Species

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Dioscorea balakrishnanii (Dioscoreaceae), a new species from south Western Ghats, India

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ABSTRACT

Within the context of the diversity and floristic study has conducted on tuberous plants of the Kerala part of South Western Ghats, a new species, *Dioscorea balakrishnanii* P.M.Salim & J.Mathew is described. The taxonomic description, colour photographs, and morphological differences to the allied taxa are provided to facilitate its easy identification in the field.

Keywords: Kerala, new species; South Western Ghats, Taxonomy

1. INTRODUCTION

Dioscorea L., comprising more than 630 climbing herbs or shrubs with rhizomes and tubers, is distributed in tropical and mid latitude regions of the world (Goverts et al., 2007; Couto & Xavier, 2022; GBIF, 2025). In India, the genus represented by 33 species and 24 varieties (Elsamma, 2010; Hoque et al., 2018; Balakrishnan et al., 2023). Of which, 13 species were recorded in Kerala part of south Western Ghats (Sasidharan, 2013), and two species of them, viz. *Dioscorea belophylla* Voigt and *D. kalkapershadii* Prain & Burkill, are considered as the endemic elements of the south Western Ghats (Nayar et al., 2006).

Botanical explorations in the forests of southern Western Ghats during January 2022– February 2025 have yielded some interesting specimens of the genus *Dioscorea*. Critical analysis of the literature (Bentham & Hooker, 1883; Hooker, 1894; Duthie, 1920; Burkill, 1960; Coursey, 1967; 1976; Fischer & Gamble, 1924; Matthew, 1991; Balakrishnan, 2006; Elsamma, 2010; Sasidharan, 2013), as well as from the scrutiny of vouchers deposited in K, NY, PE, MH, CAL, TBGT and KUBH were revealed these specimens do not match with described species and are sufficiently distinctive to warrant taxonomic recognition as a new species., *Dioscorea balakrishnanii*.

2. TAXONOMIC TREATMENT

Dioscorea balakrishnanii P.M. Salim & J.Mathew, sp. nov. (Fig. 1)

Type:

India, Kerala, Wayanad District, 900 Thamarakkad, tract towards tentgram, 1360 m, 18 January 2022, *P.M.Salim 3717* (holotype: KUBH! [Kerala University Herbarium,

Thiruvananthapuram]; isotype: MH!). — Paratype: Same locality 16 February 2025, *J.Mathew 4436* (KUBH).

Diagnosis:
Dioscorea balakrishnanii is morphologically similar to *Dioscorea spicata* Roth especially in the leaf morphology (texture), forerunner tip and vein numbers (5) but differs in having: Stems unarmed (prickles present at the stem base in *D. spicata*); Oppositely or subopposite arranged leaves with subcordate to rounded base (alternately arranged leaves with obtuse base in *D. spicata*) and staminate inflorescence 2–7 per axil, each has panicle (staminate inflorescence 1–2 per axil, each has spike in *D. spicata*). *D. balakrishnanii* is also showing similarities with *D. oppositifolia* L. in appearance, mainly in oppositely arranged leaves and panicle male inflorescence, but can be easily distinguished by the ovate leaves with 5 prominent veins and a forerunner tip, (long acuminate leaves with 3 prominent veins in *D. oppositifolia*), glabrous male inflorescence (male inflorescence with brown hairs in *D. oppositifolia*) and female inflorescence are glabrous and 4-5 per axils (female inflorescence with brown hairs and 1 per axils in *D. oppositifolia*).

