

EUGENIA PACHAKUMACHIANA (MYRTACEAE), A NEW SPECIES FROM THE WESTERN GHATS, INDIA

S. Arumugam  & C. Murugan *

Eugenia pachakumachiana Arum. & Murugan, a species from Megamalai Wildlife Sanctuary, southern Western Ghats of Tamil Nadu, India, and new to science is described and illustrated. The species is compared with its closely allied species *Eugenia rottleriana* Wight & Arn. and incorporated into a key of Indian *Eugenia* species.

Keywords. *Eugenia*, India, Megamalai Wildlife Sanctuary (Theni), Myrtaceae, new species, Western Ghats.

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Introduction

The myrtle family, Myrtaceae, belongs to the order Myrtales and comprises 130–150 genera and about 5650 species worldwide. It is mainly distributed in tropical regions, with centres of diversity in the Neotropics, Malesia and Australasia (Govaerts *et al.*, 2022). *Eugenia* L., the largest genus of the family, is estimated to comprise 1122 species and is distributed predominantly in Neotropical regions (Govaerts *et al.*, 2022). Globally, it is the second largest arboreal genus, comprising 884 species (Beech *et al.*, 2017). The genus is most closely related to *Syzygium* Steud. but easily differentiated by the young shoots and flowers often pubescent, flowers usually solitary or aggregated in many-flowered axillary dichasial or raceme-like inflorescences, and seeds with fused cotyledons. By contrast, in *Syzygium*, the young shoots and flowers are usually glabrous, the inflorescences usually terminal (sometimes rami- or cauliflorous) or paniculate, and the seeds have free cotyledons (Shareef & Kumar, 2020).

Although *Eugenia* species are distributed from Mexico to Argentina, only a few species occur in Africa, Madagascar and southern Asia, probably as a result of long-dispersal events (Mazine *et al.*, 2016; Vasconcelos *et al.*, 2017; Giaretta *et al.*, 2018). The evergreen forests in the high ranges of the Western Ghats are centres of diversity of the genus in India (Murugesan *et al.*, 2019; Shareef & Kumar, 2020).

In India, the genus is represented by 28 taxa including the recently described *Eugenia bolampattiana* V.Ravich., Murug. & Murugan, *E. kalamii* Shareef, E.S.S.Kumar, Shaju & Prakashk., *E. megamalayana* Murugan & Arum., *E. sphaerocarpa* Vadhyar, Sujana, J.H.F.Benji. & G.V.S.Murthy., *E. terpnophylla* var. *keralensis* Shareef, E.S.S.Kumar & P.E.Roy and

Botanical Survey of India, Southern Regional Centre, TNAU Campus, Coimbatore, Tamil Nadu – 641003, India.

* Author for correspondence. E-mail: sivanthimurugan@rediffmail.com.

E. velliangiriana Murug., V.Ravich., Murugan & Arum. Twenty-four of the taxa are endemic to the Western Ghats.

Materials and methods

During intensive and extensive botanical explorations in the southern Western Ghats, the authors collected several interesting specimens of *Eugenia* from the Megamalai Wildlife Sanctuary in Tamil Nadu, India. On careful scrutiny of the literature, including all relevant regional and local floras and research papers published in various journals (Duthie, 1879; Murugan, 2002; Gopalan & Srinivasan, 2003; Kumar & Yeragi, 2003; Murugan & Gopalan, 2005; Gopalan & Murugan, 2008; Shareef *et al.*, 2011; Byng *et al.*, 2015; Shareef *et al.*, 2018; Murugan & Arumugam, 2019; Murugesan *et al.*, 2019; Ravichandran *et al.*, 2020; Vadhyar *et al.*, 2020), and examination of type specimens at MH and online digital images of type specimens at BM, CAL, E, G, K, L, P (Thiers *et al.*, [continuously updated](#)), the present collection was recognised as a hitherto undescribed taxon and is described here as a new species. A line illustration and photographs are provided. An updated key to all 28 Indian *Eugenia* species is also presented.

Taxonomic treatment

Species description

***Eugenia pachakumachiana* Arum. & Murugan, sp. nov.**

This new species is closely allied to *Eugenia rottleriana* Wight & Arn. but differs in leaf morphology (oblong-lanceolate versus narrowly oblanceolate), type of inflorescence (simple, solitary versus axillary racemes), flower size (2–3 cm in diameter versus 1–1.5 cm in diameter), calyx lobes (equal, c.3 mm long, ovate, versus subequal, c.5 mm long, triangular-ovate), petals (elliptic-ovate versus elliptic-lanceolate), number of ovules (8–12 versus 3–6 in each cell), and fruits (1.5 cm in diameter, exocarp with ridges and furrows [when young] versus c.1 cm in diameter, exocarp smooth). – Type: India, Tamil Nadu, Theni District, Megamalai Wildlife Sanctuary, Chinnamanur Range, Thenpalani Beat, 09°43'44.0"N, 77°25'30.6"E, 990 m, 23 vi 2019, C. Murugan & S. Arumugam 144268 (holotype CAL; isotypes CAL, MH). **Figures 1, 2.**

Tree, 3–6 m high, bark smooth, somewhat flaky, light brown, mottled with light cream to white patches of various sizes, blaze pale red to white; branches terete, tawny, glabrescent; internodes 1–3 cm long; branchlets flat, sparsely brownish pubescent, glabrescent.

