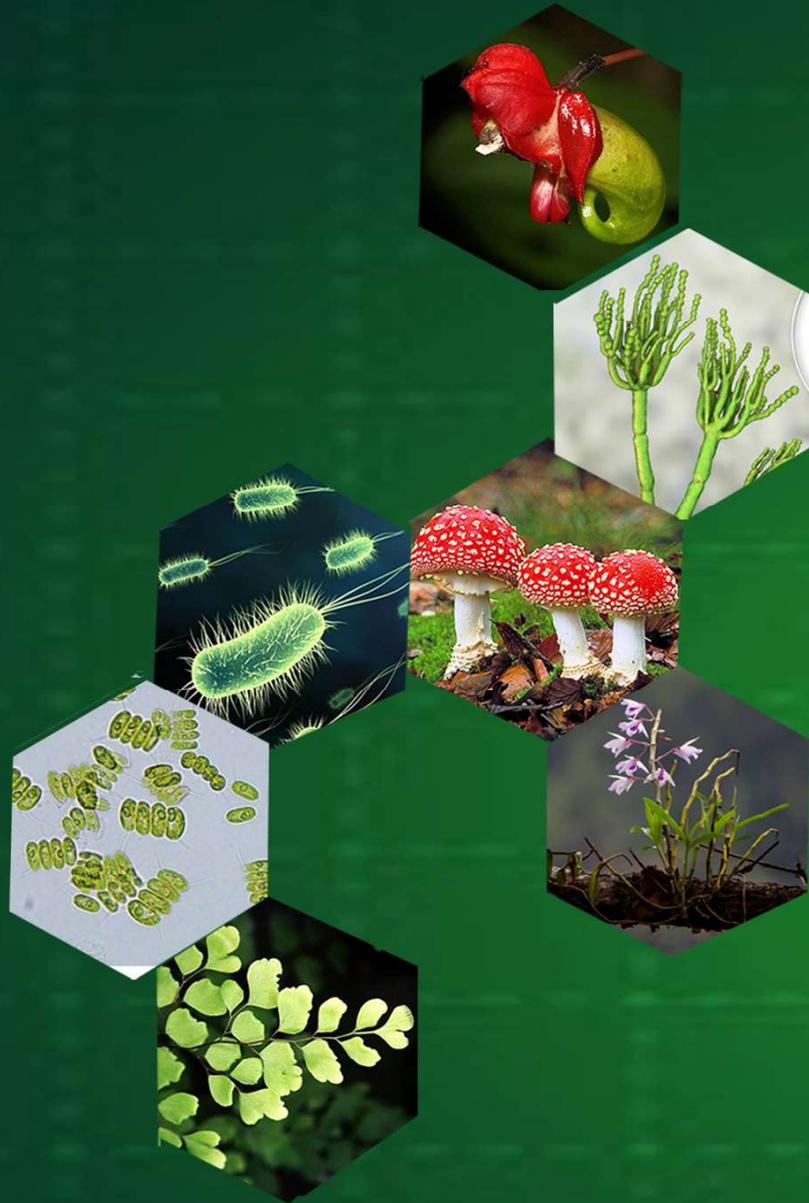


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**Taxonomy and Diversity of the Lesser-Known Varieties of *Ficus virens*
(Moraceae) from The Western Ghats**

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Abstract

The genus *Ficus* (Moraceae) which comprises around 115 taxa distributed in India is a dominant genus among the angiosperms. A comprehensive revision of the genus *Ficus* L., from the Western Ghats, recorded 36 taxa of *Ficus*. Encountered two interesting specimens were identified as varieties of *Ficus virens*. *Ficus virens* Aiton is one of the most common and widely distributed species of *Ficus* in the world. Which shows great complexity in the morphological characters and hence more complex in the taxa. Whereas the *Ficus virens* var *matthewii*, is a new record for Kerala and *Ficus virens* var *dispersa*, a new report to India. These two varieties of *Ficus virens* showed significant differences from the common variety *Ficus virens* var *virens*. A detailed taxonomic description of all the three varieties along with an identification key and images are provided here.

Keywords: Distributional record, *Ficus virens*, *Urostigma*, Western Ghats.

Introduction

The genus *Ficus* L., (Moraceae) is a highly diversified genera with respect to the habit pattern and life forms. The genus is mainly distributed in the tropical and sub-tropical regions of the world (Chaudhary *et al.*, 2012; Mohapatra *et al.*, 2020). The presence of the specialised inflorescence - hypanthodium, minute flowers and morphological complexities make the genera problematic. The global revision of the genus by E. J. H. Corner since 1930, reduced the number of species to ca. 750. The first detailed work on the genus from India was carried out by G. King (1887) and recorded 113 species and 47 infraspecific taxa of *Ficus*. The genus remained unnoticed except few regional works. BSI initiated a revisionary work on the genera and reported 115

taxa of *Ficus* from India (Chaudhary *et al.*, 2012). According to the current status, the Western Ghats region has a diversity of 36 taxa of *Ficus*.

