



Ficus anamalayana (Moraceae): A new species from South India

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Abstract

A new species, *Ficus anamalayana* J.V. Sudhakar & G.V.S. Murthy belonging to the subgenus *Pharmacosycea* is described from Anamalais of the Western Ghats. Detailed description, colour photographs, illustrations, phenology, distribution, comparison with allied species, IUCN status etc. are provided.

Keywords: New species, *Ficus anamalayana*, Western Ghats, South India

Introduction

The genus *Ficus* L. (Moraceae) is distributed in the tropics and other warm regions of the world, especially in Indo-Malesia to Australia, Africa and America with *c.* 735 species (Berg & Corner, 2005). It is represented in India by 91 species and 24 infraspecific taxa (Chaudhary *et al.*, 2012). During the present revisionary study on Indian *Ficus*, the first author collected some interesting *Ficus* specimens from Anamalais of the Western Ghats. The examination of these collections with other species of *Ficus* at major Indian herbaria (CAL, MH, BSI & RHT), perusal of relevant literature (Roxburgh, 1832; Miquel, 1847-48 & 1867; King, 1887-88 & 1888; Corner, 1965; Rani, 1985; Berg & Corner, 2005; Chaudhary *et al.*, 2012) and consultation with the *Ficus* authority, late C.C. Berg, National Herbarium of Netherlands, it was confirmed as a new species. While scrutinising the specimens of different herbaria, it was found that Tamil Nadu specimens were misidentified by Rani, (1985), as *F. albipila* (Miq.) King and few other specimens at MH collected from Kerala (Ernakulam and Idukki Districts) belong to this new species. Further, this new species also confused with *F. dalhousiae* (Miq.) Miq. of the subgenus *Urtostigma* due to its morphological resemblance. But can be differentiated from it by the presence of two waxy glands at axils of basal lateral nerves, chiefly oblong receptacles, slender peduncles, united tepals of male flowers, greenish to pale young foliage and absence of aerial roots. *F. anamalayana* is described here with an illustration, photographs, including

T.S. of leaf to show cystoliths and SEM images of achenes. Besides, the digital images of the type specimens and a comparative table to distinguish *F. anamalayana*, *F. albipila* and *F. dalhousiae* are provided.

Table 1

Ficus anamalayana J.V. Sudhakar & G.V.S. Murthy, **sp. nov.** **Figs. 1, 2, 3, 4**

Ficus dalhousiae *sensu* K.M. Matthew, Mat. Fl. Tamilnadu Carnatic: 344. 1981, non Miq. 1867.

Ficus albipila *sensu* N. Rani, J. Bombay Nat. Hist. Soc. 82: 235. 1985, non (Miq.) King 1888; Chithra in A.N. Henry *et al.*, Fl. Tamil Nadu 2: 251. 1987; K.M. Matthew, Fl. Tamilnadu Carnatic 4: t. 593. 1988, Fl. Centr. Tamil Nadu 482. 1991, J. Econ. Taxon. Bot., 20: 12. 1996 & Fl. Palni hills 2: 1177. 1999.

It resembles *F. albipila* (Miq.) King in the shape and indumentum of leaf lamina, and bifid stigma of female flowers. However, the new species differs from the latter in having cystoliths only on the upper surface of leaves, long stipules, waxy glands in the axils of basal lateral nerves beneath, basally connate basal bracts and white dotted green mature figs. It has also some morphological resemblance to *F. dalhousiae* (Miq.) Miq. of the subgenus *Urtostigma* but differs from it by the presence of two waxy glands at axils of basal lateral nerves, chiefly oblong receptacles, slender peduncles, united tepals of male flowers, greenish to pale young foliage and absence of aerial roots.

