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A new species of *Malaxis* (Orchidaceae: Epidendroideae) from the Southern Western Ghats, India

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A new species, *Malaxis nilgiriensis*, is described and illustrated based on the material collected from the Nilgiris of Western Ghats, southern India. It superficially resembles *Malaxis versicolor* but differs by the presence of a pseudobulb and stolon, a short inflorescence, and a lip slightly bilobed with four retuse teeth. The taxonomic phenology of the new species as well as its etymology, conservation status, and diagnostic features are discussed.

Keywords: India; *Malaxis*; Nilgiris; Orchidaceae

Introduction

The mainly tropical genus of *Malaxis* Sol. *ex* Sw. is cosmopolitan and predominantly terrestrial with about 250 species (Mabberley 2008). In the tropics, *Malaxis* occurs in a wide variety of habitats, ranging from lowland rain forests to semi-arid environments, and at altitudes ranging from sea level to 3500 m elevation (González-Tamayo 2002). Taxa in *Malaxis* are herbaceous and characterized by their sympodial habit, rhizomatous stems often with small pseudobulbs or corms covered by membranaceous cataphylls, few non-articulated leaves, terminal raceme or corymbose inflorescence with small, usually green, flowers (Pérez-Escobar and Blanco 2014). The flowers of *Malaxis* frequently possess a concave disc, which is sometimes transversely divided by a longitudinal ridge located at the base of the labellum. In India, 19 species of *Malaxis* occur, of which five occur in South India (Abraham and Vatsala 1981; Gogoi et al. 2012).

In India, after the Himalayas, the largest concentration of endemic plant species is found in the tropical moist deciduous and tropical semi-evergreen forests of the Western Ghats and to a much lesser degree in the Eastern Ghats of southern India (Nayar 1996). The Nilgiris are part of the Western Ghats and have the highest proportion of endemic plant taxa.

During a botanical field trip to the Nilgiris, we located a single population of just over 20 individuals of a terrestrial *Malaxis* growing on fringes of the grasslands in open sunlight at the Mukurthi National Park in the Nilgiris.

These specimens could not be identified using the pertinent literature (Blatter 1928; Fischer 1928; Pradhan 1976; Joseph 1987; Bose and Bhattacharjee 1980; Abraham and Vatsala 1981; Singh, Phukan and Bujarbatrua 2001; Jalal and Jayanthi 2012) and specimens deposited in the Madras Herbarium (MH), Botanical Survey of India (BSI), Southern Circle, Coimbatore, Tamilnadu, India. This supported the notion that this was a species new to science.

Materials and methods

Three live plants were collected with their subterranean portions on 9 September 2014. This is the maximum number of specimens that can be collected owing to the restrictions prevailing for collecting plant samples from the National Park. Two specimens were in flower and one was vegetative. Dry herbarium specimens were prepared, and submitted to the MH of the BSI, Southern Circle, and Department of Botany, Bharathiar University (BUH), Coimbatore, Tamil Nadu, India.

Taxonomic treatment

Malaxis nilgiriensis Muthukumar, Rajendran, Priyadharsini, et Sarvalingam, **sp. nov.** (Figures 1, 2)

Description

Plants are *c.*12.6 cm tall. Pseudobulbs 2.7 by 2.5 cm, covered with sheaths, pale green. New bulbs arise from tip of stolon originating from base of pseudobulb laterally. Stolon is 1.3 by 0.4 cm. Roots 3.9–6.7 cm long, attached at the base of the pseudobulb, filiform. Leaves green, usually three, alternate, ovate to lanceolate, plicate, apex acuminate, base oblique, five veined, veins purple, petiolate. Petioles tubular, purple, 2.03 by 0.47 cm with a sheathing leaf base. Larger leaves 5.3 by 2.3 cm. Smaller leaves 3.3 cm long and 1.8 cm wide.

