

MEMECYLON WAYANADENSE
(MELASTOMATACEAE), A NEW SPECIES
FROM THE WESTERN GHATS, INDIA

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Memecylon wayanadense Ratheesh, Sivu & Pradeep, a new species of Melastomataceae from the Wayanad forests of Kerala, India, is described and illustrated. The new species is allied to *Memecylon angustifolium*, *M. rivulare* and *M. sivadasanii* but differs in habit, leaf shape, sclereid type, inflorescence type and position, and the shape and size of the sepals and petals. An UPGMA analysis of 20 RAPD primers resulted in two major clusters with *Memecylon sivadasanii* in one cluster and *M. rivulare*, *M. angustifolium* and *M. wayanadense* in the second cluster. *Memecylon wayanadense* forms a subgroup within the second cluster.

Keywords. Kerala, *Memecylon wayanadense*, new species, RAPD, Wayanad, Western Ghats.

INTRODUCTION

The genus *Memecylon* L. (Melastomataceae) was established by Linnaeus in 1753 since when more than 250 species have been added to it, mainly from the paleotropics (Mabberley, 2005). A total of 67 taxa of *Memecylon* (40 species and 27 varieties) were included in the *Flora of British India* (Clarke, 1879) of which nine species and three varieties are from modern-day India. Recent enumeration reveals that 39 taxa of this genus are now reported from India, of which 21 are endemics (Murugan & Gopalan, 2006). In India, the Western Ghats is the major centre of diversity with 27 species, including 20 endemics confined to this 'hotspot' of biodiversity (Gamble, 1919; Mohanan *et al.*, 2001; Viswanathan & Manikandan, 2001; Santhosh Kumar *et al.*, 2003; Manickam *et al.*, 2007).

Wayanad District in Kerala is a 'hotspeck' of biodiversity in the Nilgiri phytogeographical region of the Western Ghats. Recent floristic explorations in this region (Ratheesh Narayanan, 2010) led to the collection of a narrow-leaved *Memecylon* which is quite different from hitherto-described species. On detailed examination,

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combined with a study of the pertinent literature (Clarke, 1879; Gamble, 1919; Henry & Subramanyam, 1971; Bremer, 1979, 1987; Balakrishnan & Nair, 1982; Mohanan *et al.*, 2001) and type material, these collections turned out to represent a new species.

SPECIES DESCRIPTION

Memecylon wayanadense Ratheesh, Sivu & Pradeep, **sp. nov.** Figs 1–3.

Affinis *Memecylon sivasanii* N.Mohanan *et al.* sed habitu fruticoso, caule brevior prope terram ramificanti, foliis latioribus (1–1.5 cm non 0.6 cm latis), petiolis foliorum brevioribus (0.5 mm non 2 mm longis), inflorescentiis plerumque in axillis foliorum (non in fasciculis ad truncum principalem versus basin), pedicellis florum longioribus (6–7.5 mm non 2–3.5 mm longis), fructibus obovatis differt. – Type: India, Kerala, Wayanad District, Chembra-Vellarimala hill ranges, Kallady forest, 11°30'N, 76°06'E, c.1200 m, evergreen forest, 12 xi 2006, M.K. Ratheesh Narayanan 1010 (holo MH; iso MSS¹, TBGT).

Shrub, 1.5–2 m tall, repeatedly branched, branchlets slightly quadrangular when young, terete on maturity. *Leaves* opposite, narrowly lanceolate, 5–8 × 0.7–1.3 cm, coriaceous or subcoriaceous, glabrous, shining above, pale below, base acute, margins entire, apex long acuminate; midrib prominent, secondary nerves obscure; foliar sclereids filiform and branched (Fig. 3); petiole 0.4–0.5 cm long, pink when young, sulcate. *Inflorescence* a few-flowered cyme; peduncles axillary, 0.8–1 cm long; pedicels 0.6–0.75 cm long, glabrous; bracts 2, ovate, 0.7–0.8 × 0.4–0.5 mm, entire, apex obtuse; bracteoles broadly ovate, c.1.1 × 0.8 mm long, margin serrate, apex acute, glabrous. *Flowers* bisexual; calyx deeply 4-lobed, lobes broadly triangular, apex acute to subacute, persistent; tube campanulate, 2–2.3 × 0.8–1 mm, violet; petals 4, broadly ovate, clawed, 0.5–3 × 0.5–3 mm, white with violet tinge; stamens 8, incurved in bud; filaments 2–3 mm long, glabrous, violet; anthers 2, c.1.5 mm long, opening by terminal slits, yellowish white, connectives attached ventrally with anthers, with a gland on dorsal middle surface. *Ovary* inferior, c.2 mm across, unilocular, ovules 6 with central placenta; style simple; stigma pointed. *Berries* obovate, c.1 cm across, greenish yellow, glabrous with persistent calyx lobes.

