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Research

A remarkable new species of *Salacia* (Celastraceae: Salacioideae) from the Western Ghats, India

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A new species of *Salacia* is described from Karnataka and Kerala states of the Western Ghats, India. It is unique within the genus on account of its obliquely dehiscing anthers and 7–10 cm long, prolate to broadly ellipsoid or ovoid, keeled, greenish-yellow 5- to 8-seeded fruit with thin epicarp and dry mesocarp. *Salacia megacarpa* sp. nov. can be grouped with *S. fruticosa* Heyne ex M.A.Lawson and *S. oblonga* Wight & Arn. which are the only other species from the sub-continent which exhibit axillary, ramiflorous, dichotomously branched cymes.

Keywords: branched cymes, dry mesocarp, ellipsoid fruits, endemic, prolate, *Salacia*

Introduction

Salacia L. (Celastraceae: Salacioideae) consists of ca 200 species (Mabberley 2017) distributed predominantly in the tropics. Half of the species of *Salacia* are distributed in tropical Africa (ca 90 species), whereas the remaining are distributed in the neotropics (ca 35 species) and tropical Asia (ca 60 species) (Hallé 1958, Hou 1964, Ramamurthy and Naithani 2000, Lombardi 2010, Pelser et al. 2011). In India, it is represented by 21 species, of which 11 are endemic to the country (Ramamurthy and Naithani 2000). Recently, three new species and one subspecies have been described from southern India (Udayan et al. 2012, 2013, Sujana et al. 2015). Among the peninsular Indian species, *S. fruticosa* M.A.Lawson, *S. macrosperma* Wight, *S. beddomei* Gamble, *S. malabarica* Gamble, *S. gambleana* Whiting & Kaul and *S. brunoniana* Wight & Arn. are endemic to the Western Ghats., *S. chinensis* L. occurs throughout peninsular and Andaman Islands, whereas *S. oblonga* Wight & Arn. is restricted to the Western Ghats of India and Sri Lanka.

The genus *Salacia* has affinities to *Loeseneriella* Smith (1941) and *Reissantia* Hallé (1958) in habit and leaf characters but can be distinguished based on its axillary or extra axillary fascicled, thyrsiform or paniculate cymes; intrastaminal fleshy, annular-pulvinate or flattened disc; 3 stamens inserted at the pistil base; trilocular, 2–8 ovulate ovary and drupaceous or baccate, indehiscent, mucilaginous pulpy fruits. Often these genera, along with *Hippocratea*, have been placed in Hippocrateaceae, but none of the alleged morphological characters of this family has proved to be constant. Furthermore, molecular studies have shown that *Hippocratea* (including *Loeseneriella* and *Reissantia*)

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and *Salacia* do not form a monophyletic group, the former being characterised by dehiscent mericarps and winged seeds and the latter by indehiscent, drupaceous fruits (Hou 1964, Robson 1965, Robson et al. 1994, Simmons 2004, Coughenour et al. 2010).

As part of the ongoing revision of Indian *Salacia*, a unique, scrambling *Salacia* with large fruits and axillary as well as ramiflorous, dichotomously branched inflorescences were recorded from Bramhagiri Wildlife Sanctuary, Karnataka in 2016 by the first author. Two years later, another population of *Salacia* exhibiting the same set of morphological characters was encountered by the second author from Kakkayam Dam forest site, closer to Malabar Wildlife Sanctuary, Kerala. Both places were revisited to gather complete specimens. After comparison with known species from India and adjoining regions, we could conclude that it is a hitherto undescribed species of *Salacia*. It is therefore described and illustrated here with colour plates, detailed diagnosis and comparison with related species.

Salacia megacarpa N.V.Page & Nandikar sp. nov. (Fig. 1–2)

Type: India, Karnataka, Abailu Antipoaching Camp, Bramhagiri Wildlife Sanctuary, Virajpeth Taluk, Kodagu District, 850 m. a.s.l., 23 Jan 2016, N.V. Page 22201 (holotype: MH, isotypes: JCB, WII, NGCPR).

Etymology

The specific epithet refers to the large fruits; the largest among Indian *Salacia*.

Diagnostic characters

A species recognised by its axillary and ramiflorous, branched, 3- to 6-flowered cymes, elliptic-oblong petals, obliquely dehiscing anthers, large 7–10 cm long, prolate to broadly ellipsoid, or ovoid, distinctly keeled, greenish-yellow, 5- to 8-seeded fruit with dry mesocarp, thin epicarp and triangular to ovoid or ellipsoid, truncate, ochreous seeds covered with faint reticular meshes.