Leaves simple, opposite, oblong-lanceolate, 1–7 × 0.8–2 cm, base cuneate, margin entire, revolute, apex obtusely acute or rarely slightly retuse, membranous, dark green and glossy above, pale green beneath with oil glands, young leaves pale pink to reddish; midrib rather prominent; lateral veins indistinct; petioles 4–8 mm long, flat above, rounded below, with

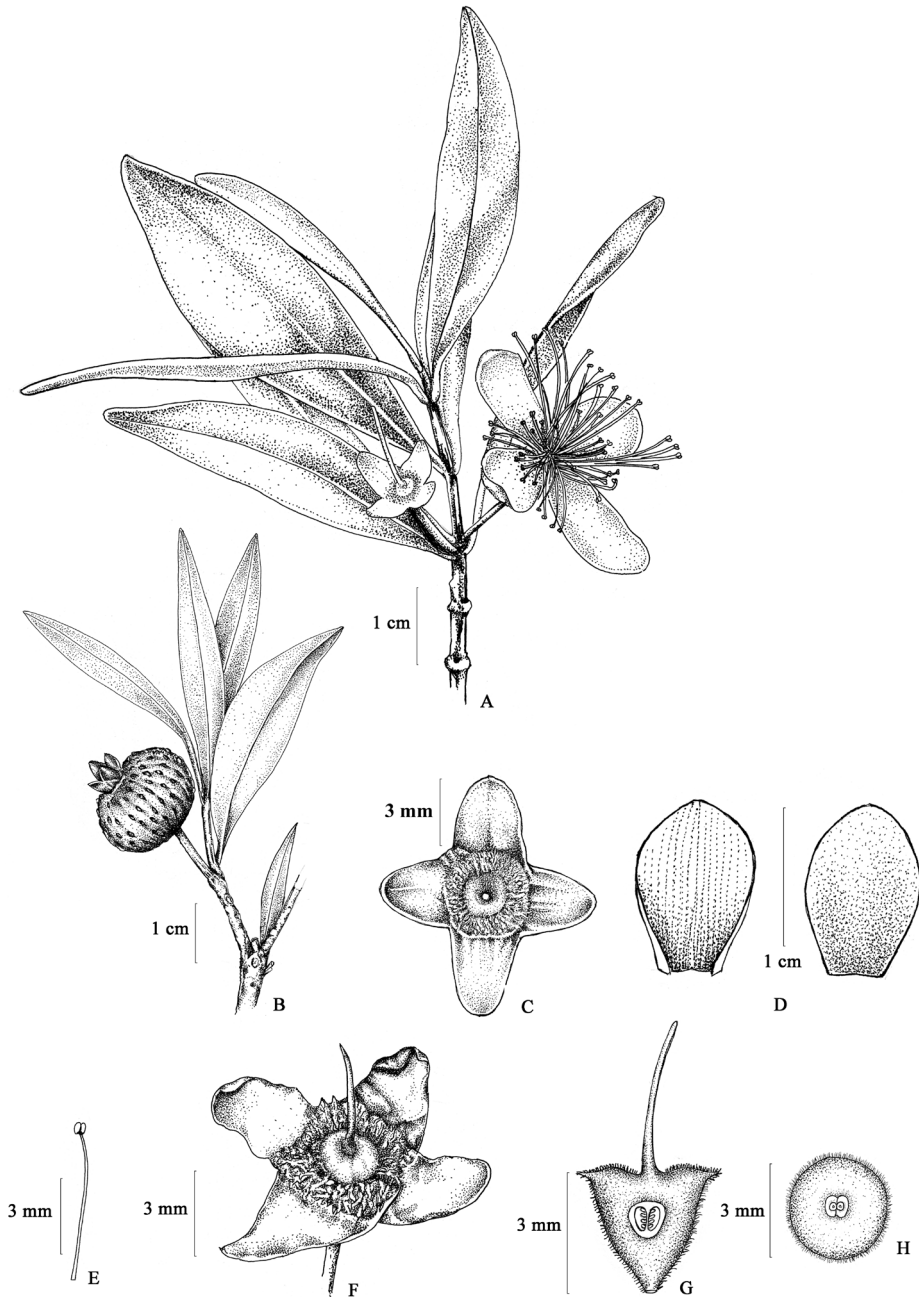


Figure 1. *Eugenia pachakumachiana* Arum. & Murugan, sp. nov. A, Flowering branch; B, fruiting branch; C, calyx, showing disc; D, petals; E, stamen; F, hypanthium with calyx lobes; G, ovary (longitudinal section); H, ovary (cross-section). Drawn from the holotype, Murugan & Arumugam 144268 (CAL), by R. Suresh.