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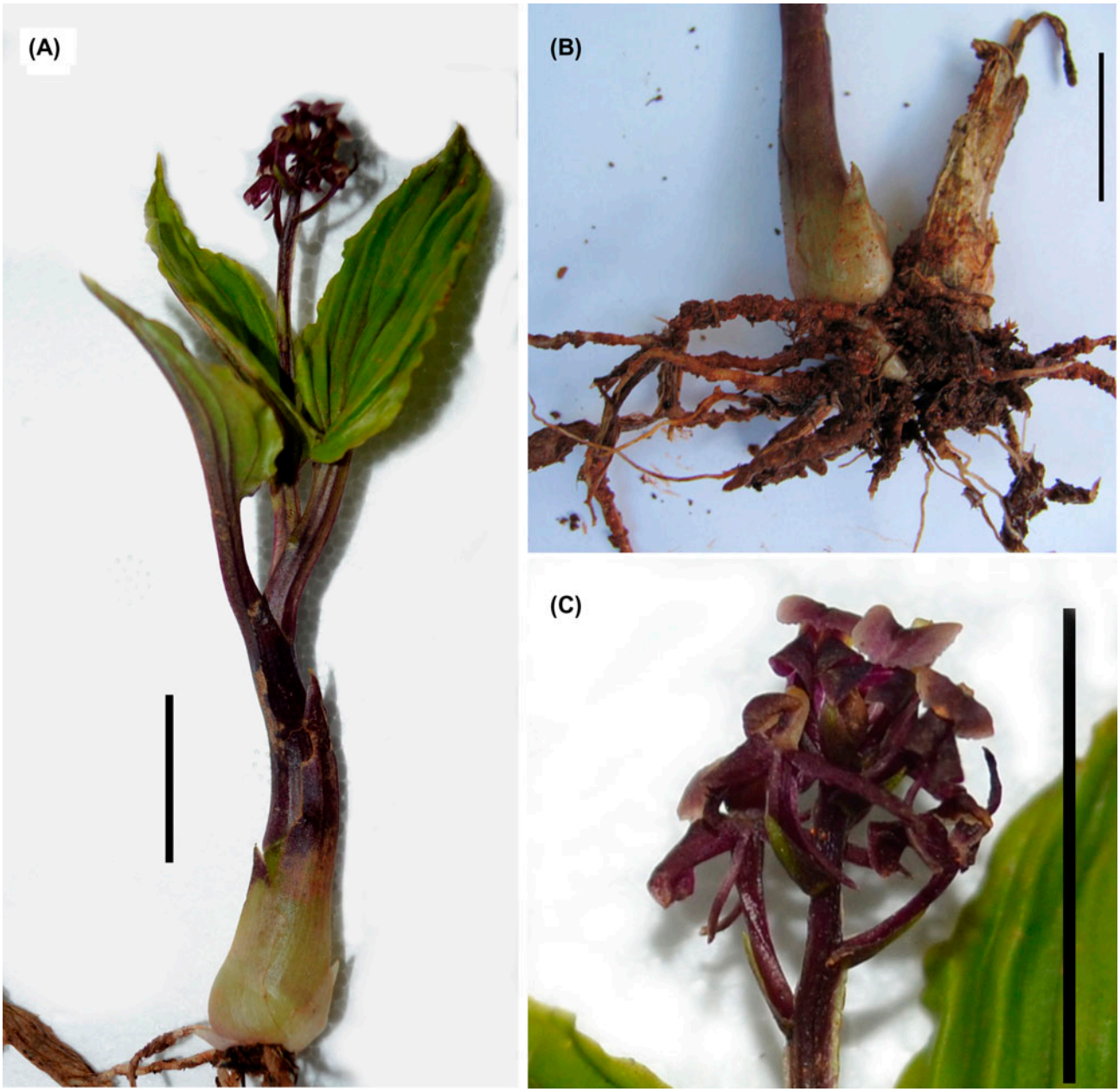

Figure 1. *Malaxis nilgiriensis* Muthukumar et al. **(A)** Habit. **(B)** Pseudobulbs with roots. **(C)** Inflorescence. Scale bars = 2 cm.

