

## TWO NEW SPECIES OF DIOSPYROS (EBENACEAE) FROM INDIA

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### SUMMARY

*Diospyros ghatensis* and *D. pyrrocarpoides* (Ebenaceae), two new tree species from the evergreen forests of South India are described.

### INTRODUCTION

The large genus *Diospyros* is represented by about 900 species (Index Kewensis and Suppl. I to XIX) distributed mainly in the tropics. In the wet evergreen forests of the Western Ghats, this genus is represented by 23 species (Gamble, 1957; Cooke, 1958; Kostermans, 1978). During our floristic inventories of the evergreen forests of the Western Ghats, two new species were discovered.

### *Diospyros ghatensis* Ramesh & De Franceschi, *spec. nov.* – Fig. 1

Arbor dioica. Folia alterna bifaria; lamina elliptica vel elliptico-lanceolata, penninervia, nervis lateralibus utrinsecus 3–6, interdum infirma opposita paria et acuta in angulis; venis prope percurrentibus et perpendicularibus ad costam; gemmae axillares, imbricatis squamis. Flores masculi in brevibus axillaribus cymis, extus tomentosi, intus glabri, sessiles, 4-meri; stamina 16, geminata, receptaculo vel pro parte tubi basi inserta; pistillodium glabrum, ad apice bifidum. Flores feminei ignoti. Fructus globosus, solitarius, in pedunculo cum cicatricibus ex imbricatarum squamarum bracteis; 4-locularis; calix fructifer leviter accrescens, semina plana, elliptica, albumine aequabili. — Typus: *Ramesh & De Franceschi 280* (HIFP, holo), India, Kerala State, Quilon Dist., Yerur R. F., 250 m, 23 Apr. 1992.

*Trees* up to 25 m high. *Twigs* hirsute in young trees, glabrous in adults. *Axillary buds* covered by imbricate scales which are caducous. *Young shoots* with several scars of fallen scales at base. *Leaves* alternate; petiole 3–11 mm long; lamina elliptic to elliptic-lanceolate, (3–)5.5–13.5 × (1–)3–6 cm, narrowly acuminate with blunt tip at apex, acute to slightly attenuate at base, coriaceous when mature; secondary nerves 3–6 pairs, arching towards apex, sometimes lowermost pairs opposite and acute in angle; tertiary nerves nearly percurrent. *Male inflorescences*: axillary cymes, up to 1.8 cm long, brown tomentose. *Bracts* imbricately arranged, persistent, sub-orbicular, up to 1.5 mm across; abaxial side tomentose; adaxial side glabrous; margin ciliate. *Male flowers* sessile. *Calyx* 3 mm long, tomentose outside, glabrous inside; lobes 4, ovate, acute, 2 mm long. *Corolla* creamy white, sparsely hairy outside, glabrous inside; tube 6 mm long; lobes 4, obliquely ovate. *Stamens* 16, in opposite pairs,