Figure 2. *Eugenia pachakumachiana* Arum. & Murugan, sp. nov. A, Habit; B, trunk (entire and blazed); C, flowering branch; D, young leaves; E, flowering twig; F, fruiting twig. Photographs: C. Murugan.

brownish adpressed hairs. *Flowers* axillary, solitary, bisexual, actinomorphic, 2–3 cm in diameter; bracteoles 2, linear, 3–4 mm long, brownish pubescent, rarely persistent; pedicels terete, stout, 1–2 cm long, brownish pubescent. *Calyx tube* adnate to ovary, turbinate, 2–3 × 2–3 mm, tawny-pubescent; lobes 4, equal, valvate, ovate, c.3 × 3 mm, shorter than petals, curved inwards, apex rounded or obtuse, coriaceous, with adpressed hairs, brownish. *Petals* 4, alternate to calyx lobes, valvate, elliptic-ovate, 1–1.2 × 0.8–1 cm, flat at base, oblong, entire, apex rounded. *Stamens* 70–100 in several whorls, unequal, 5–13 mm long; filaments filiform 4–12 mm long; anthers ovate, c.0.5 mm in diameter, 2-celled, dorsifixed. *Disc* inconspicuous, flat, 4-angular, pitted, hairy. *Ovary* inferior, turbinate to globose, c.3 × 3 mm, 2-celled; ovules 8–12 in each locule on axile placentation; style slender, subulate, 1–1.4 cm long; stigma simple, minutely punctiform. *Fruits* globose, or slightly depressed globose, drupe, c.1.5 cm in diameter, apex crowned by persistent calyx lobes, dark green when young, pale pink to red when mature, sparsely brown pubescent; exocarp ridged, furrowed when young; seeds 1 or 2, globose, smooth.

Distribution. Known only from Thenpalani Beat, Chinnamanur Range, Megamalai Wildlife Sanctuary, Tamil Nadu, India.

Habitat and ecology. Common along streams in dry deciduous forest from 800 to 1000 m in altitude. The species is ecologically associated with *Atalantia racemosa* Wight & Arn., *Derris benthamii* (Thwaites) Thwaites, *Diospyros melanoxylon* Roxb., *Erythroxylum lanceolatum* (Wight) Walp., *Euonymus dichotomus* B.Heyne ex Wall., *Memecylon grande* Retz., *Murraya paniculata* (L.) Jack, *Psydrax dicoccos* Gaertn. and *Syzygium cumini* (L.) Skeels.

Phenology. Flowering and fruiting between May and August.

Etymology. The specific epithet refers to the type locality, Pachakumachi Hills (Megamalai Wildlife Sanctuary), one of the microendemic centres in the Western Ghats of India.

Proposed IUCN conservation category. This species is currently known only from the Megamalai Wildlife Sanctuary. Based on our assessment, it is tentatively classified as Data Deficient (DD) (IUCN, 2019), because further observations on its occurrence, its distribution and the population size across the entire range of the Western Ghats are essential for assessment of its exact conservation status.

Additional specimens examined. INDIA. **Tamil Nadu State:** Theni District, Megamalai Wildlife Sanctuary, Chinnamanur Range, Thenpalani Beat, 09°43'44.0"N, 77°25'30.6"E, 990 m, 18 viii 2018, C. Murugan & S. Arumugam 138817 (MH).

The [Table](#) summarises the differences between *Eugenia pachakumachiana* and *E. rottleriana*.

Table. Distinguishing characters of *Eugenia pachakumachiana* and *E. rottleriana*