Table 1. Comparison of distinguishing characters of three species of *Ficus*

Characters	<i>F. anamalayana</i> J.V. Sudhakar & G.V.S. Murthy	<i>F. albipila</i> (Miq.) King	<i>F. dalhousiae</i> (Miq.) Miq.
Subgenus	Pharmacosycea	Pharmacosycea	Urostigma
Habit	Medium to large tree, up to 15 m tall, without buttresses	Large gigantic tree, up to 45 m tall, with prominent buttresses (up to 5 m high)	Medium to large tree, up to 20 m tall, without buttresses
Aerial roots	Absent	Absent	Present
Waxy glands in leaves	Two, in the axils of basal lateral nerves beneath	Absent	one, at the base of midrib beneath
Cystoliths	Present only on upper surface of leaves (Hypergenous)	Present on both surfaces of leaves (Amphigenous)	Present only on upper surface of leaves (Hypergenous)
Young foliage	Greenish to pale beneath	Greenish to pale beneath	Dark red or pink beneath
Stipules	3–5 cm long	0.5–1.3 cm long	2–3 cm long
Basal bracts	Persistent, basally connate and forming a small cupule	Caducous, free	Persistent, free or basally connate
Receptacles	Oblong to obovoid	Subglobose or subpyriform	Globose to subglobose, turbinate
Colour of receptacles at maturity	Green with white dots	Yellow to pink to red	Greenish or yellow with white dots
Peduncles	Slender, 0.6–1.2 cm long	Slender, 0.2–0.6 cm long	Stout, 0.5–1 cm long
Tepals of male flowers	United	Free	Free

Typus: INDIA, **Tamil Nadu**, Coimbatore district, Anamalais (Anamalai Tiger Reserve), on the way from Aliyar to Attakatti, near forest check post, 300 m, 25.10.2010, J.V. Sudhakar 122947 (Holotypus, CAL; Isotypii, MH).

Tree, up to 15 m tall, without buttresses; aerial roots usually absent; branchlets spreading as a dense crown, puberulous or pubescent. Leaves simple, alternate, symmetric; lamina ovate or ovate-oblong, 20–32 × 10–18 cm, cordate to rounded at base, entire or faintly undulate along margins, acuminate to subacute at apex with c. 1 cm long acumen, subcoriaceous, sparsely white puberulous on main nerves above, white puberulous beneath; basal nerves 5–9, midrib flat above, prominent beneath; lateral nerves 10–12 pairs, looped at margin, flat above, raised beneath; tertiary nerves scalariform; waxy glands two, at axils of basal lateral nerves, cystoliths only

on upper surface (hypergenous); petiole 4–11 cm long, stout, white puberulous or pubescent, 3–4 mm thick, epidermis persistent. Stipules terminal, in pairs, lanceolate or ovate – lanceolate, 3–5 cm long, subglabrous, caducous. Receptacles axillary or below leaves, paired, pedunculate, monoecious, oblong to obovoid, 1–1.5 cm in diam., pale green when young, green at maturity, white dotted, white puberulous, slightly ribbed when dry; peduncle 0.5–1.2 cm long, slender, 1–2 mm thick, pale green to green, puberulous; basal bracts 3, basally connate forming small cupule, shallowly lobed at apex, 2–2.5 mm long, ciliolate, puberulous; ostiole prominent, 1–1.5 mm in diam., open; ostiolar bracts 3, ovate, up to 1 mm long; internal ostiolar bracts ovate or deltoid, 1.3–1.5 mm long, glabrous; interfloral bracts ovate – lanceolate, 0.8 – 1.2 × 0.5 – 0.6 mm, white, glabrous. Male flowers: very few, near ostiole, pedicellate, 1.5–1.8 mm long, pedicel up to 0.5 mm long; tepals 3, completely united,