Distribution. Known only from three localities in the Chembra-Vellarimala hills of the Meppady forest range of Wayanad, Kerala, India.

Habitat and ecology. The new species is distributed in the lower stratum of evergreen forests at an altitude of 800–1400 m. The other species commonly found in this habitat include *Glyptopetalum grandiflorum* Bedd., *Justicia santapau* Bennet, *Psychotria globicephala* Gamble, *Milusa nilagirica* Bedd., *Meiogyne ramarowii* (Dunn) Gandhi, *Orophea uniflora* Hook.f. & Thoms., *Agrostistachys borneensis* Becc., *Dimocarpus*

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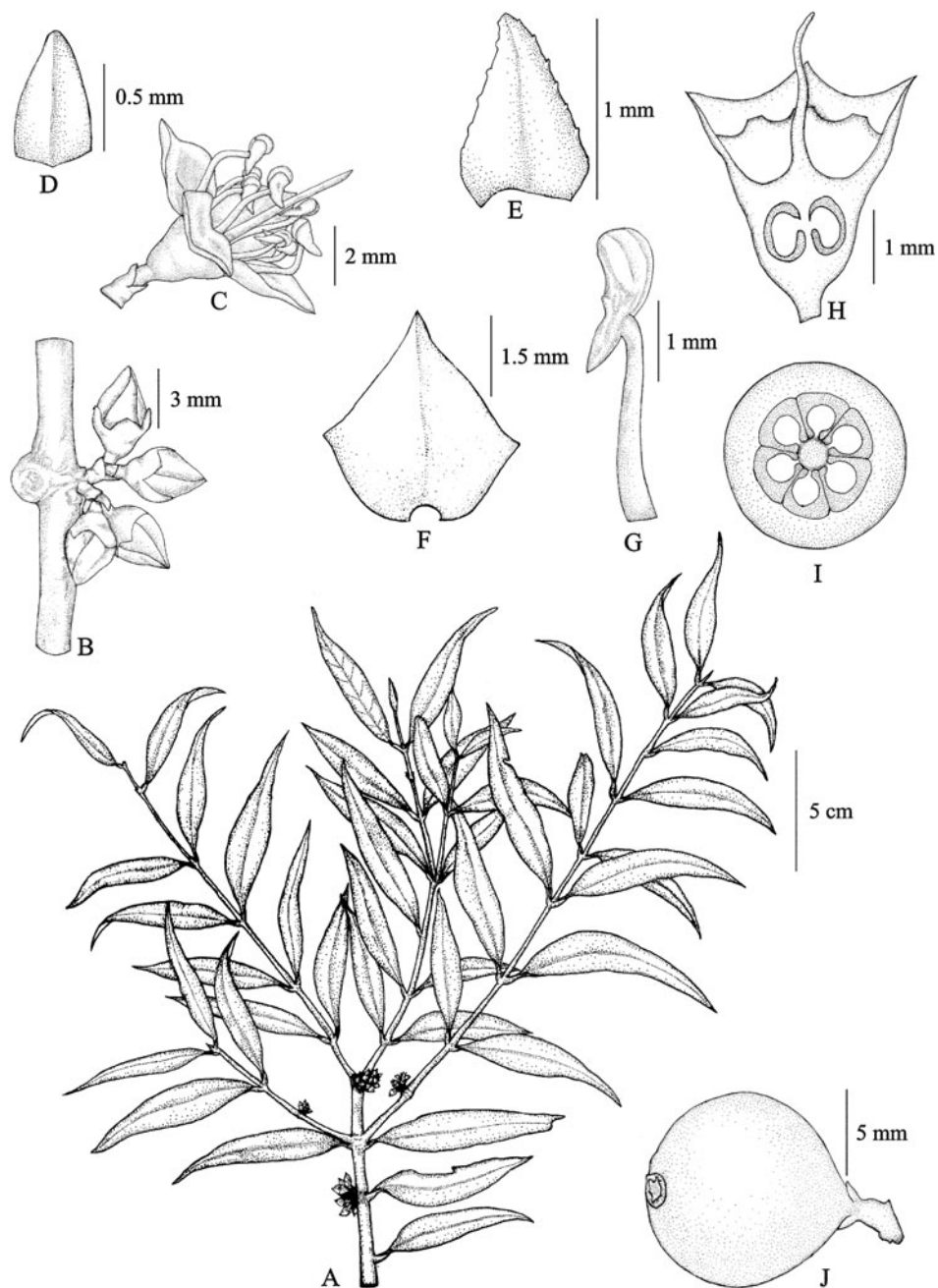


FIG. 1. *Memecylon wayanadense* Ratheesh, Sivu & Pradeep. A, flowering twig; B, inflorescence; C, flower; D, bract; E, bracteole; F, petal; G, stamen; H, flower L.S.; I, ovary; J, fruit.