The genus is divided into six sub genera, within which the subgenus *Urostigma* is the most abundant member (Berg and Corner, 2005). *Ficus virens* belonging to the subgenus *Urostigma* is one of the most widespread species in the genus *Ficus* (Berg, 2004; Chantarasuwan *et al.*, 2013). It is a morphologically highly variable species. Revisionary studies on the subgenus *Urostigma* established two new varieties of *Ficus virens* (Chantarasuwan *et al.*, 2013).

As part of the a comprehensive revision of *Ficus* of Western Ghats, field explorations in the Wayanad and Idukki districts of Kerala led to the collection of two interesting specimens. On detailed study, literature review and herbarium reference, the specimens were identified as *Ficus virens* var *matthewii* and *Ficus virens* var *dispersa*. *Ficus virens* var *matthewii* was a new distributional record to the state of Kerala (Nair *et al.*, 2021 a) and *Ficus virens* var *dispersa* was a new report to India (Nair *et al.*, 2021 b). Thus, three varieties of *Ficus virens* are distributed in the Western Ghats. This article provides a detailed description along with identification key and images to the lesser-known varieties of *Ficus virens* from the Western Ghats.

Materials and Methods

Field explorations were conducted for the collection of the specimens. The collected samples were studied in detail for the morphological and floral characters. The floral imaging of the samples was done using a digital microscope. The observed morphological and floral characters were enumerated in a data sheet. The samples were identified using relevant literatures (Corner, 1965; Berg, 2004 and Chantarasuwan *et al.*, 2013) and the identification was confirmed with reference to the type specimens of the taxa deposited in National Herbarium Nederland (L).

Result

The revision of the genus *Ficus* of Western Ghats region enumerated the presence of 36 taxa of *Ficus* from the region. No members belonging to the subgenus *Ficus* was observed from the study area. The subgenera wise diversity of the genus is shown in Fig 1. The most dominant subgenus was the *Urostigma*, similar to the global

diversity. This subgenus mainly included the epiphytic and hemi epiphytic species of the genus.

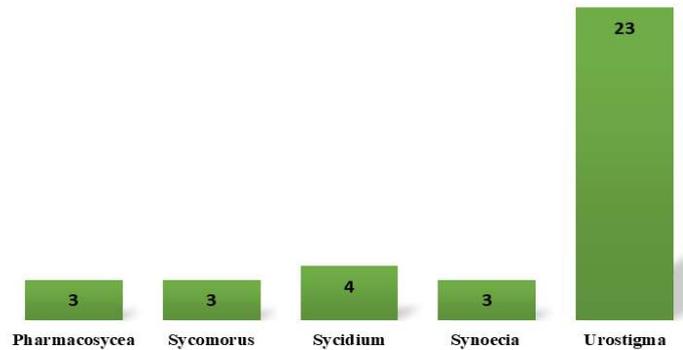


Fig 1. Subgenera wise diversity of *Ficus* in Western Ghats

Three varieties of *Ficus virens* were observed from the Western Ghats region. Two varieties *Ficus virens* var *matthewii* and *Ficus virens* var *dispersa* were not previously reported from the study area. These taxa showed substantial variations in their morphological and floral characters.

Systematic Treatment

***Ficus virens* Aiton var. *dispersa* Chantaras.** Syst. Bot. 38(3): 681. 2013; Nair *et al.*, Biodiv. Res. Conserv. 63: 41-47. 2021.

Type: Papua New Guinea. New Britain: West Nakanai, Rapuri village near Cape Hoskins, probably 5 Aug 1954, A. Floyd NGF 6457 (Holotype: L; isotype: K).

