



Hedyotis manasensis (Rubiaceae), A New Species From Assam, India

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Abstract A new species *Hedyotis manasensis*, from Assam, is described and illustrated. The complete description with colour plate is provided for easy identification. Its conservation status is assessed as critically endangered as per IUCN.

Keywords Critically endangered · *Hedyotis* · India

Introduction

The genus *Hedyotis* Linnaeus belongs to the family Rubiaceae widely distributed in tropical and warm temperate regions of the world, especially in paleotropics [1]. World-wide, it comprises of about 700 species [2–5]. It is a highly complex genus commonly confused with *Oldenlandia* Linnaeus. In India, the genus is represented by 74 taxa under seven sections [2]. In Assam, the genus is represented by 3 species [6]. While working on the floristic diversity of Manas National Park in Assam, the authors collected a set of interesting species with one unknown *Hedyotis* species. Based on detailed taxonomic studies with the consultation of relevant literature [2, 7–10] and herbarium specimens, the present collection is recognized as a new species, which is

described and illustrated below. To facilitate identification, comparative morphological characters, colour photographs are provided (Figs. 1, 2). A conservation assessment based on IUCN categories and criteria [11, 12] is also presented.

Type

India, Assam, Manas National Park, 26°42.690'N, 91°04.975'E, 16th Aug., 2021, *D. Baro* 80; (Holotype GUH!; isotype NEIAFMRH!).

Description

Erect woody, Shrubs upto 2.5–5 m tall. Stem hollow, angular at base and terete at middle and above, pubescent, dark purplish red in colour. Two branchlets arise from the nodes arrange in decussate form. Internodes 15–20 cm. Leaves sub-sessile, dark green, 11.5–12.5 cm × 1–1.2 cm, decussate, whorl, represent 2–3 whorls at the height of ½ of the stem, linear to narrowly linear-lanceolate with ciliate, acuminate at apex; base cuneate, ciliate at margin, petioles 2–3 mm, linear cuspidate; veins 8–9 pairs, prominulous abaxially, eucamptodromous, midrib is adaxially glabrous and abaxially pubescent. Stipules 2, interpetiolar, 4–6 × 6–9 mm, fused to petiole bases, triangular, lacinate, linear, persistent, fringed at apex, bristle 7 in number, unequal, glabrous, light yellow green. Bract-1, 5–10 mm, bracteole-1, 3–5 mm, linear-lanceolate, acute at apex, 1-veined, glabrous. Inflorescence axillary and terminal, 15–60 flowered capitates cymes; peduncle upto 10–30 cm long, slender, hirsute. Pedicels short 3–5 mm. Flowers heterostylous, 8–9 mm long, purple, hirsute, pedicel short 3–4 mm long. Calyx: sepals 4, fused, green; tube obconic, 4-toothed, glabrous,

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Fig. 1 *Hedyotis manasensis* sp. nov. **A** Habitat; **B** Stem showing quadrangular; **C** T/S of stem showing hollow nature; **D** and **E** Adaxial and abaxial Leaves surface with fused stipules; **F** and **G**. Stipules.