FIG. 2. *Memecylon wayanadense* Ratheesh, SivU & Pradeep. A, habit; B, leaves; C, flowering branch; D, inflorescence; E, bark; F, buds; G, fruits.

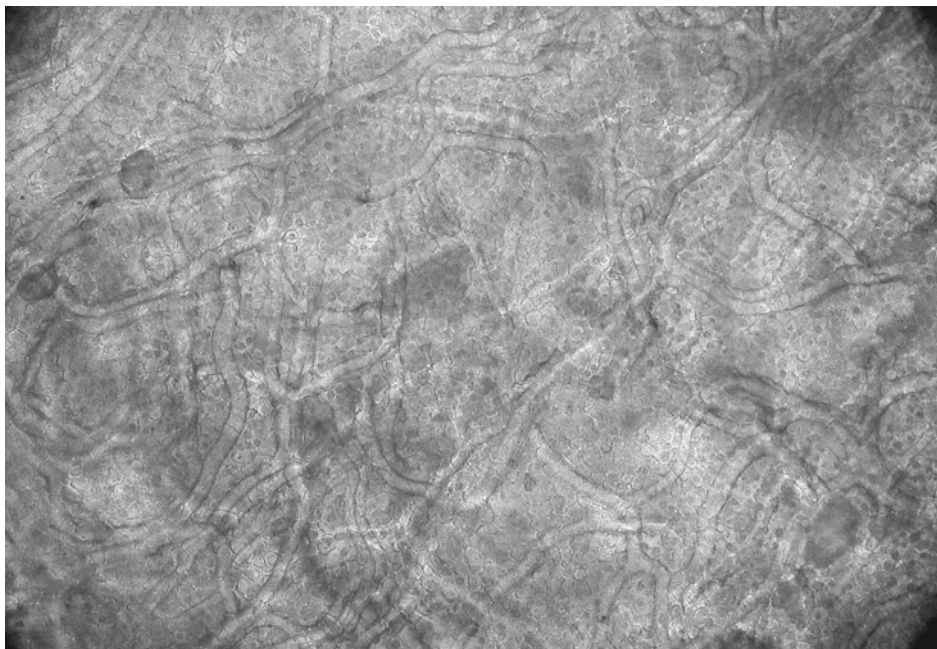


FIG. 3. A portion of cleared leaf of *Memecylon wayanadense* showing filiform branched sclereids.

longan Lour., *Drypetes venusta* (Wight) Pax & Hoffm., *Epiprinus mallotiformis* (Müll.Arg.) Croizat and *Palaquium ellipticum* (Dalz.) Baill.

Phenology. Flowering from October with a peak in December. Fruit matures in March.

Etymology. The specific epithet denotes the type locality, a floristically rich region in the southern Western Ghats.

Taxonomic note. *Memecylon angustifolium* Wight, *M. rivulare* K.Bremer and *M. sivadasanii* N.Mohanan et al. are also narrow-leaved species described from the Indo-Sri Lankan region. *Memecylon wayanadense* is allied to these species but differs in habit, leaf shape, sclereid type, inflorescence type and position, and the shape and size of the sepals and petals. A more detailed morphological comparison of these species is given in Table 1.

Additional specimens examined. INDIA. Kerala State, Wayanad District, Chembra-Vellarimala hill ranges, Kallady evergreen forest, 11°30'N, 76°06'E, c.1200 m, 30 xii 2007, *Ratheesh Narayanan, Sivu & Pradeep* 61770 (MH, TBGT); Kattimattam, 11°30'N, 76°08'E, c.1400 m, 12 xi 2009, *Ratheesh Narayanan & Sivu* 3454 (MSS).