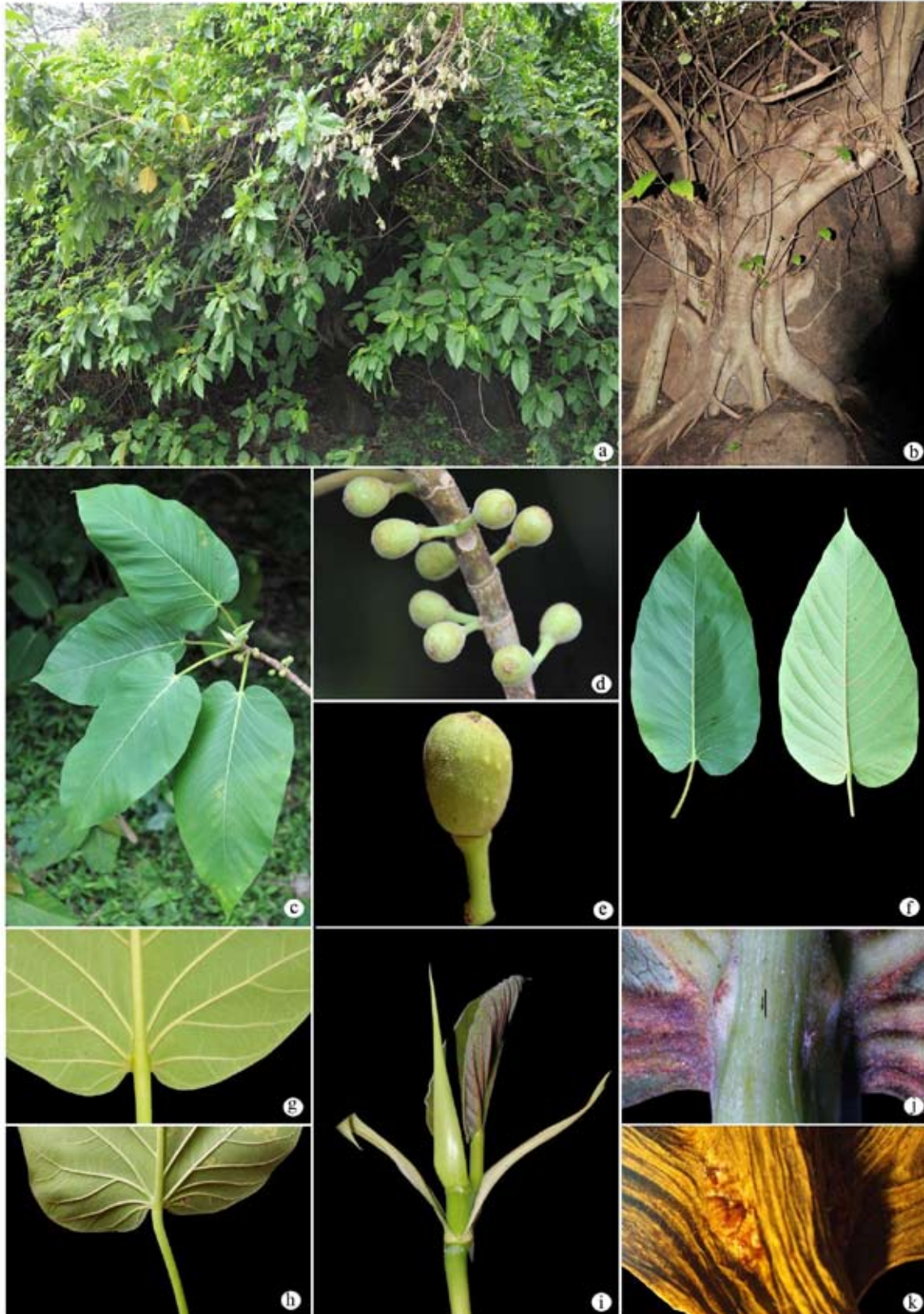


Fig. 1. *Ficus anamalayana* J.V. Sudhakar & G.V.S. Murthy *sp. nov.*: **a.** Habit; **b.** Basal portion of the trunk; **c.** Twig; **d.** Receptacles; **e.** Single fig; **f.** Leaf adaxial and abaxial surfaces; **g.** & **h.** Basal portion of the leaf showing nerves; **i.** Stipules; **j.** & **k.** Leaf abaxial surface showing waxy glands.