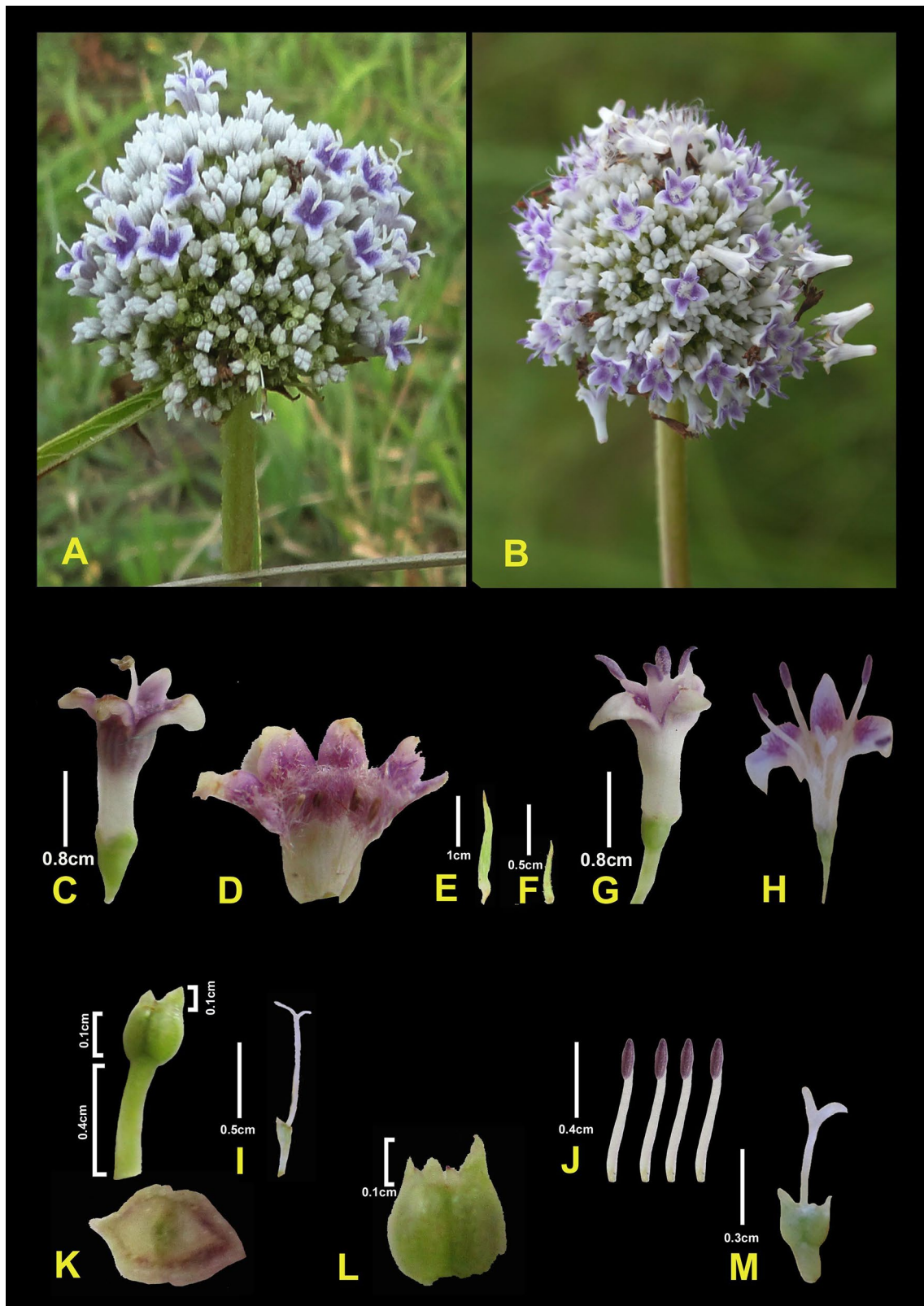


Fig. 2 *Hedyotis manasensis* sp. nov. **A** Inflorescence of Pin Flower; **B** Inflorescence of Thrum Flower; **C** Single Pin flower; **D** Corolla showing inserted stamen; **E** and **F** Bract and Bracteole; **G** Single

Thrum flower; **H** Corolla showing exerted stamen; **I** Long style; **J** Stamen of Thrum Flower; **K** T.S of Ovary; **L** Capsule with Calyx; **M** Short style.