TABLE 1. Comparison of *Memecylon wayanadense*, *M. sivadasanii*, *M. rivulare* and *M. angustifolium*

Character	<i>Memecylon wayanadense</i>	<i>Memecylon sivadasanii</i>	<i>Memecylon rivulare</i>	<i>Memecylon angustifolium</i>
Habitat	Undergrowth in evergreen forest	Undergrowth in evergreen forest	On banks of rivers or streams	On banks of rivers or streams
Habit	Single-stemmed small shrubs branching near ground	Single-stemmed large shrubs or small trees	Many-stemmed bushy large shrubs, branching near ground	Many-stemmed bushy large shrubs, branching near ground
Leaf	Linear-lanceolate, apex acuminate	Narrowly linear-lanceolate, slightly curved, apex caudate	Narrowly elliptic, apex obtuse to round	Narrowly elliptic, apex obtuse to round
Leaf width	0.7–1.3 cm	0.5–0.6 cm	0.7–1.5 cm	0.6–1.5 cm
Foliar sclereids	Filiform, branched	Elongate, branched	Narrowly filiform, unbranched	Narrowly filiform, unbranched
Inflorescence	Simple cyme produced mainly in the axils of leaves	Branched umbels produced on tubercles on main stem	Umbel produced in the axils of leaves or by scars of fallen leaves	Thyrsoid umbel produced in the axils of leaves or by scars of fallen leaves
Pedicel length	6–7.5 mm	2–3.5 mm	3–6 mm	3–7 mm
Calyx	Campanulate, deeply lobed, 0.8–1 mm wide	Campanulate, deeply lobed, 1–1.5 mm wide	Cup-shaped, shallowly lobed, 2.5–3.5 mm wide	Cup-shaped, shallowly lobed, 2–3.4 mm wide
Petals	Broadly ovate, cordate	Broadly rounded	Widely elliptic-ovate	Elliptic-ovate
Fruit shape	Obovate	Globose	Globose	Globose

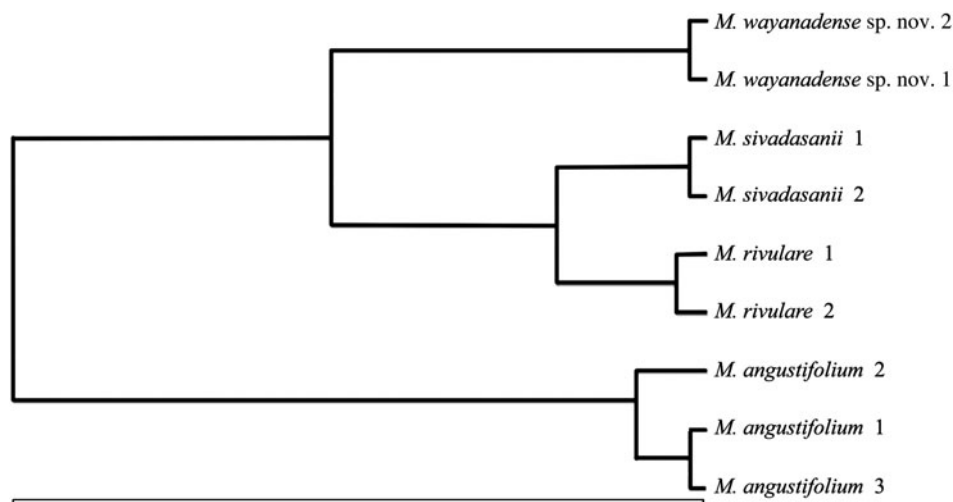


FIG. 4. UPGMA dendrogram based on Nei's genetic distance.

MOLECULAR DATA ANALYSIS

In order to quantify the similarities and differences of the proposed new species to allied species, genetic data analysis was carried out using 20 RAPD (randomly amplified polymorphic DNA) primers. Total genomic DNA was isolated from samples following a modified method based on Murray & Thompson (1980). RAPD reactions were carried out in a 25 μ l volume containing 50 ng of template DNA, 2.5 μ l of 10 \times reaction buffer, 50 μ M of each dNTP, 20 pmol of random primer, and 0.75U Taq DNA polymerase. The PCR reaction followed an initial denaturation for 5 minutes at 95°C, followed by 34 cycles of 1 minute at 95°C, 30 seconds at 36°C and 1 minute at 72°C and a final extension at 72°C for 5 minutes. Ten base pair primers were used (Biogen, USA) for the amplification and 20 μ l of the amplicon was resolved on a 1.2% agarose gel (Sigma, USA). The gel was stained using ethidium bromide and the DNA bands were visualised under UV light. Amplification with each random primer was repeated three times and those primers that produced reproducible and consistent bands were selected for data generation. Bands were scored as present (1) and absent (0). An UPGMA dendrogram was constructed based on Nei's genetic distance figure 2 (Nei, 1972), using POPGEN ver. 3 software. This groups the nine samples into two major clusters. In cluster A are two accessions of *Memecylon wayanadense* sp. nov., two accessions of *M. sivadasanii*, and two accessions of *M. rivulare*. In cluster B are three accessions of *Memecylon angustifolium*. The dendrogram (Fig. 4) shows that *Memecylon sivadasanii* and *M. rivulare* are closely allied, *M. wayanadense* is then allied to that species pair, and *M. angustifolium* is different from all the others.

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