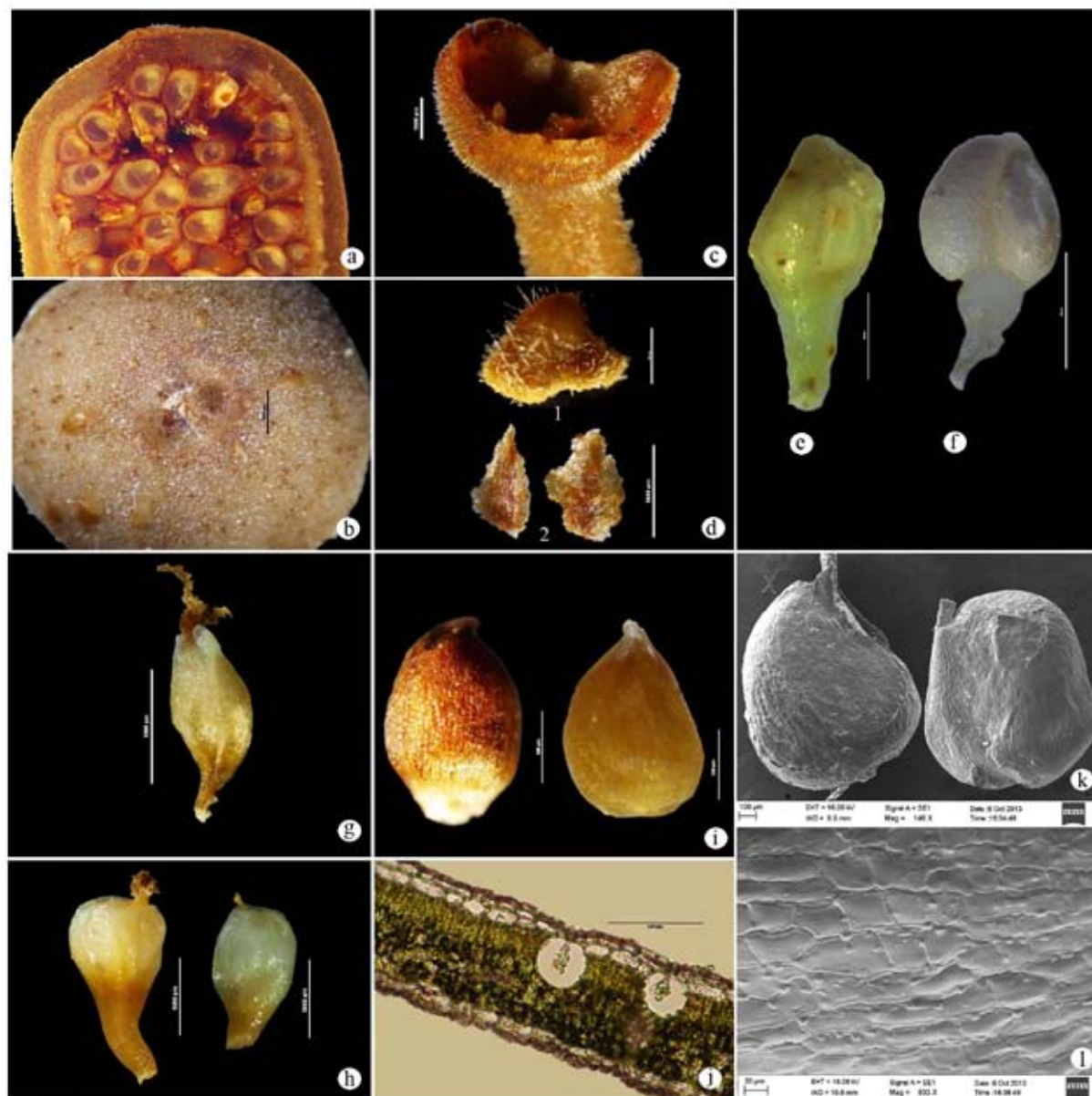


Fig. 2. *Ficus anamalayana* J.V. Sudhakar & G.V.S. Murthy *sp. nov.*: **a.** L.S. of Fig; **b.** Ostiole; **c.** Basal bracts; **d.** 1. Ostiolar bract, 2. Internal ostiolar bracts; **e.** Male flower; **f.** Stamen; **g.** Female flower; **h.** Gall flowers; **i.** Achenes; **j.** Cystoliths on upper surface of leaf lamina; **k & l.** SEM Images of Achenes and their surface.

rarely free, spathulate, 1–1.3 mm long, reddish or whitish, glabrous. Stamen 1, 0.6–0.8 mm long, inserted; filament *c.* 0.2 mm long or absent; anther ovoid or oblong, *c.* 0.6 mm long. Gall flowers pedicellate, 2.5–3.5 mm long, pedicel 1.4–1.6 mm long; tepals 3, free or united, ovate, *c.* 1.6 mm long, glabrous; ovary obovoid, 0.5–1 mm; style lateral or terminal, 0.3–0.5 mm long, glabrous; stigma simple or capitate. Female flowers sessile, 2.3–3.5 mm long; tepals 3, completely united, spathulate or tubular, 1.5–2 mm long, pale or whitish, glabrous;

ovary ovoid or globose, *c.* 1 mm long; style 1–1.2 mm long, glabrous; stigma bifid, smooth. Achenes ovoid or tetragonous, 1–1.5 mm in diam., surface striate or reticulate, rarely verrucate.

Etymology: The name '*anamalayana*' refers to the type locality, Anamalai hills of Western Ghats.

Flowering & Fruiting: June – December.

Habitat: In deciduous and semi-evergreen forests, especially on rocks.