light green, 2–3 × 1.3–1.7 mm, triangular to lanceolate, acute at apex. Corolla: petals 4, gamopetalous, valvate, tubular; tube 6–8 mm long, white in outside and bluish purple inside, glabrous on outer side and hirsute at the throat of the corolla lobe; lobes upto 2.5–3.5 mm long, ovate, apex acute, incurved. **Pin flowers:** Corolla tubular, with dense hairy on throat inside, glabrous outside with slight vein, 4-lobed, upto 2 mm, stamens 4, epipetalous, anthers up to 2 mm, dorsifixed, brownish yellow, inserted, filament indistinct; style long upto 5 mm. **Thrum flowers:** Corolla tubular with minute hairy on throat inside, glabrous outside, anther exerted, stamens at the apex of corolla tube, 4 mm long, style inserted, upto 3 mm, ovary 2-loculed triangular in shape. Capsule sub-globose, 2–3 mm × 2–2.5 mm, pubescent, opening septicidally. Seeds 1.3–1.4 × 1.2–1.4 mm long, angular, ellipsoid, exotesta reticulate, brownish black, glabrous (Fig. 1, 2).

Recognition

Hedyotis manasensis sp. nov. signify to have few similarities with *Hedyotis sithiravaraiensis* S. Muruganandam, Devanath., S. Ravikumar & D. Naras (2020: 749) and *Hedyotis rajasekaranii* Karupp. & Ravichandran (2014: 57) but can be differentiated in having dark purplish red, the height of the plant, hollow stem, sub-sessile, linear to narrowly linear-lanceolate with ciliate; Peduncle 10–30 cm, with minute hair, hollow cylindrical, Corolla white in outside and bluish purple inside, dense hairy on throat, glabrous outside whereas with minute hair in thrum flower. Stamen-4, Inserted in Thrum flower and exerted in Pin flower (4 mm long). Style bifid, gynobasic, inserted (Table 1.) but can be differentiated in having dark purplish red, hollow stem, simple leaves, decussate, whorls, linear to narrowly linear-lanceolate with ciliate, more number of secondary veins with short petiole; Interpetiolar stipules fused to petiole bases, triangular to rounded, laciniate, linear, pale yellow in colour, Peduncle 10–30 cm, with minute hair, hollow cylindrical, Corolla white in outside and bluish purple inside, dense hairy on throat, glabrous outside whereas with minute hair in thrum flower. Stamen-4, Inserted in Thrum flower and exerted in Pin flower (4 mm long). Style bifid, gynobasic, inserted.

Taxonomic Keys to the Closely Associated Species Along with Species nov.

- 1a. Herbs, annual or perennial, stems flattened, subterete, or 4-angled, sparsely to densely hirtellous:

2a. Flowers sessile or subsessile, distylous *H. uncinella*

2b. Flowers sessile to subsessile, apparently homostylous *H. verticillata*

- 1b. Erect woody or climbing shrubs, branchlets 4-angled, glabrous:

3a. Flowers bisexual, homostylous in nature *H. scandens*

- 3b. Flowers bisexual, heterostyly in nature:

4a. Stem erect, hollow quadrangular below and hollow cylindrical above with minute hair, Peduncle 10-30 cm *H. manasensis*

4b. Stem erect, angular, glabrous, Peduncle upto 10 cm:

5a. Leaves lanceolate to lance-ovate, Lateral nerves 5-7 pairs *H. sithiravaraiensis*

5b. Leaves Elliptic-ovate, Lateral nerves 2-3 pairs *H. rajasekaranii*

Distribution

Endemic to type locality in Manas National Park of Assam. Known from the type only.

Habitat

The new species is grown in the grasslands.

Conservation Status

Currently only known from one small area within the type locality in Manas National Park of Assam. The total known population is estimated to consist of less than 100 mature individuals. The extent of occurrence is less than 100 km² and we also observed a steady decline in the quality and size of habitat during the last two years. Major threats include overgrazing by wild elephants. Based on this information, we assess this taxon as Critically Endangered (CR B1ab (iii)) under the IUCN's Categories and Criteria [11, 12].