Description: Tree up to 15 m height, without aerial roots; bark smooth lenticellate, brown coloured; young twigs terete, brown, glabrous; inter node 0.4–1.2 cm. Stipules ovate, margins entire, 0.4–0.8 cm, apex acute, base truncate, glabrous, pale green–brown. Leaves alternate, spiral, margins entire, ovate–lanceolate, 5.9–11.8 × 3.6–5.8 cm, acumen 0.6–1.2 cm, apex cuspidate, base rounded–obtuse–cuneate, glabrous, pale red when young, green on maturity, subcoriaceous, brochidodromous venation, lateral veins 7–9 pairs; petiole terete, 2.6–4.8 cm, glabrous, pale green. Receptacles axillary, solitary or in pairs, monoecious; peduncle 0.3–0.4 cm, glabrous, pale green; basal bracts present. Syconium 0.7–1.1 cm across, globose, glabrous, pale green to purple coloured with spots; ostiole 0.1–0.2 cm in diameter. Male flowers abundant around ostiole and few dispersed, 1.2 mm long, sessile, tepals, 4, free, 0.75 mm long, linear, glabrous, pale red coloured. Female flowers at the base, 4 mm long, pedicellate, tepals 3, free, 2 mm

long, linear, stigma bifid, ovary 1 mm long, obovoid, glabrous, pale brown coloured. Gall flowers scattered, 2 mm long, tepals 3, fused, 1.5 mm long, linear, stigma short, ovary 1 mm long, obovoid, glabrous, pale brown coloured.

Etymology: The dispersed arrangement of male flowers within the receptacle might have named the variety “*dispersa*”.

Habitat: Semi evergreen and deciduous forest.

Fruiting and Flowering: December–February.

Distribution: This variety is reported so far from Malaysia, Indonesia, Papua New Guinea and East Australia.

***Ficus virens* Aiton var. *matthewii* Chantaras., Syst. Bot. 38(3): 683. 2013; Nair *et al.*, Species. 22(69): 21-28. 2021.**

Type: India, Tamil Nadu (Madras), Dist. Dindigul, Anna, Pachalur, below village, 1 Nov 1987, K. M. Matthew RHT 50937 (holotype: L; isotypes: RHT, SHC)

Description: Tree up to 35 m height, without aerial roots; bark smooth lenticellate, brown coloured; young twigs terete, pale brown, glabrous; inter node 0.6–4.0 cm. Stipules triangular – widely triangular, margins entire, 0.7–1.5 x 0.6–1.2 cm, apex acute, base truncate, hairy, tomentose, pale brown. Leaves alternate, lanceolate - elliptic - lance ovate - ovate, margins entire, 5.8–20.5 x 3.1–7.2 cm, acumen 0.4–0.9 cm, apex acute – acuminate - obtuse, base attenuate – cuneate – obtuse – rounded - truncate, glabrous, green on abaxial, dark green on adaxial, subcoriaceous, brochidodromous venation, lateral veins 10–12 pairs; petiole terete, 1.5–11.2 cm, glabrous, pale green. Receptacles axillary or below the leaves, clustered, monoecious; peduncle 0.2–0.3 cm, glabrous, pale green; basal bracts present. Syconium 0.4–2.2 cm across, obovoid, glabrous, pale green to purple coloured; ostiole 0.3–0.4 cm in diameter. Male flowers few near the ostiole, 1.0–1.1 mm long, pedicel short or sessile, tepals, 3–4, fused, 1 mm, linear, glabrous, pale brown coloured. Female flowers at the base, 3 mm long, sessile, tepals 3, fused, 1.5 mm, linear, stigma 0.4 mm, ovary 2 mm, obovoid, glabrous, pale brown coloured. Gall flowers 2.5 mm, tepals 4, fused, 2 mm, linear, stigma 0.2 mm, ovary 1 mm, obovoid, glabrous, pale brown.

Etymology: The variety is named ‘*matthewii*’ in honour of the contributions by Dr. K M Matthew, who collected the specimen for the first time in 1987.

Habitat: In evergreen forests.

Flowering and fruiting: October – December.

Distribution: South India and Sri Lanka.

Ficus virens Aiton var *virens.*, Corner, Gard. Bull. Singapore 21: 9. 1965; Chew, Fl. Australia 3: 35. 1989; Sasidh. & Sivar., Bio. Docu. Kerala part 6: 442. 2004; Chantaras., Syst. Bot. 38(3): 680. 2013.