Description

Spreading liana or scandent shrub, with slender, often coiling, glabrous, sparsely lenticellate branches. Leaves simple, opposite; stipules inconspicuous or absent; petiole 1.0–1.5 cm long; lamina broadly elliptic-ovate, oblong, 9–17 × 3.5–8 cm, rounded to obtuse or acute at apex, cuneate or rounded at base; leaf margin entire or faintly crenate, coriaceous; leaf surface glabrous, adaxially dark green and abaxially light green; midrib and lateral veins 6–10 in pairs and prominent, turning brown after drying; venation semicraspedodromous. Inflorescences axillary and ramiflorous, as dichotomously branched, 3- to 6-flowered cymes; peduncle ca 5 mm; bracts minute; pedicels 3–5 mm, sparsely puberulous; pedicel base with 1–2 inconspicuous rudimentary flowers with 2–4 whorls of petals. Normal flowers spherical in bud, citrine, with calyptriform sepals; open flowers ca 10 mm wide, dark greenish yellow; sepals 5, suborbicular or gibbous, ca 1.8 × 1.5 mm, acute at apex, with finely erose margin; petals 5, elliptic-oblong, 3–6 × 2 mm, grey-green to yellowish-green; rounded or acute at apex, hyaline or erose, with margin entire, hyaline, often revolute; disc pentagonous, pulvinate, ca 2 mm high, carnose, yellowish-green. Stamens 3, erect at anthesis, later recurved; filaments short, ca 0.7 mm long, with dilated base; anthers bilobed, dehiscing obliquely, saffron. Pistil pyramid-shaped, 3-cleft, with stamens emerging from each cleft of pistil; style ca 0.6 mm long; stigma simple; ovary embedded in disk, trilocular. Fruit shortly stipitate, prolate to broadly ellipsoid, or ovoid, 7–10 × 4–6 cm, distinctly 3-keeled, indehiscent, acute at apex, greenish-yellow; epicarp thin; mesocarp dry; seeds 5–8, triangular to ovoid or ellipsoid, truncate on hilum side, ca 3 × 2 cm, without mucilaginous pulp, ochreous, surface with faint reticular meshes; hilum linear, sericeous.

Phenology

Flowers observed from January to March followed by fruiting.

Distribution and habitat

Salacia megacarpa is endemic to the Western Ghats, India (Karnataka and Kerala). A few individuals were observed at the type locality at an elevation of 850 m. a.s.l. in wet evergreen forest, often growing along the streams in association with *Syzygium laetum* Gandhi, *Palaquium ellipticum* Baill., *Cleistanthus patulus* Müll. Arg., *Holigarna nigra* Bourd., *Heritiera papilio* Beddome. In addition, it was also collected from open, semi evergreen forest of the Malabar Wildlife Sanctuary towards Kakkayam Dam site. In this location, the plants were seen spreading along the roadsides in association with *Glochidion ellipticum* Wight, *Ancistrocladus heyneanus* J.Graham, *Jasminum rottlerianum* DC. And *Thottea siliquosa* (Lam.) Ding Hou.

Conservation status

The conservation status is assessed as 'DD' (Data Deficient), as its distribution range is not yet fully documented. Till date the species is known from two localities in Karnataka and Kerala.

Similar species

Salacia megacarpa is similar to *S. fruticosa* with respect to its habit and inflorescence, but the latter differs in having crenate leaf margin, orbicular petals, 2- to 3-seeded orange berries and mucilaginous pulpy seeds. *Salacia oblonga* also has axillary and ramiflorous, dichotomously branched cymes but it can be differentiated from the species described here by having subsessile, urceolate flowers and globose orange-red fruit. The Indo-Malaysian *S. korthalsiana* has similar branched cymes, but can be distinguished by single-seeded fruits.

Additional specimens examined (paratypes)

India. Karnataka: Kodagu district, Virajpeth Taluk, Abailu Antipoaching Camp, Bramhagiri Wildlife Sanctuary, 16 May 2017, N.V. Page 22201B (WII, fruit: spirit collection). Kerala: Kozhikode district, Malabar Wildlife Sanctuary, Kakkayam Dam, 6 Mar 2018, Jadhav D.C. and M.D. Nandikar 1485 (NGCPR, BSI).