Table 1 Comparison of morphological characters of *H. manasensis* sp. nov. with *H. sithiravaraiensis* S. Muruganandam, Devanath., S. Ravikumar & D. Naras (2020: 749) and *H. rajasekaranii* Karupp. & Ravichandran (2014: 57)

Character	<i>Hedyotis manasensis</i> sp. nov	<i>H. sithiravaraiensis</i>	<i>H. rajasekaranii</i>
Habit	Shrubs up to 2.5–5 m high	Shrubs or subshrubs up to 2 m high	Shrubs or subshrubs up to 2 m high
Stem	Stems erect, frequently inclined on the grassland, hollow, angular at the base and terete at the middle and above, pubescent	Stems erect, 4-angled, longitudinally grooved when young, terete when mature, glabrous	Solid angular, glabrous
Leaves	Leaves simple, decussate, whorls, 2–3 whorls leaves in 1/2 height of each individual, linear to narrowly linear-lanceolate with ciliate, 11.5–12.5 cm × 1–1.2 cm, adaxially glabrous and abaxially pubescent	Leaves simple, decussate, Lanceolate to lance-ovate, 5.5–11 × 1.5–3 cm, glabrous on both side	Elliptic-ovate, 3–7 × 0.5–2 cm, obtuse-rounded at base; glabrous on both surfaces
Lateral nerves	8–9 Pairs	5–7 Pairs	2–3 Pairs
Petiole	Subsessile, 2–3 mm long	Distinctly petiolate, 7–15 mm long	Distinctly petiolate, up to 8 mm long
Stipules	Interpetiolar, Triangular to linear, up to 4–6 mm, glabrous, bristle 5–7 in each side, the bristles in fused with leaves petioles at the node's glabrous, pale-yellow green	Widely deltate, 3–7 × 5–9 mm, fringed at apex, glabrous, bristle 5–7	Triangular, 6 × 4 mm, thick, dentate-laciniate at apex, glandular-hairy
Inflorescence	Axillary or terminal dense capitates	Usually terminal and rarely axillary; heads globose	Usually terminal, rarely axillary heads, globose, compact
Peduncle	Peduncle 10–30 cm, Glaucous, hollow terete	Peduncle sessile or 4.5–10 cm long, terete, glabrous	Peduncle 1–3 cm long, 4- angled, minutely hirsute
Pedicel	3–5 mm long	Up to 1 mm long	Pedicel short
Calyx	Obconic, 2–3 × 1.3–1.7 mm, Lobes triangular to lanceolate	Campanulate, 1.2–1.5 mm long, lobes oblong-lanceolate	Campanulate, 5–8 × 0.5–1.8 mm, lobes triangular
Corolla tube	Tubular 6–8 mm long, 4-lobed, white on the outside and bluish purple inside, densely hairy on the throat, glabrous outside, and minute hair in thrum flower	Tubular, 8.5–10 mm long, 4– 5-lobed, pink or purplish blue, densely hairy inside, glabrous outside	Tubular, 8.5–10 mm long, 4–5-lobed, bluish purple, throat pinkish, densely hairy, glabrous outside
Stamen	Stamen-4, Inserted in the Thrum morph flower and exerted in the Pin morph flower (4 mm long)	Inserted in both Thrum and Pin morph flowers; filament sessile or c. 0.2 mm long	Stamens 4–5, exerted, filament 1.5–2.5 mm long
Style	In thrum flower up to 3 mm and in Pin flower up to 5 mm long	In thrum flower, 1.5–2.4 mm long, and in Pin flower: up to 7.5 mm	Up to 13 mm long

Immediate conservation efforts are necessary to prevent its extinction.

Phenology

August to December.

Etymology

The specific epithet is named after the type locality, Manas, which is a national park, Assam.

Notes

Hedyotis manasensis sp. nov. signify to a have few similarities with *Hedyotis Sithiravaraiensis* and *Hedyotis rajasekaranii* in having shrub habit, angular nature of stem and simple, decussate arrangement of leaves, bisexual, heterostyly flower in nature, the tubular form of Corolla, Capsule nature of the fruit, nevertheless *Hedyotis manasensis* sp. nov have immense differences from these two species for having hollow charters in stem and peduncle, Stipules fused to petioles bases, linear cuspidate, whorls leave arrangement, linear to narrowly linear-lanceolate with ciliate, Inserted stamens only in thrum flower and exerted in pin flower.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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