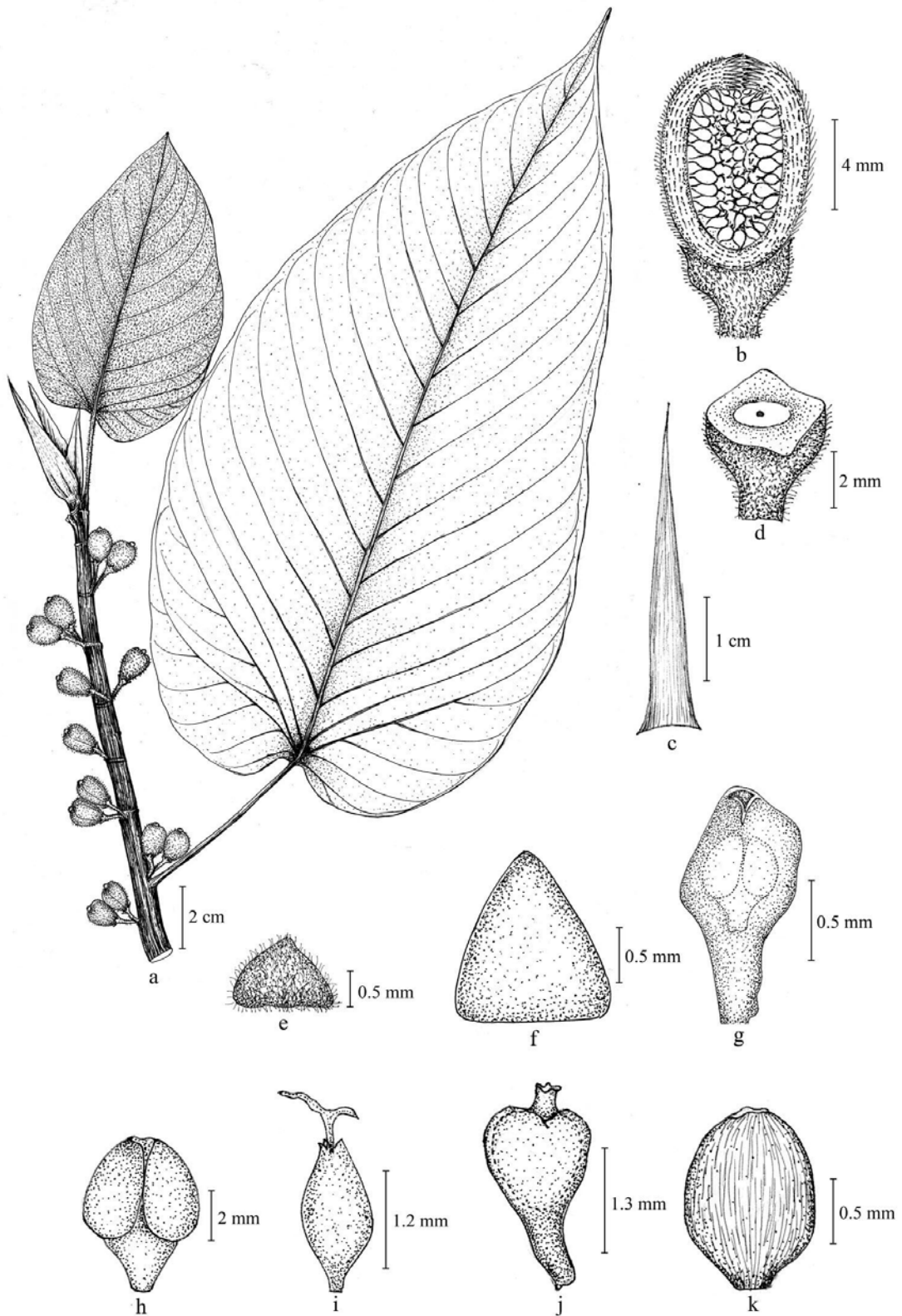


Fig. 3. *Ficus anamalayana* J.V. Sudhakar & G.V.S. Murthy *sp. nov.*: **a.** Twig; **b.** L.S. of Fig; **c.** Stipule; **d.** Basal bracts; **e.** Ostiolar bract; **f.** Internal ostiolar bract; **g.** Male flower; **h.** Stamen; **i.** Female flower; **j.** Gall flower; **k.** Achene (*J.V. Sudhakar 122947, 122978, CAL, MH & L.*)