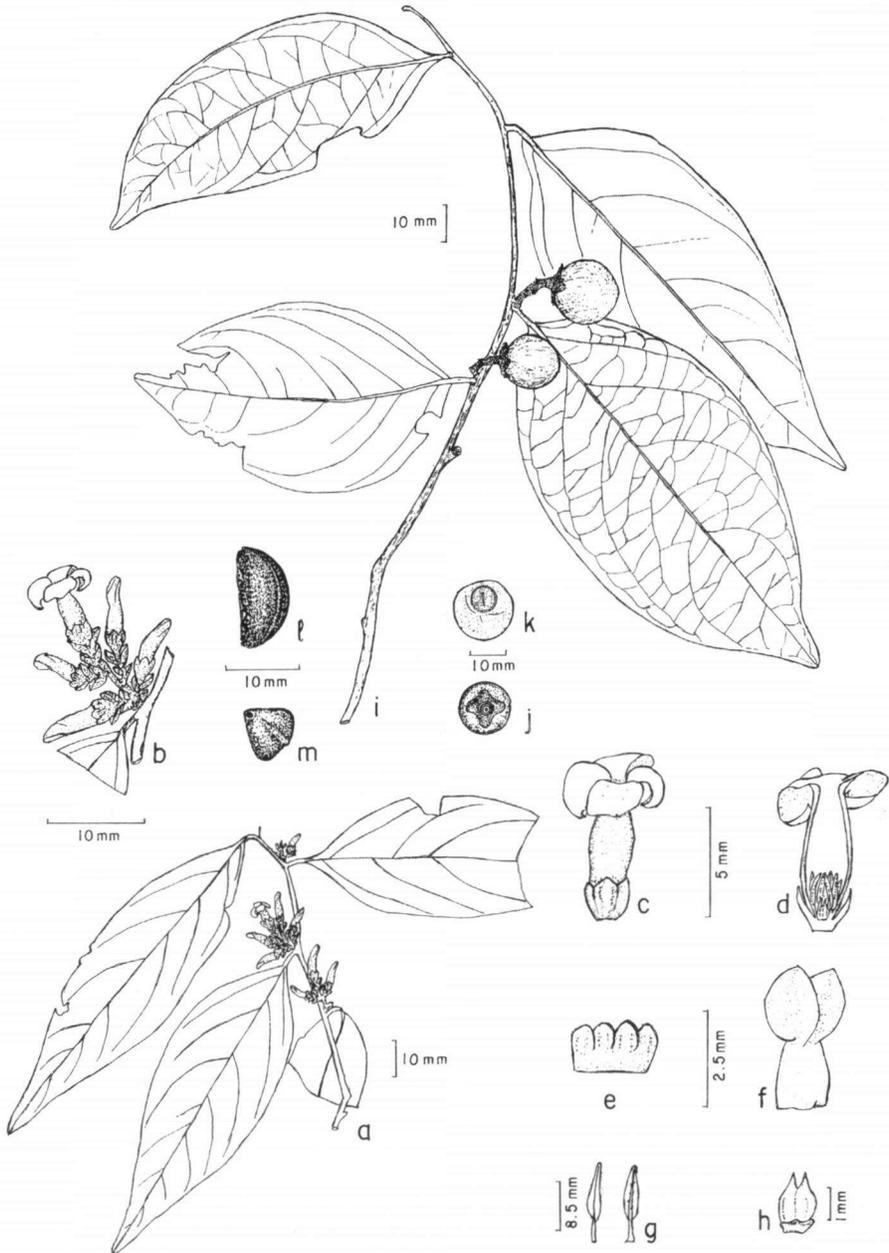


Fig. 1. *Diospyros ghatensis* Ramesh & De Franceschi (a–h: male plant, i–m: female plant). a. Flowering twig; b. inflorescence; c. flower; d. longitudinal section of flower showing stamens and pistillode; e. calyx cut open, abaxial view; f. portion of corolla, abaxial view; g. stamens; h. pistillode; i. fruiting twig; j. basal view of fruit showing calyx; k. cross section of fruit showing three aborted seeds and one fully developed seed; l, m. seeds (a–h: Ramesh & De Franceschi 280; i–k: Ramesh & Pascal 1950; l, m: Ramesh & De Franceschi 103).

2.5–4 mm long; connective slightly hairy. *Pistillode* glabrous about 1 mm across, 8-grooved; with bifid apex. *Female flowers* unknown. *Fruits* globose, solitary on a peduncle with several bract scars, up to 2.5 cm across, glabrous, 4-celled; fruiting calyx not very accrescent, about 1 cm across. *Seeds* 1 to 4, flat and wedge-elliptical shape, 1.3 cm long; albumen not ruminant. *Seedlings* with spirally arranged scale leaves on orthotropic shoot; branching rhythmic with distichous phyllotaxy; leaves smaller than in adult, rounded at base.

Distribution – India: the Western Ghats of Karnataka, Kerala, and Tamil Nadu States.

Ecology – Subcanopy trees in the wet evergreen forests; altitude up to 1200 m.

Etymology – This species is named according to its distribution, as it is common along the Western Ghats of South India.