Description:
A twining vine to 5 m, stems annual from a fleshy tuber. Tubers annually replaced, cylindric to fusiform or claviform, epidermis region pale brown, parenchyma bright white, mucilaginous, crown white, thickened, appearing to scale devoid, c. 30 – 40 cm below the soil surface. Indumentum consisting of straight unicellular hairs to 0.5 mm long. Stems right-twining, to at least 8 mm in diameter in flowering individuals, terete, unarmed, white below ground, greyish-white towards the base above it. Cataphylls present at the stem base, c. 1.5 cm long, narrowly ovate to elliptic or lanceolate, brownish-grey, chartaceous, apex acute to acuminate; bulbils absent. Leaves simple, entire, opposite or subopposite, glabrous; petiole 2–4 cm long, straight or twisted at base, striated, with short basal and apical pulvini, glabrous, terete; blade 3.4–9.6 × 2.1–5.3 cm, dark green above and light green below, occasionally with white spots close to the midrib, glands near the insertion of the petiole is present, membranaceous to chartaceous, ovate to cordate, base subcordate to rounded, apex acuminate, with forerunner tip ca. 3 mm long, veins 5, primary venation prominent below and in lateral edges. Staminate inflorescence 2–7 per axil, each has panicle, 3- 10.5 cm long, concentrate, Staminate flowers epedicellate, bracteoles ca. 1 mm long, ovate, pale green to yellowish, membranaceous, glabrous; Tepals 6, 0.3–0.8 mm long, broad ovate, yellowish to pale white, glabrous, stamens 6, epipetalous, filaments ca. 0.1 mm long; anthers 0.21–0.32 mm long, enclosed, applicate at the tip, oblong, extrorse; staminodes absent; pistillode absent. Pistillate inflorescence 6–10.8 cm long, 4-6 per axils, glabrous, concentrate, peduncle absent. Pistillate flowers seen in post anthesis state, tepals like male. Immature capsule 18 – 21× 10 – 13 mm, oblong in outline, thick-chartaceous, base truncate, apex rounded, pale to dark brown. Seeds not seen at any stage of development.

Distribution:
India; known only from the type locality.

Habitat and ecology:
Dioscorea balakrishnanii found in the montane forest c. 1360 m on the gap of moist rocky floor covered with thick organic litter under deep to semi-shaded condition. They are growing in association with *Coleus malabaricus* Benth., *Dendrocalamus monadelphus* Thwaites, *Ceropegia decaisneana* Miq. ex Hook.f., *Ficus laevis* Blume. *Discospermum sphaerocarpum* Dalzell and *Symplocos cochinchinensis* (Lour.) S.Moore. A population of 20 plants was observed at the type locality.

Flowering and fruiting: January - March

Etymology:
The species epithet 'balakrishnanii' is in honour of Dr. V. Balakrishnan (the Member Secretary of Kerala State Biodiversity Board) for his valuable contributions in biodiversity conservation and the taxonomy of South Indian *Dioscorea*.

Notes:
This yam species is locally known as '*Chola kizhangu'* among the Kattunayikar Tribes of Wayanad District. The tubers are edible when cooked and are said to have an excellent flavour. It can be used as a potential tuber variety for food security and for the cultivation of food crop with low glycemic index.