Fig. 4. Type specimen of *Ficus anamalayana* J.V. Sudhakar & G.V.S. Murthy (CAL)

Additional Specimens examined (Paratypii): INDIA, **Tamil Nadu**, Coimbatore district, Anamalais, on the way from Aliyar to Attakatti, near forest check post, 300 m, 15.6.2011, J.V. Sudhakar 122978 (L, MH); Aliyar to Attakatti, on big rocks, 250 m, 05.01.2012, J.V. Sudhakar 126784 (K). Dindigul district, Kodaikanal taluk, Palni hills, Palani-Kodaikanal ghat road, 900 m, 27.11.1985, K.M. Matthew & N. Rajendren 43326; below Adukkom, Kurukkaru, 900 m, 13.5.1986, K.M. Matthew & N. Rajendren 45005; Vellagevi, path down to Vengayapparai, 1400 m, 17.06.1986, K.M. Matthew 45647; Vengayapparai, 725 m, 12.09.1986, K.M. Matthew 46881; Palni ghat road, 900 m, 15.05.1987, K.M. Matthew & N. Rajendren 49455; Law's ghat road, 700 m, 4.12.1989, K.M. Matthew 51942; Palni ghat road, below Sowrikkadu, 1000 m, 13.12.1989, K.T. Mathew, S. Periyannayagam & S. Sebastian 53805 (RHT). Namakkal district, Rasipuram taluk, Kolli hills, Ariadurai aaru, 400 m, 30.07.1978, N. Venugopal 15844; Varakur, Vatchukkal aaru, 850 m, 01.08.1978, N. Venugopal 15969; On the way to Aruvithurai, 600 m, 29.03.1979, P. Perumal 22491; Arappuleeswarer, down the steps to the falls, 900

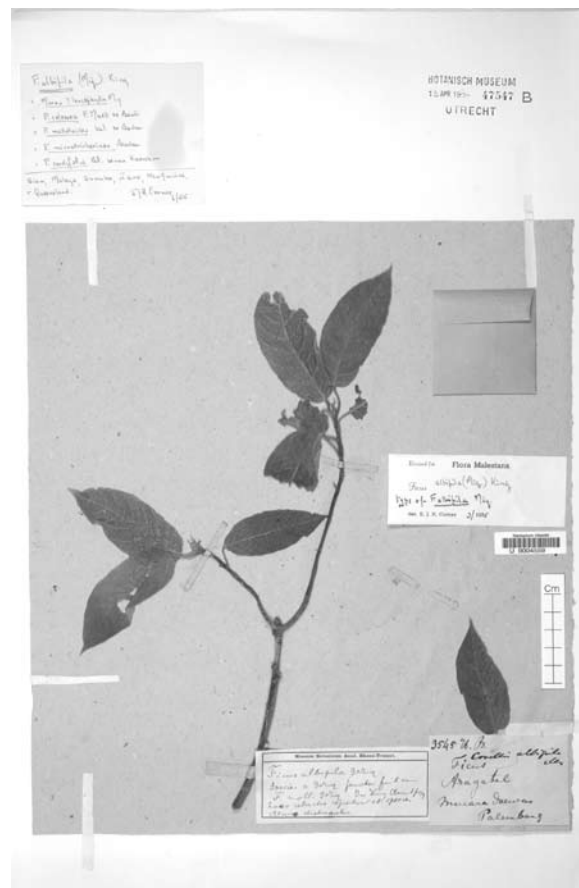


Fig. 5. Type specimen of *Ficus albipila* (Miq.) King (U)