Description: Tree up to 30 m height, without aerial roots; bark smooth lenticellate, brown coloured; young twigs terete, pale brown, glabrous; inter node 0.4–3.8 cm. Stipules triangular, margins entire, 0.25–1.5 x 0.2–0.4 cm, apex narrowly acute, base truncate, glabrous, pale brown. Leaves alternate, ovate-elliptic- lanceolate-obovate, margins entire, 5.2–18.5 x 2.5–8.5 cm, acumens 0.4–1.0 cm, apex acute, base rounded to truncate, glabrous, green on abaxial, dark green on adaxial, subcoriaceous, brochidodromous venation, lateral veins 8–12 pairs; petiole terete, 1.6–6.1 cm, glabrous, pale green. Receptacles axillary or below the leaves, clustered, monoecious; peduncle 0.2–0.3 cm, glabrous, pale green; basal bracts present. Syconium 1.0–1.6 cm across, sub globose, glabrous or minutely puberulous, pale green to purple coloured; ostiole 0.2–0.4 cm in diameter. Male flowers near the ostiole, 1.0–1.5 mm long, pedicel short or sessile, tepals, 3–4, fused, 0.75 mm, linear, glabrous, pale brown coloured. Female flowers at the base, 2 mm long, sessile or short pedicellate, tepals 3, fused, 0.75 mm, linear, stigma 0.25 mm, ovary 1 mm, obovoid, glabrous, pale brown coloured. Gall flowers 2.0 mm, pedicel short or sessile, tepals 4, fused, 0.75 mm, linear, stigma short, ovary 1 mm, obovoid, glabrous, pale brown.

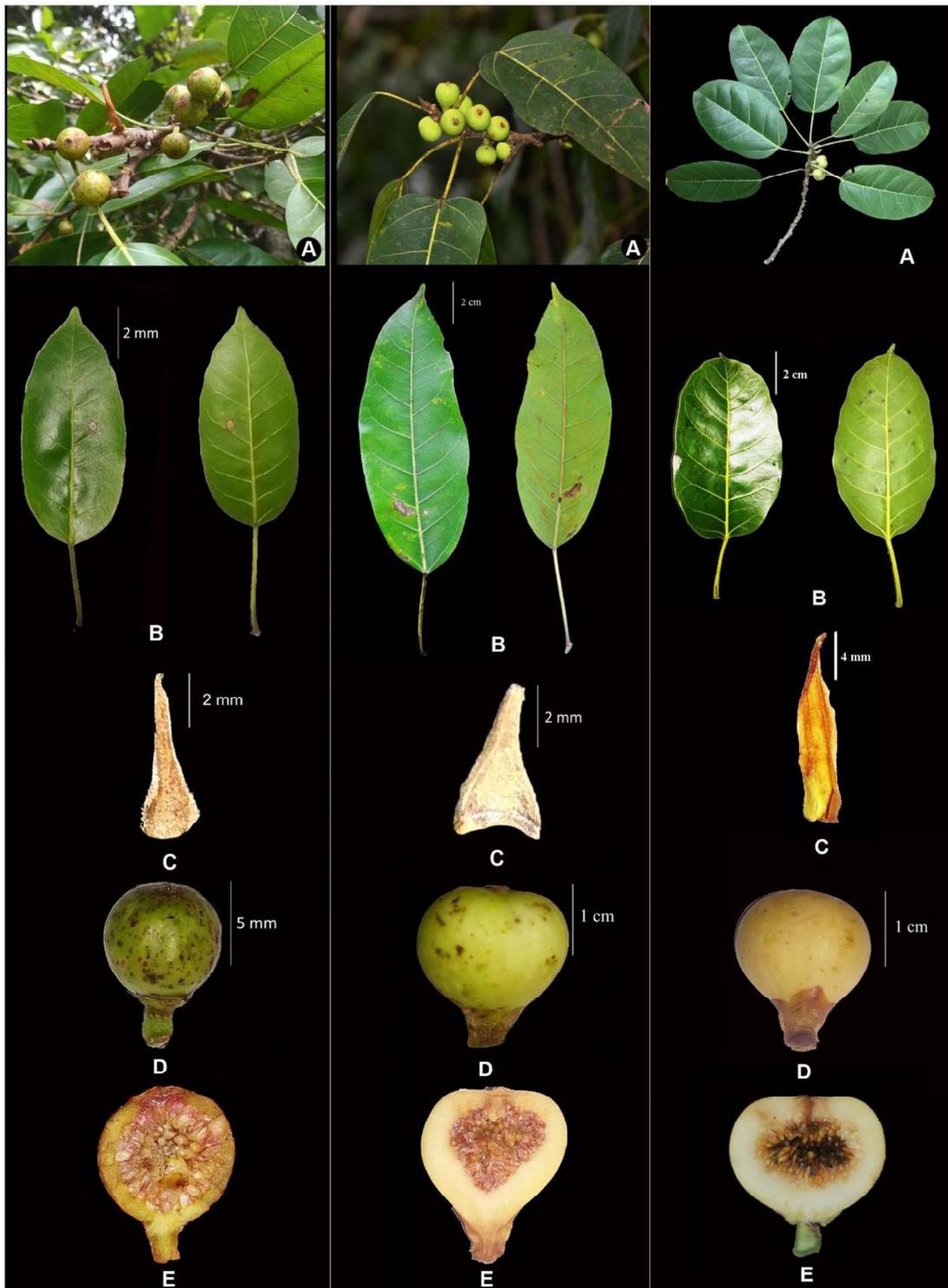
Etymology: The variety might have named '*virens*' due to the green and reddish colour of the young leaves.