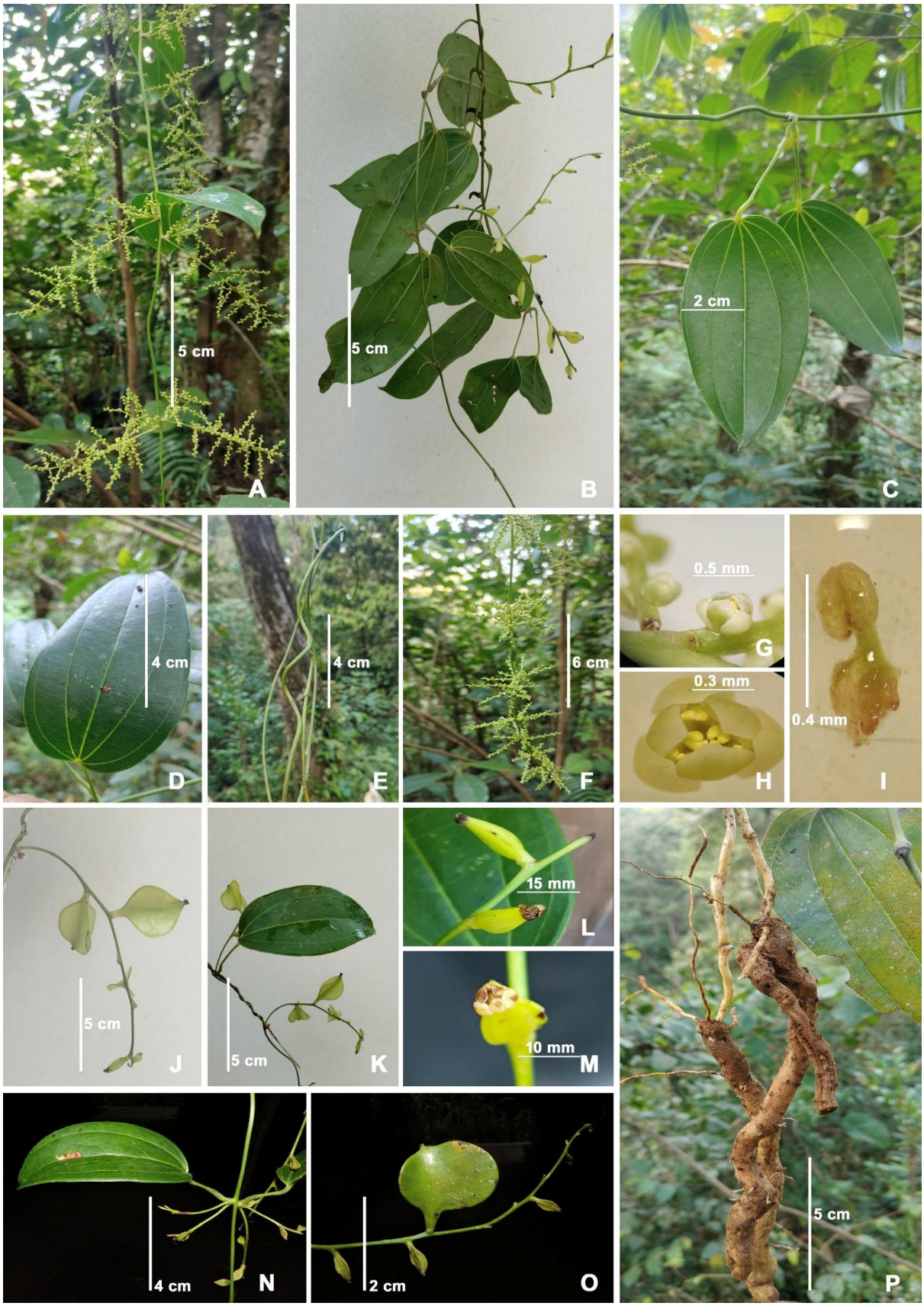

Fig. 1. *Dioscorea balakrishnanii* — A: Male inflorescence. – B: Female Inflorescence. — C: Leaves abaxial side. — D : Adaxial side of the leaf. – E: Stem. – F: Male inflorescence. – G– H: Male flower. – I: Stamen. — J–K: Female inflorescence. — L – M: Pistillate flowers after anthesis. — N: Female inflorescence emerging from the axils. — O: Immature fruit — P: Tubers. (Photograph by J. Mathew).

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Conflict of Interest

The author declares that there are no conflicts of interests.

Informed consent

Not applicable.

Ethical approval & declaration

In this article, as per the plant regulations followed in the Department of Botany, Sanatana Dharma College, Alappuzha – 688003, Kerala, India & Research Department of Botany, University of Kerala, Karyavattom, Thiruvananthapuram – 695581, Kerala, India; the authors observed a new species - *Dioscorea balakrishnanii* (Dioscoreaceae) from south Western Ghats, India. The species was deposited in Kerala University Herbarium, Thiruvananthapuram, India. The ethical guidelines for plants & plant materials are followed in the study for species observation, identification & experimentation.

Data and materials availability

All data associated with this study are present in the paper.

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