Inflorescence terminal, peduncle, 4.5 cm long, triangular, terminating in a short raceme. Flowers five or six, non-resupinate, *c.*8–12 mm long, dark purple with lip possessing pale green margin. Floral bracts green with pale green margin, 5–7 mm by 2.5 mm wide, ovate, slightly concave, triangular single veined. Pedicel with ovary *c.*13 mm long, twisted. Lateral sepals two, 6 by 2 mm, incurved below lip, and refluxed towards dorsal sepal, three veined, ovate to lanceolate, slightly acute and convex. Dorsal sepal, one widely spread against gynostemium, convex, 6 mm long, 3 mm wide, elliptic, obtuse, three veined. Petals two, elongated, linear, *c.*7 by 1 mm, obtuse, single veined, pendent laterally to lip. Lips slightly bilobed, 6.1 by 4.3 mm, deeply convex at anterior, teeth four retuse, dark purple with pale green margin, lip cavities are of two-thirds length, veined, basal lobes erect and stunted. Gynostemium 3.5 by 1.3 mm, broadly connate with the lip base, erect.

Type: Mukurthi National Park, Nilgiri District, Tamil Nadu, India, 9 September 2014, *Muthukumar 230* [Holo, MH: 176972; Iso, BUH: 006244].

Etymology

The specific epithet is in reference to the original locality, the Nilgiris.

Distribution, habitat and ecology

Mukurthi National Park (11°10’ to 11°22’ N, 76°26’ to 76°34’ E) of the Nilgiri Biosphere Reserve, Tamil Nadu,