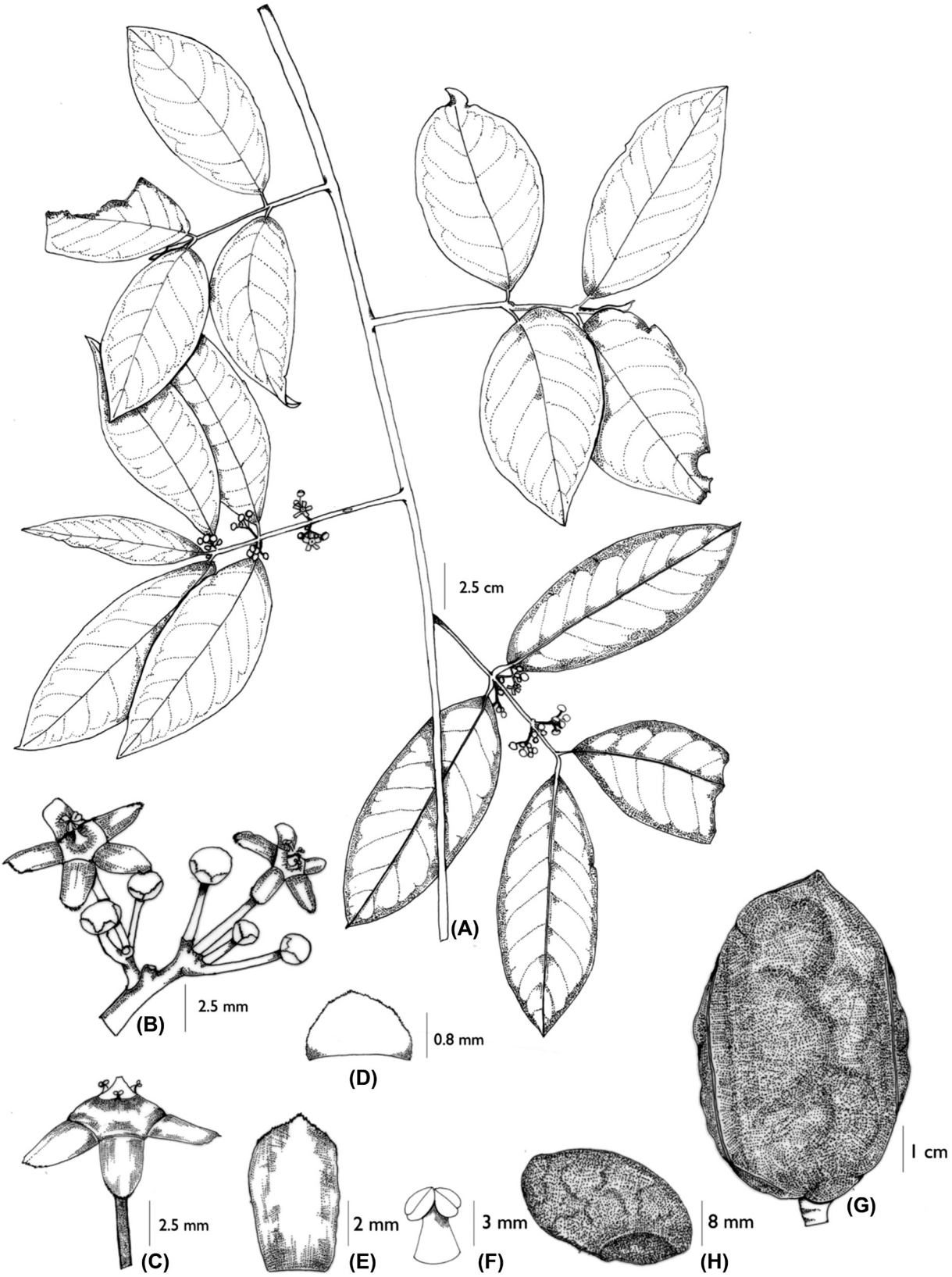

Figure 1. *Salacia megacarpa* sp. nov. (A) flowering twig, (B) inflorescence, (C) flower, (D) sepal, (E) petal, (F) stamen, (G) fruit, (H) seed. Illustration: Mayur Nandikar.