m, 11.08.2000, K.M. Matthew 62336; Top of falls, 1000 m, 23.06.2001, K.M. Matthew 62689 (RHT). Salem district, Attur taluk, Periyakalrayans, shola of Pattivalavu Nagaluru, 840 m, 13.12.1976, K.M. Matthew & D.I. Arockiasamy 5455; Yercaud taluk, Shevaroys, Yercaud ghat road, 1300 m, 02.07.1979, K.M. Matthew 23478 (RHT). Theni district, Uthamapalayam taluk, Palni hills, Kurangani ghat road, 600 m, 18.11.1986, K.M. Matthew 47485; Periakulam taluk, Kumbakkarai - Vengayapparai stream, 600 m, 17.05.1987, K.M. Matthew & N. Rajendren 49546; Uthampalayam taluk, (Sambal Aru) Kurangani to Central station, 750 m, 17.11.1987, K.M. Matthew & M. Charles 51332 (RHT); Combaitholu - Megamalai River bank, 10.07.1991, V. Lakshmanan 95210 (MH). Tiruchirappalli district, Thuraiyur taluk, Pacchaimalais, Kottathumaduvu, 850 m, 08.09.1976, K.M. Matthew & V.A. Amalraj 3911; Kannimar Shola, Foot path from Moopanvayal to Yerumaipetty, D.I. Arockiasamy 7037; Kannimar shola, Erumaipetty - Kaikatty, 950 m, 19.03.1978, K.M. Matthew 12486; Thuraiyur taluk, way to Kaikatty, 950 m, 01.04.1979, C. Manoharan 22601 (RHT). Thirunelveli district, Pambar Dam

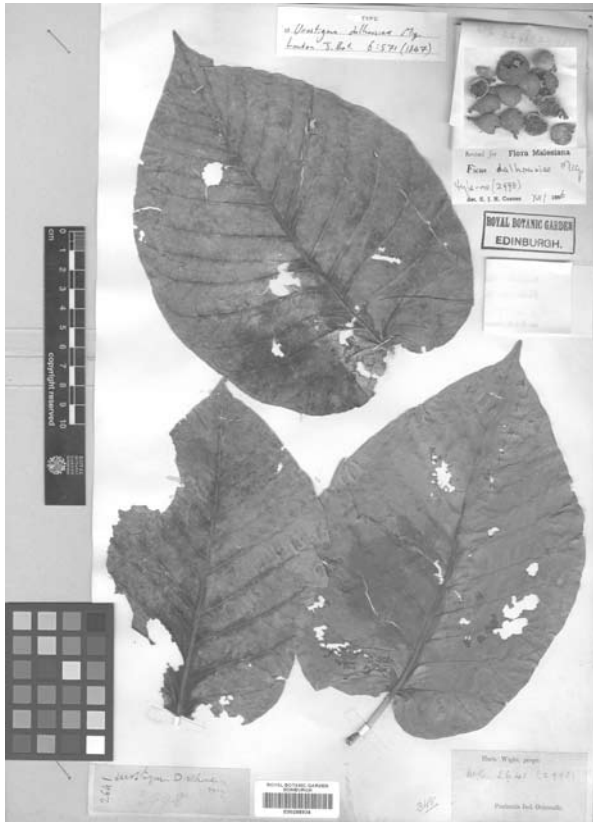


Fig. 6. Type specimen of *Ficus dalhousiae* (Miq.) Miq. (E)

site, 11.12.1986, *P. Daniel* 84777(MH). **Kerala**, Ernakulam district, Pindimedu – Pooyamkutty, 75 m, 24.12.1988, *P. Bhargavan* 90083 (MH). Idukki district, Kattappana side, 900 m, 13.11.1981, *C.N. Mohanan* 72488 (MH).

Distribution: South India (Tamil Nadu and Kerala).

IUCN Status: *Ficus anamalayana* is categorized here as 'Least Concern (LC)' according to IUCN Red List Categories and Criteria version 3.1 (IUCN, 2012). This species is widespread in Western Ghats of Tamil Nadu and Kerala and Eastern Ghats of Kolli and Shevaroy hills of Tamil Nadu. It is represented in various Indian herbaria (RHT, MH, CAL, BSI) with many collections.

Note: Matthew (1981) in his 'Materials for a Flora of Tamil Nadu Carnatic' cited some of the *Ficus* specimens deposited in RHT of this species under the name *F. dalhousiae*. Later Rani (1985) mistakenly determined all those cited specimens as *F. albipila* and reported it as a new record to India. Subsequent authors (Chithra, 1987; Matthew, 1988, 1991, 1996 & 1999) have adopted Rani's observation. During

the present revisionary study, it was confirmed that these specimens belong to a new species, *F. anamalayana*. Moreover, Sreekumar (1998) reported *F. albipila* from Andaman Islands (South Andaman, Hevelock-3, near the playground) based on a single collection *i.e.* *P.V. Sreekumar & L.N. Ray* 18137 (PBL), but the cited specimen could not be traced in BSI, ANRC herbarium (PBL) to check the identity and its distribution in the Islands. Therefore, the report of occurrence of *F. albipila* in India from Andamans needs confirmation.

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