Notes – 1. This species appears to have close similarities with *D. philippinensis* A. DC. Both species have 4-merous flowers and several imbricate bracts covering the axillary vegetative bud and the peduncle. *Diospyros ghatensis* has distinctly arched secondary nerves, nearly percurrent tertiary nerves, non-impressed midrib on the upper surface of the lamina and 16 stamens, whereas in *D. philippinensis* secondary nerves are gradually curved, tertiary nerves reticulate, midrib is impressed above and the flowers contain 8 stamens each.

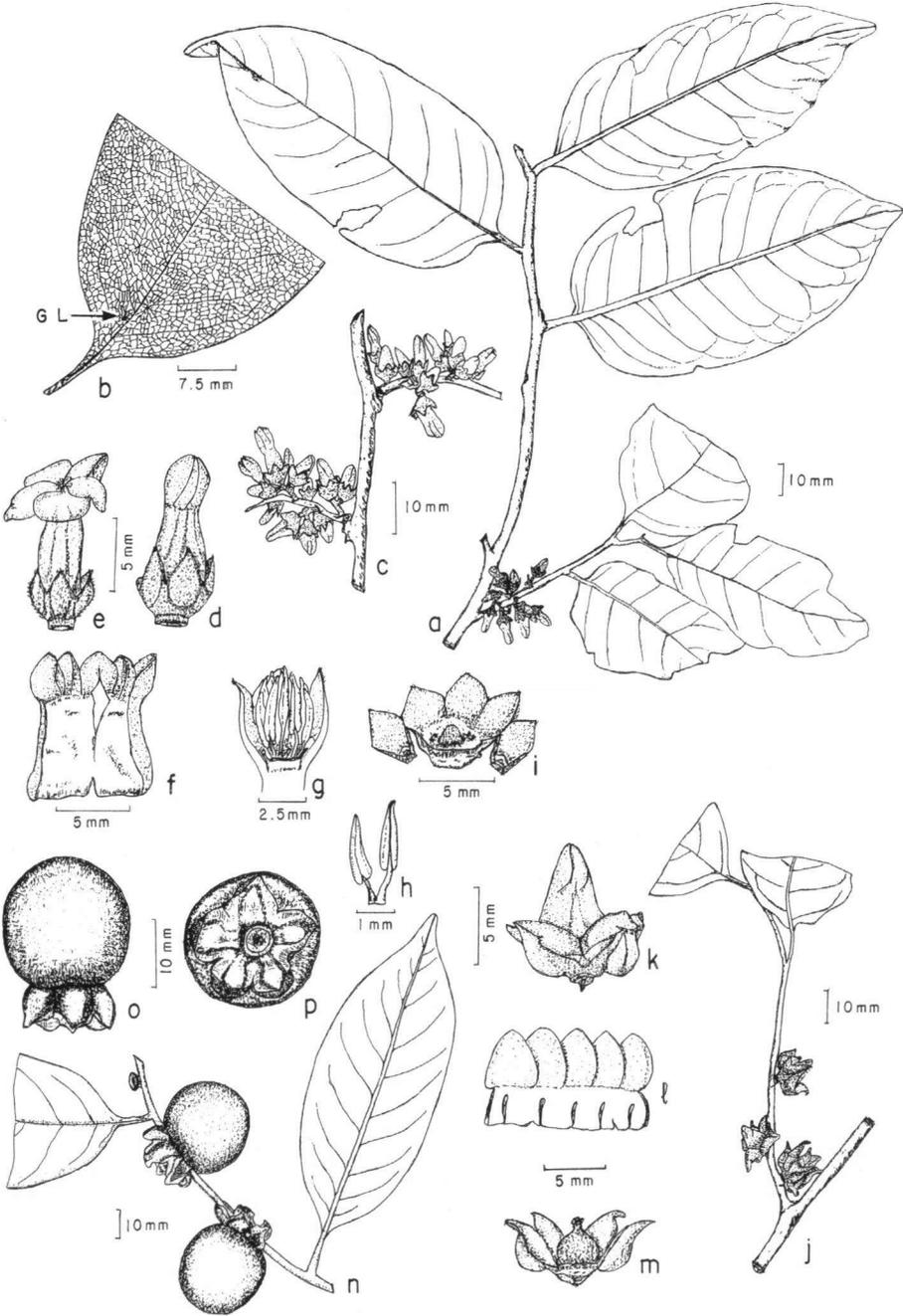
2. In the Western Ghats, *D. saldanhae* Kostermans and *D. pruriens* Dalz. show close affinity with *D. ghatensis* in the floral organisation and the hirsute hairs covering branchlets and leaves especially during the young stages.