Character	<i>E. pachakumachiana</i>	<i>E. rottleriana</i>
Habit	Medium-sized tree, 3–6 m high	Large shrub, to 3 m high
Branchlets	Sparsely brownish pubescent, later glabrescent	Tawny fulvous-tomentose
Leaves	Oblong-lanceolate, 2–7 × 0.8–2 cm, cuneate at base, revolute at margins, obtusely acute at apex, membranous	Oblanceolate, 6–12 × 1.8–2.8 cm, attenuate at base, revolute at margins, acute or obtuse at apex, thin coriaceous
Leaf veins	Indistinct	5–8 pairs
Petiole	4–8 mm long, flat above, rounded at base, brownish adpressed hairy	c.5 mm long, densely rusty-tomentose
Inflorescence	Flowers always solitary, axillary, 2–3 cm in diameter	Flowers usually axillary in fascicled racemes, rarely solitary, c.1 cm in diameter
Pedicele	1–2 cm long, stout, terete, brownish pubescent	0.8–1.5 cm long, very slender, densely rusty-tomentose
Bracteoles	Linear, 3–4 mm long, brownish pubescent, rarely persistent	Short, always persistent
Calyx	Equal, 0.2–0.3 × 0.2–0.3 cm	Subequal, c.0.5 cm in diameter, triangular-ovate
Petals	Elliptic-ovate, 1–1.2 × 0.8–1 cm oblong, entire	Elliptic-lanceolate, 0.25–0.3 cm long, villous along margin
No. of ovules	8–12 in each cell	3–6 in each cell
Fruits	Globose, c.1.5 cm in diameter, sparsely brown pubescent, exocarp protruding ridges and furrows, pinkish red	Globose, c.1 cm, yellowish orange-green, rusty-tomentose, exocarp smooth

Key to *Eugenia* species in India

- 1a. Leaves silvery-pubescent beneath _____ *E. argentea* Bedd.
 1b. Leaves glabrous or brown hairy beneath _____ 2
- 2a. Flowers sessile _____ 3
 2b. Flowers pedicellate _____ 4
- 3a. Calyx lobes longer than the petals _____ *E. macrosepala* Duthie
 3b. Calyx lobes shorter than the petals _____ 5
- 4a. Lateral veins 8–10 pairs, indistinct; fruits tomentose; seeds 1 or 2 __ *E. codyensis* Munro
 4b. Lateral veins 18–24 pairs, distinct; fruits glabrous; seeds 3–6
 E. sphaerocarpa Vadhyar, Sujana, J.H.F.Benj. & G.V.S.Murthy
- 5a. Flowers in racemes _____ 6
 5b. Flowers solitary or in fascicles _____ 7
- 6a. Leaf base acute; calyx lobes ovate; petals obovate _____ *E. roxburghii* DC.
 6b. Leaf base cordate; calyx lobes suborbicular; petals ovate ____ *E. singampattiana* Bedd.

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- 7a. Fruits ribbed _____ *E. uniflora* L.
- 7b. Fruits not ribbed _____ 8
- 8a. Branchlets usually glabrous _____ 9
- 8b. Branchlets pubescent or floccose _____ 10
- 9a. Leaves spatulate-obovate _____ *E. mabaeoides* Wight
- 9b. Leaves ovate-lanceolate to elliptic _____ 11
- 10a. Leaves, branchlets and fruits floccose _____ *E. floccosa* Bedd.
- 10b. Leaves, branchlets and fruits not floccose _____ 16
- 11a. Lateral veins 10–14 pairs; calyx lobes unequal; disc glabrous; ovules 1–3 per cell
E. kalamii Shareef, E.S.S.Kumar, Shaju & Prakashk.
- 11b. Lateral veins 6–10 pairs; calyx lobes equal; disc hairy; ovules 4 to many per cell ____ 12
- 12a. Pedicel and calyx lobes rusty to fulvous-tomentose _____ 13
- 12b. Pedicel and calyx lobes glabrous or puberulous _____ 14
- 13a. Leaf base cuneate; ovules 4 per cell, pendulous _____ *E. wynadensis* Bedd.
- 13b. Leaf base cordate; ovules 2 per cell, axile _____ *E. aloysii* C.J.Saldanha
- 14a. Leaves lanceolate; pedicels puberulous; fruits oblongoid
E. anamalaiensis E.S.S.Kumar, Veldkamp & Shareef
- 14b. Leaves ovate; pedicels glabrous; fruits globose _____ 15
- 15a. Large shrub; flowers small, c.5 mm in diameter; fruit red, regularly globose _____
E. mooniana Wight
- 15b. Tree; flowers large, c.1.2 cm in diameter; fruit white, irregularly globose
E. memecylifolia Talbot
- 16a. Staminal disc inconspicuous _____ 17
- 16b. Staminal disc broad and conspicuous _____ 19
- 17a. Lateral veins distinct; pedicels slender _____ 18
- 17b. Lateral veins indistinct; pedicels stout _____ *E. pachakumachiana*
- 18a. Lateral veins 5–8 pairs, distinct; pedicels c.5 mm long _____ *E. rottleriana* Wight & Arn.
- 18b. Lateral veins 12–15 pairs, indistinct; pedicels 3–5 mm long
E. bolampattiana V.Ravich., Murug. & Murugan
- 19a. Flowers 1.5–2.5 cm in diameter _____ 20
- 19b. Flowers up to 1 cm in diameter _____ 23
- 20a. Leaf base rounded _____ *E. megamalayana* Murugan & Arum.
- 20b. Leaf base cuneate _____ 21

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