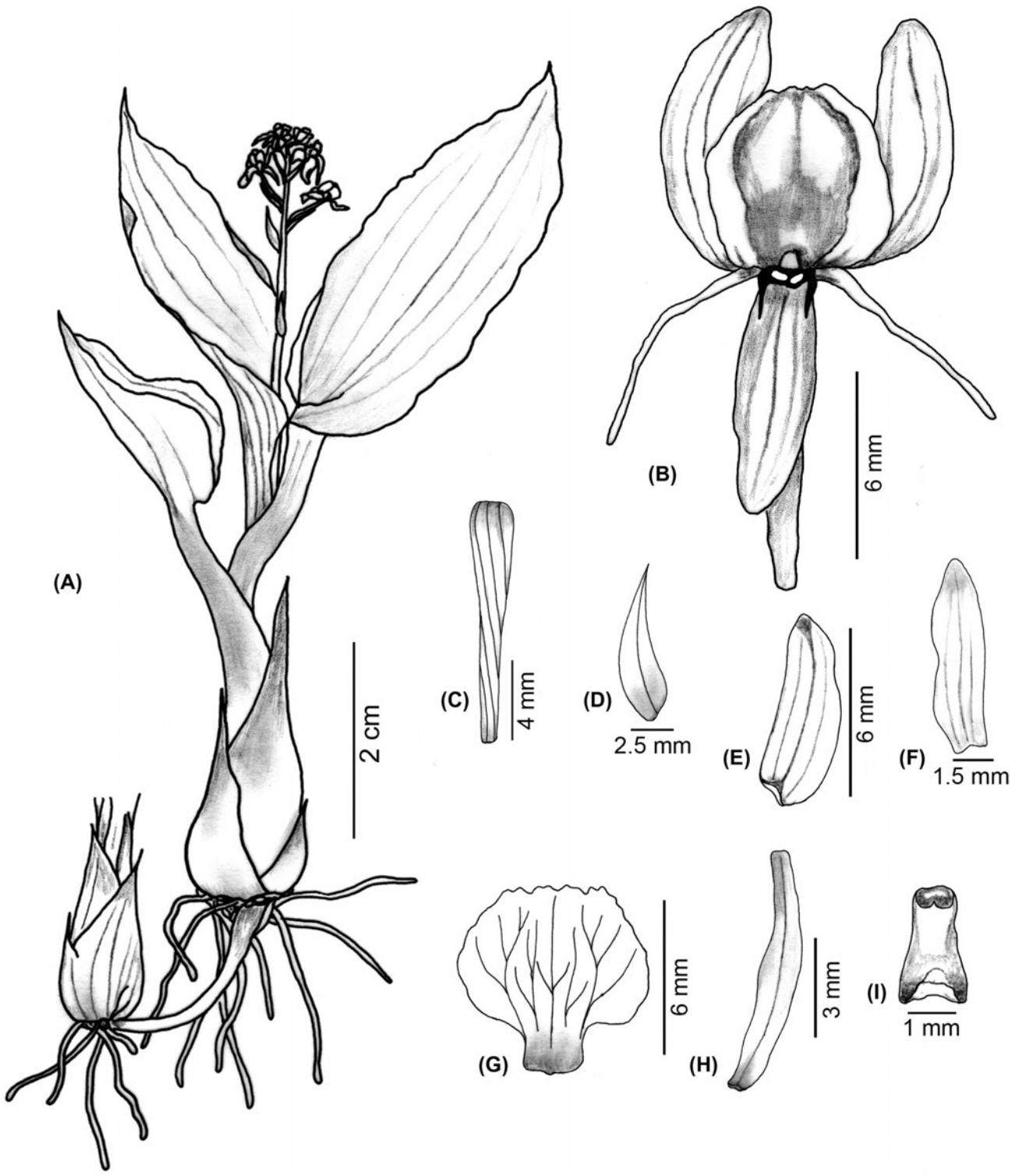

Figure 2. *Malaxis nilgiriensis* Muthukumar et al. **(A)** Habit. **(B)** Flower. **(C)** Pedicel. **(D)** Bract. **(E)** Lateral sepal. **(F)** Dorsal sepal. **(G)** Lip. **(H)** Petal. **(I)** Gynostemium.

India. The park extends over an area of 78.46 km^2 at an altitude ranging from 1500 to 2630 m (average 2400 m altitude). The temperature ranges from 35°C during summer (by day) to below 0°C during winter (at night). The annual rainfall ranges between 2010 to 6330 mm. The natural vegetation of Mukurthi National Park consists of vast stretches of grasslands interspersed with shola forests. *Malaxis nilgiriensis* grows mixed with *Malaxis versicolor* (Lindl.) Abeyw., and has a very similar appearance, which may be the reason it was overlooked

Table 1. Comparison of morphological characteristics of *Malaxis nilgiriensis* with other closely resembling *Malaxis* species.