SOUTH-WEST INDIA. *Unknown collector 283122* (CAL); Karnataka, Kodagu Dist.: Kadamakkal R. F., *Ramesh & Pascal 1950* (HIFP). Tamil Nadu, Coimbatore Dist.: Udumanparai, Anamalais, *Barber 5859* (MH); Tirunelveli Dist.: Walaiyar cardamom estate, *Kostermans 26306 26322* (L, HIFP); Kalakkad & Mundanturai sanctuary, *Ramesh & De Franceschi 103, 105, 375, 378, 451* (HIFP); Puliaray R. F., *Ramesh & De Franceschi 504*. Kerala, Trivandrum Dist.: Merchiston, *Bourdillon 884* (FRCH); Quilon Dist.: Yerur R. F., *Ramesh & De Franceschi 280* (HIFP).

## *Diospyros pyrrocarpoides* Ramesh & De Franceschi, *spec. nov.* – Fig. 2

Arbor mediocris, dioica. Ramuli glabrescentes. Folia alterna bifaria; lamina elliptico-oblonga vel oblongo-lanceolata, apice breviter et obtuse acuminata, penninervia, nervis lateralibus utrinsecus 8–11, venis minute tenuiter reticulatis. Flores masculi in brevibus axillaribus cymis, in novellorum ramuliorum basi disposita; tomentosi, 5-meri; stamina circiter 20, geminata, glabra, receptaculo inserta; ovarium rudimentum dense hirsutum. Flores feminei solitarii, sessiles, in novellorum ramuliorum basi disposita; calix intus et extus dense tomentosus, 5-lobatus, lobis ovatis vel acutis, marginibus revolutis; corolla tubulosa, extus tomentosa, intus glabra; staminodia 5, tubi basi inserta; ovarium tomentosum, 4-loculare, loculis uniovulatis, stylus brevis, stigmatibus bifidis, glaber; calix fructifer accrescens, reflexus, marginibus tenibus undulatis. Fructus globosus, dense rufo-tomentus; semina ignota. — Typus: *De Franceschi 484* (HIFP, holo), India, Karnataka State, Hassan Dist., Bisle R. F.

*Trees* up to 15 m high. *Branchlets* slender, glabrous except in inflorescence parts. *Leaves* alternate; petiole to 2 cm long, canaliculate above; lamina elliptic-oblong to oblong-lanceolate, 2.5–7 × 7–13(–16.5) cm, shortly and bluntly acuminate (acumen up to 6 mm long) or bluntly acute at apex, rounded and slightly decurrent at base, glabrous, subcoriaceous; midrib canaliculate above; secondary nerves 8–11 pairs;



higher order nerves finely reticulate, prominent below. *Male inflorescences*: short cymes with 3–4 subsessile flowers in each, located near the base of new shoots. *Calyx* 5.5 mm long, tomentose on either side; lobes 5, 2.5 mm long, triangular, acute, margin slightly reflexed. *Corolla* creamy white; tube 6 mm long, tomentose outside, glabrous inside; lobes 5, broadly ovate, acute, 3 mm long, spreading recurved, tomentose on both sides; *stamens* about 20, 2.5 to 3 mm long; filament 0–0.4 mm long; *pistillode* hairy, about 1 mm across. *Female flowers*: solitary, sessile and near the base of young shoots; *calyx* 7 mm long, densely tomentose on either side; lobes 5, ovate, acute, 4 mm long, longitudinally folded outside and slightly reflexed; *corolla* creamy white, tomentose except for the tube inside; tube 3 mm long; lobes ovate, bluntly acute at apex; *staminodes* 5 adnate to the base of corolla; *ovary*, tomentose, orbicular, 3 mm across, 4-locular with one ovule each; *stigma* subsessile, bilobed. *Fruit*: berry globose, subsessile, 3 cm across, densely brown tomentose. *Fruiting calyx* accrescent, strongly reflexed with thin wavy margin. *Mature seeds* unknown (insect-damaged). *Seedlings* with spirally arranged leaves on orthotropic shoot; branching rhythmic with distichous phyllotaxy.