Habitat: In evergreen and deciduous forests.

Flowering and fruiting: November – June.

Distribution: In the tropical and sub-tropical regions.

Diversity: The three varieties of *Ficus virens* shows considerable range of variations in their characters. Table 1 shows the variations in the characters of the three variety of *Ficus virens*. Figure 2 shows the images of the three varieties, *Ficus virens* var *dispersa*, *Ficus virens* var *matthewii* and *Ficus virens* var *virens*.



Ficus virens var *dispersa*

Ficus virens var *matthewii*

Ficus virens var *virens*

Figure 2. **A.** Fruiting branch; **B.** Leaf abaxial and adaxial side; **C.** Stipule; **D.** Syconium; **E.** Syconium L S.

Character	<i>Ficus virens</i> var <i>dispersa</i>	<i>Ficus virens</i> var <i>matthewii</i>	<i>Ficus virens</i> var <i>virens</i>
Habit	Tree up to 15 m	Tree up to 35 m	Tree up to 30 m
Stipule size	0.4–0.8 cm	0.7–1.5 cm	0.25–1.5 cm
Petiole Size	2.6–4.8 cm	1.5–11.2 cm	1.6–6.1 cm
Leaf shape	Ovate - lanceolate	lanceolate -elliptic - lance ovate - ovate	ovate to elliptic to lanceolate to obovate
Leaf size	5.9–11.8 x 3.6 –5.8 cm	5.8–20.5 x 3.1–7.2 cm	5.2–18.5 x 2.5 – 8.5 cm
No of lateral veins	7–9	10–12	8–12
Peduncle size	3–4 mm	2–3 mm	2–3 mm
Syconium size	0.7–1.1 cm when fresh	0.4–2.2 cm when fresh	0.4–1.5 cm when dry
Syconium shape	Globose	Obovoid	Sub globose
Indumentum of syconium	Glabrous	Glabrous	Glabrous or minutely puberulous
Ostiole size	1.5–2.5 mm	3–4 mm	2–4 mm
Position of male flowers	abundant around the ostiole and a few dispersed	Few near ostiole	Near ostiole or dispersed
No of tepals	4	3–4	3–4
Nature of female flowers	Pedicellate	Sessile	Sessile or short pedicellate

Table 1: Character variations in varieties of *Ficus virens* Aiton.

Key to varieties of *Ficus virens*

1a. Small tree up to 15 m tall, stipules less than 1.0 cm long, lateral veins less than 10 pairs, peduncle 3–4 mm long, syconium globose ***F. virens* var. *dispersa*.**

1b. Large tree above 25 m tall, stipules more than 1.0 cm long, lateral veins up to 10 pairs, peduncle 2–3 mm long, syconium obovoid or sub-globose **2.**

2a. Petiole above 10 cm long, syconium obovoid in shape, indumentum glabrous, male flowers few, near the ostiole ***F. virens* var. *matthewii*.**

2b. Petiole below 10 cm long, syconium sub-globose in shape, indumentum glabrous or minutely puberulous, male flowers near the ostiole and dispersed ***F. virens* var. *virens*.**

Species examined: *F. virens* var *dispersa*. Papua New Guinea. West Nakanai, Rapuri village near Cape Hoskins, 05-08-1954, A. Floyd NGF 6457 (Holotype L; Isotype K). *F. virens* var *matthewii*: Tamil Nadu, (Madras): Dindigul, Pachalur, 01-11-1987, Matthew RHT 50937 (L). *F. virens* Aiton: Tamil Nadu, Coimbatore, Girimalami, 18-03-1931, K. Cherian Jacob, 421(MH); Kerala, Kollam, Vilakkumaram, Shenduruny WLS, 09-12-1993, Sasidharan, 10687; Idukki, 1101 m, 16-05-1994, N. Sasidharan & Jomy Augustine, 13740 (KFRI); Thiruvananthapuram, Peringammala, 19-06-1984, N. Mohanan, 174 (TBGT); Wayanad, Vythiri, 900 m, 15-05-2000, Rathesh Narayanan, 2547 (CALI).

Conclusion

A total of 36 taxa of *Ficus* were recorded from the Western Ghats, among them *Ficus virens* var *matthewii* and *Ficus virens* var *dispersa* were two lesser known taxa and were reported as new records for India and Kerala respectively. They showed significant variations in the floral and morphological characters.

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