovate, symmetrical, 7 – 10 x 2.5 – 6 cm, acuminate to subacute, coriaceous; stipules ovate lanceolate, 0.1 – 1.5 cm long, sparsely to densely appressed-puberulous, sub-persistent or caducous. Figs on clusters of ca 30 cm long often branched, leafless branches on the older wood, down to the trunk; receptacles subglobose to sub-pyriform, ca. 5 cm long, 2.5 – 3.5 cm in diameter, pinkish to purple-red at maturity.

Flowers: February – March; *Fruits:* April – June.

Specimen cited: Assam, Kokrajhar, Deplai, Chakrasila Wildlife Sanctuary, *R. Buragohain 013*; dated 05.11. 2015.

Distribution: INDIA (almost throughout from the outer Himalayas, low hills to plains), AUSTRALIA, BANGLADESH, CHINA, MALESIA, MYANMAR, NEPAL, PAKISTAN, SRI LANKA.

Ficus religiosa Linnaeus, Sp. Pl. 2. 1059. 1753; Wight, Icon. Pl. Ind. Orient. 6: t. 1967. 1853; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 55, t. 67a. 1887 & in Hooker f., Fl. Brit. India 5: 513. 1888; Prain, Bengal Pl. 2: 735. 1903; Brandis, Indian Trees 601. 1906; Corner, Gard. Bull. Singapore 21(1): 6. 1965 & in Dass. & Forsb., Rev. Handb. Fl. Ceylon 3: 236. 1981; Grierson & Long, Fl. Bhutan 1(1): 94. 1983; Haridasan & Rao, For. Fl. Megh 2: 831. 1987; Wu *et al.*, in Wu *et al.*, Fl. China 5: 37. 2003; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 402. 2008; Chaudhary *et al.*, Taiwania 57(2): 208. 2012. [PLATE - I: Fig. C]

Vernacular name: **Pakri** (Bodo)

Large trees, 25 – 30 m tall, deciduous, hemiepiphytic. Leaves spirally arranged; lamina broadly ovate to ovate-cordate, 15 – 30 x 5.5 – 13.5 cm, long caudate with sharp acumen upto 7 cm long, coriaceous. Figs axillary or just below the leaves, in pairs or sessile; basal bracts 3, distinct, 3 – 5 mm long, puberulous or only ciliolate, often splitting into lobes, persistent; receptacle subglobose, 0.5 – 0.8 cm in diameter, 1 – 1.3 cm long, turning from pink to purple to black at maturity.

Flowers: January – March; *Fruits:* March – June

Specimen cited: Assam, Kokrajhar, Deplai, Chakrasila Wildlife Sanctuary, R. Buragohain 014; dated 05.11. 2015.

Distribution: INDIA (Wild and planted from Subhimalayan regions to plains), BANGLADESH, CHINA, MYANMAR, NEPAL, PAKISTAN, SRI LANKA, THAILAND.

Ficus rumphii Blume, Bijdr. Fl. Ned. Ind. 437. 1825; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 54, t. 67b, 84t. 1887 & in Hooker f., Fl. Brit. India 5: 512. 1888; Prain, Bengal Pl. 2: 735. 1903; Brandis, Indian Trees 601. 1906; Deb, Fl. Tripura 1: 218. 1981; Grierson & Long, Fl. Bhutan 1(1): 93. 1983; Haridasan & Rao, F. Fl. Megh. 2: 831. 1987; Wu *et al.*, in Wu *et al.*, Fl. China 5: 39. 2003; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 403. 2008; Chaudhary *et al.*, Taiwania 57(2): 209. 2012. [PLATE - I: Fig. I]

Vernacular name: **Pakhri** (Bodo)

Trees to 20 m tall, deciduous, hemiepiphytic. Leaves spirally arranged; lamina broadly ovate, coriaceous, 8 – 13 x 6 – 10 cm long, acuminate to acute, acumen 1.5 cm. Figs axillary or just below the leaves, in pairs, sessile; basal bracts 2 – 3, 1 – 2 mm long, glabrous persistent; receptacle sub-globose, 0.7 – 0.8 cm in diameter when fresh, glabrous, turning from pink to purple to black at maturity.

Flowers: March – May; *Fruits:* July – August

Specimen cited: Assam, Kokrajhar, Bor Bamuni, Chakrasila Wildlife Sanctuary, R. Buragohain 015; dated November, 2015.

Distribution: INDIA (Throughout, ascending to 1,700 m), BHUTAN, CHINA, MALESIA, MYANMAR, NEPAL, THAILAND.

Ficus squamosa Roxburgh, Fl. Ind. 3: 531. 1832; Deb, Fl. Tripura 1: 220: 1981; Grierson & Long, Fl. Bhutan 1(1):90. 1983; Haridasan & Rao, For. Fl. Megh 2: 833. 1987; Wu *et al.*, in Wu *et al.*, Fl. China 5: 49. 2003; Giri *et al.*, Mater. Fl. Arunachal Pradesh 2: 404. 2008; Chaudhary *et al.*, Taiwania 57(2): 204. 2012. [PLATE -I: Fig. F]

Shrub to 2 m tall, rheophytic, with rooting stolons like stems and ascending or erect leafy branches, lower internodes long, upper ones short. Leaves tufted terminally, lamina oblanceolate, symmetrical, 5 – 20 x 1.3 – 4 cm, acuminate to sub-acute, coriaceous,. Figs sub-sessile or with

a peduncle to 1.5 cm long; basal bracts 3, in a whorl or scattered on the peduncle, 1.5 – 3 mm long; receptacle sub-globose, sub-pyriform or ellipsoid ca. 4 cm long, 2 – 3 cm in diameter, broadly ovate, 0.2 – 0.3 cm long, puberulous or glabrous, purple to black at maturity.

Flowers: February – March; *Fruits:* May – June

Specimen cited: Assam, Kokrajhar, Bor Bamuni, Chakrasila Wildlife Sanctuary, R. Buragohain 016; dated 05.11. 2015.

Distribution: INDIA (Arunachal Pradesh, Assam, Bihar, Meghalaya, Orissa, Tripura, Uttarakhand, West Bengal), BHUTAN, CHINA, MYANMAR, NEPAL, THAILAND.

CONCLUSION

More intensive survey in the sanctuary may lead to the record of other species of *Ficus*. However, being a sanctuary, in most of the areas they are nicely protected. Population structure of different species may also need to be assessed, especially in relation to the population and distribution pattern of Golden Langur and the management of some species might be essential as better conservation strategies.

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