Character	*Malaxis versicolor*	*Malaxis versicolor* var. I*	*Malaxis versicolor* var. II*	*Malaxis versicolor* var. III*	*Malaxis nilgiriensis* sp. nov.
Plant height	–	30 cm with inflorescence	10–12 cm with inflorescence	15–20 cm without inflorescence	12.6 cm with inflorescence
Pseudobulb	Globose, 7.5–30 cm by 0.9–2.2 cm	Absent	Absent	Absent	Globose, 2.7 cm by 2.5 cm
Stolon	–	–	–	–	Present, lateral to pseudobulb
Leaves					
Number	2–5	Usually 4	3–4	4–5	Usually 3
Colour	Green	–	–	Purplish green	Green
Size	5–15 cm by 2–13 cm	7–15 cm by 4–6 cm	4–6 cm by 1.5–3 cm	8–15 cm by 3–5 cm	3.3–5.3 cm by 1.8–2.3 cm
Shape	Narrow to ovate	–	More rounded	–	Ovate to lanceolate
Tip	Acute to acuminate	–	–	–	Acuminate
Margin	Slightly wavy	–	–	–	Entire
Veins	5–7, purple or pink-tinged	–	–	–	5, purple
Petiole	Purple-tinged, sheathy base, 3–6 cm long	–	–	–	Purple, tubular, sheathy base, 2.0 cm by 0.47 cm
Inflorescence					
Type	Raceme	–	–	–	Short raceme
Axis colour	Purple	–	–	–	Purple
Size	4–8 cm by 3–5.5 cm	–	Up to 10 cm long	12–20 cm long	Triangular, 4.5 cm long
Flowers					
Number	40–80	–	–	–	5–6
Size and colour	Small, shades of green, yellow, orange, red or purple	Yellowish green when young, purple when old	Small, pale green and purple	Deep purple	Dark purple
Size	–	4 mm across	–	4 mm across	8–12 mm long
Floral bract					
Nature	Ovate-lanceolate, acuminate or acute, deflexed, single veined	–	Not deflexed, horizontal	Strongly deflexed, longer than flowers	Ovate, triangular, single-vein. slightly concave
Colour	–	Purple	–	Purple	Green
Size	2.5–10 mm by 0.7–1.5 mm	–	–	–	0.7 cm by 0.2 cm
Dorsal sepal					
Shape	Oblong-ovate to lanceolate, obtuse to retuse, single veined	–	–	–	Convex, elliptic, obtuse, 3-veined
Colour	–	Pale-greenish purple	–	Purple	Dark purple
Size	2–3.5 mm by 0.6–1.0 mm	–	–	–	6 mm by 0.3 mm
Lateral sepal					
Shape	Oblong to lanceolate, obtuse to acute, 3 veins	–	–	–	Incurved below the lip, ovate to lanceolate, slightly acute, convex, 3 veins
Colour	–	Pale-greenish purple	–	Purple	Purple
Size	2–3.6 mm by 1–1.6 mm	–	–	–	6 mm by 2 mm
Petal					
Shape	Asymmetrical-ovate, obtuse, deflexed, 3 veins	–	–	–	Elongated, linear, obtuse, single veined, pendent laterally

Colour	–	Pale-greenish purple	–	Purple	Purple
Size	1.5–2.8 mm by 1–1.8 mm	–	–	–	7 mm by 1 mm
Lip					
Nature	–	–	–	–	Base attached to column, erect, stunted basal lobes
Shape	Subquadrate to reniform, pectinate	Superior, fan-shaped	Laciniate margin	Reniform	Fan-shaped, slightly bilobed, basal lobes erect and stunted
Colour	–	Purple	–	Purple with bright yellow margin	Dark purple with pale green margin
Size	1.2–2.8 mm by 2.1–3.2 mm	–	–	–	6.1 mm by 4.3 mm
Teeth	9–13, shorter middle teeth distinct, lateral blunt and trifid at apex	–	8-10 teeth on each side	–	4 toothed, retuse
Gynostemium	1–2 mm by 0.8–1.2 mm at top	–	–	Column yellow	3.54 mm by 1.34 mm, broadly connate with the lip base, erect

*Abraham and Vatsala (1981).

previously. *Anaphalis neelgerryana* Sch.- Bip.ex (DC.) DC., *Calanthe sylvatica* (Thouars) Lindl., *Eriocaulon odoratum* Dalz., *Impatiens levingei* Gamble ex Hook. f., *Malaxis rheedei* Sw, *Persicaia chinensis* (L.) Gross and *Persicaia nepalensis* (Meisner) H. Gross grow as neighbours.

Conservation status

Malaxis nilgiriensis is known only from the fringes of the grasslands in open sunlight interspersed with shola borders of rain forests in the Mukurthi National Park. So far in this habitat we could locate only a single small population. Areas of similar habitat, however, still remain in the region, which has not been thoroughly explored. The status of this species as assessed here has been assigned as Data Deficient (DD). Further exploration is required.

Taxonomic notes

In *M. nilgiriensis*, the leaves are usually three nerved, shorter inflorescence, flowers five or six, non-resupinate, floral bract ovate, sepal elliptic, petal linear and lip bilobed with four retuse teeth. It differs from the much more similar *M. versicolor* and its varieties in the presence of stolon, number of flowers, length of the inflorescence and, in the shape and number of teeth in the lip (Table 1).

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