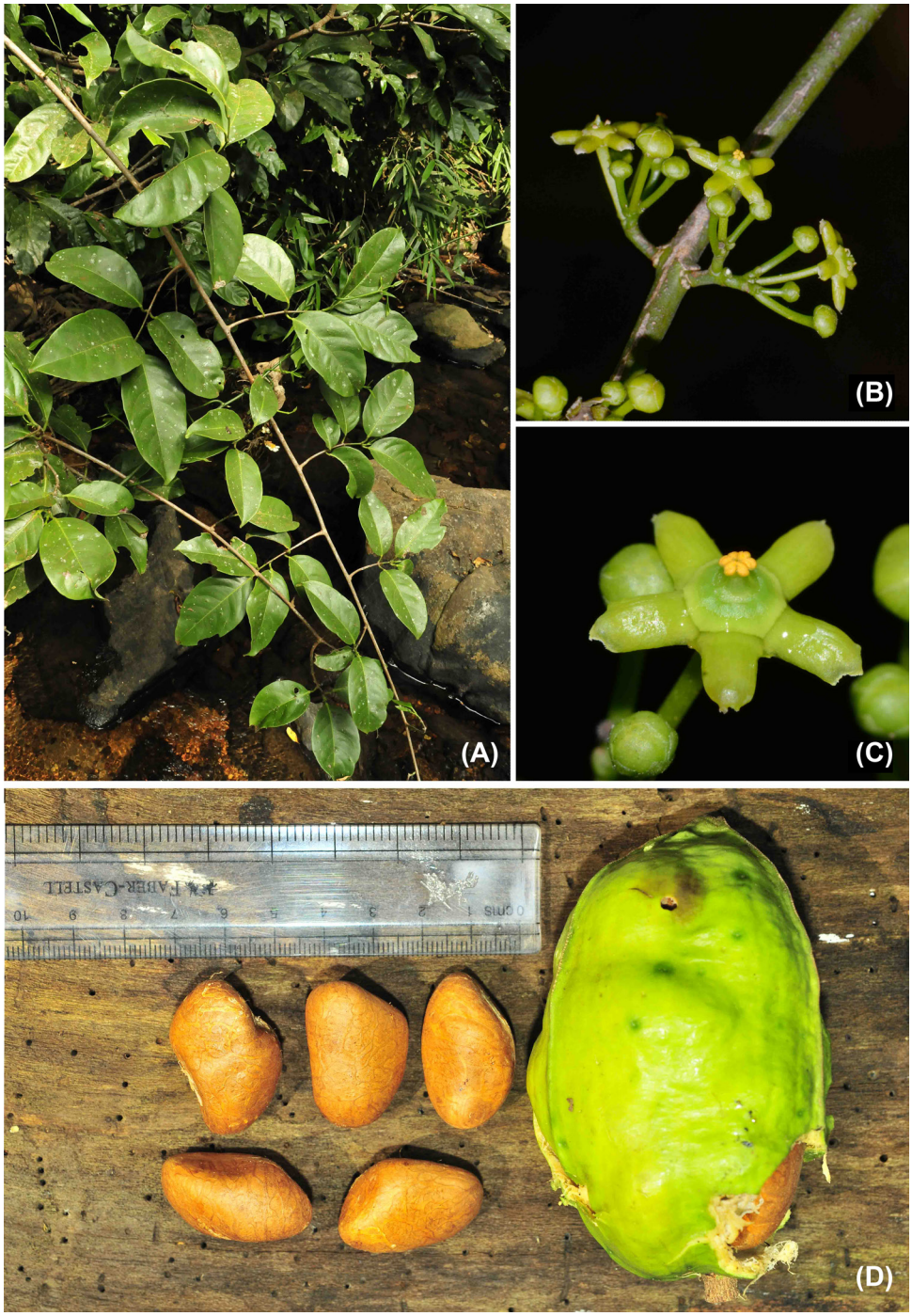

Figure 2. *Salacia megacarpa* sp. nov. (A) habit, (B) inflorescence, (C) flower, (D) fruit and seeds. Photographs by Navendu Page and Mayur Nandikar.

Discussion

The genus *Salacia* is characterized by globose to ellipsoid, one to many-seeded, indehiscent fruits with smooth or tuberculate thick to leathery epicarp and fleshy mesocarp (often mucilaginous pulp is associated with seed) (Hou 1964, Simmons et al. 2001). However, lack of mucilaginous or fleshy seeds or mesocarp in the fruits of *Salacia megacarpa* makes its unique among its congeners. All *Salacia* species in peninsular India have orange-ochreous, tawny mature fruits, except the present species in which they remain green-yellow. *Salacia megacarpa* has the largest fruit among Indian *Salacia*, and the fruit is also unique due to the three keels running along the longitudinal axis.

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