Distribution – India: the Western Ghats and the Andaman Islands.

Ecology – In the wet evergreen forests in second or third storey; altitude up to 600 m.

Notes – 1. *Diospyros pyrrocarpoides* is closer to *D. pyrrocarpa* Miq. in fine and prominent reticulation, indumentum which covers inflorescences and fruits, and folded and reflexed calyx lobes especially in female flowers and fruits.

2. Bakhuizen van den Brink (1936–1955) in his revisionary work on Malesian Ebenaceae apparently mixed *D. pyrrocarpa* Miq. with at least one other taxon in the descriptions and illustrations. Thus the status of *D. pyrrocarpa* requires further critical analysis. The specimen, *Diepenhorst 2351*, used by Bakhuizen van den Brink to illustrate a female plant (with fruits) is indicated as an isotype in the Leiden herbarium. This specimen differs from *D. pyrrocarpoides* in having leaves with a strong reticulation and depressed globose fruits on a distinct peduncle.

INDIA. Karnataka, Shimoga Dist., Jog, *Hall & McCann 34848* (BLAT); Hassan Dist., Bisle Ghat, *Saldanha 13202, 16025* (CTS, K); Kodagu Dist., Kadamakkal R. F., *Ramesh 193, De Franceschi 479* (HIFP); Hassan Dist., Bisle R. F., *De Franceschi 484* (HIFP). Kerala, Quilon Dist., Chendurmeey sanctuary, *Ramesh & De Franceschi 495* (HIFP); Palghat Dist., Madampatty, *Nair 550, Vajravelu 60628* (MH). Andamans, Long Island, *Parkinson 5, 1666* (CAL).

Fig. 2. *Diospyros pyrrocarpoides* Ramesh & De Franceschi (a, c–i: male plant; b, j–p: female plant). a. Flowering twig; b. leaf venation and glands (GL) at base; c. inflorescence; d. flower bud; e. opened flower; f. corolla cut open, adaxial view; g. calyx cut open showing stamens; h. geminate stamens; i. calyx cut open showing pistillode; j. flowering twig; k. flower bud; l. corolla cut open showing staminodes; m. calyx cut open showing ovary; n. fruiting twig; o. fruit, lateral view; p. basal view of fruit showing calyx (a, c–i: *De Franceschi 484*; j–m: *De Franceschi 479*; b, n–p: *Ramesh 193*).

Table 1

Characters	<i>Diospyros pyrrhocarpoides</i>	<i>Diospyros pyrrhocarpa</i> *
Young branchlets	glabrous	hairy
Leaf acumen	acute to acuminate with acumen up to 6 mm long	distinctly acuminate with acumen 1–2.5 cm long
Secondary nerves	8–11 pairs	6–7 pairs
Indumentum	golden brown	dark brown
Male inflorescence	near the base of young shoots	scattered
Calyx and corolla lobes	shorter or equal to tube	longer than tube
Stamens	glabrous	hairy at top
Fruiting peduncle	sessile or subsessile	peduncle about 7 mm long

\* *de Wilde & de Wilde-Duyfjes 12361, 13592.*

Other specimens of *Diospyros pyrrhocarpa* (*de Wilde & de Wilde-Duyfjes 12361, 13592, L*) collected from North Sumatra and examined by us were found to be similar to *Villamil 20979* used by Bakhuizen van den Brink to illustrate a male plant. Table 1 shows in which characters these two specimens differ from *D. pyrrhocarpoides*.

Earlier collectors erroneously identified this new species as *Diospyros crumenata* Thw. However, *D. pyrrhocarpoides* differs from *D. crumenata* because of its 5-merous flowers, folded fruting calyx and tomentose fruits.

Kurz (1877) doubtfully keeps the Andaman specimen as *D. pyrrhocarpa* var. *andamanica* based on lateral nerves of leaves faint and numerous. However, the *Parkinson 5 & 1666* (CAL) collections, fruting material from the Andamans, tally exactly with the Western Ghats specimens.

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