



Ophiorrhiza debiana (Rubiaceae, Rubioideae), a new species from North-East India

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A new species of *Ophiorrhiza* is described from Arunachal Pradesh, North-East India. *Ophiorrhiza debiana* is compared with *O. cordata*, a Chinese species. Detailed description, distribution, ecology, phenology and relevant taxonomic notes are provided along with colour photographs.

Keywords: Arunachal Pradesh, Himalaya, New species, *Ophiorrhiza*, Rubiaceae.

The genus *Ophiorrhiza* Linnaeus (1753: 150) belongs to the tribe Ophiorrhizeae in the subfamily Rubioideae (Bremer & Manen 2000). It is a notably species-rich taxonomically complicated genus consisting of 318 species, five varieties and one subspecies (WCSPF 2017) and found in wet tropical forests of South-East Asia extending to Australia, New Guinea and the Pacific islands (Darwin 1976, Chen & Taylor 2011). Deb and Mondal (1997) studied the taxonomy of *Ophiorrhiza* in Indian subcontinent and documented 47 species and 9 varieties. Recently a new species viz. *O. sahyadriensis* Hareesh *et al.* (2015a: 220) and *O. rugosa* Wallich (1824: 547) var. *angustifolia* (Thwaites 1880: 77) Ridsdale (1996: 461) (Hareesh *et al.* 2015b) were added to the flora of India. In the present scenario, 46 species and five varieties were distributed in India with 25 endemics (Hareesh *et al.* 2015b). Among them 16 taxa were endemic to South India and six taxa in North-East India and one taxon in Nicobar Islands. While conducting floristic explorations in the North-East India, the authors came across an interesting *Ophiorrhiza* species from Arunachal Pradesh. Detailed taxonomic studies with the perusal of relevant literature (Darwin 1976, Lo 1990, Halford 1991, Deb & Mondal 1997, Chen & Taylor 2011, Hareesh *et al.* 2015 a&b), proved this to be a species hitherto unknown to science, which is described along with colour illustrations.

Materials and methods

Plant materials were collected from near Sessa village and Ziro point on the way to Bomdilla from Balukpong, West Kameng district of Arunachal Pradesh, North-East India during field studies in 2015 and 2017. The photographs of the floral parts were taken at the time of the collection itself. The floral parts were preserved in FAA for subsequent studies and three twigs were taken for preparation of herbarium specimens. Measurements of floral parts for description were made from both live and preserved specimens. Herbarium specimens were prepared using standard herbarium methods. The dried plant material is pasted on a herbarium sheet and deposited at ASSAM, CAL and CALI.

Taxonomy

Ophiorrhiza debiana Hareesh, A. Joe & M.Sabu *sp. nov.* (Fig. 1)

Ophiorrhiza debiana is similar to *O. cordata* W.L. Sha (1999: 189) but differs from the latter in having sparsely puberulous stem, persistent stipule with entire apex, lamina round to sub-cordate or attenuate at base, glabrous orbicular bracts, corolla tube 18–23 mm long, corolla tube with rusty small hairs above the villous ring within and non-keeld corolla lobes with 1 mm long horn at apex.

Type:—INDIA. Arunachal Pradesh: West Kameng district, near Sessa village, on the way to Bomdilla from Balukpong, 29 June 2015, V.S. Hareesh & A. Joe 143726 (holotype, CALI; isotypes, CAL, ASSAM).

Creeping herbs, 10–30 cm tall; stem woody at base, terete, puberulous, green in young, pale brown when mature; internodes 1.5–5.5 cm long. *Stipules* subulate-linear with broad base, entire, 5–7 mm long, acute, puberulous, persistent, pale brown. *Petioles* 0.5–3 cm long, slender, glabrous or puberulous; leaf blades ovate or ovate-elliptic, 2–6 × 1.5–3 cm, rounded to

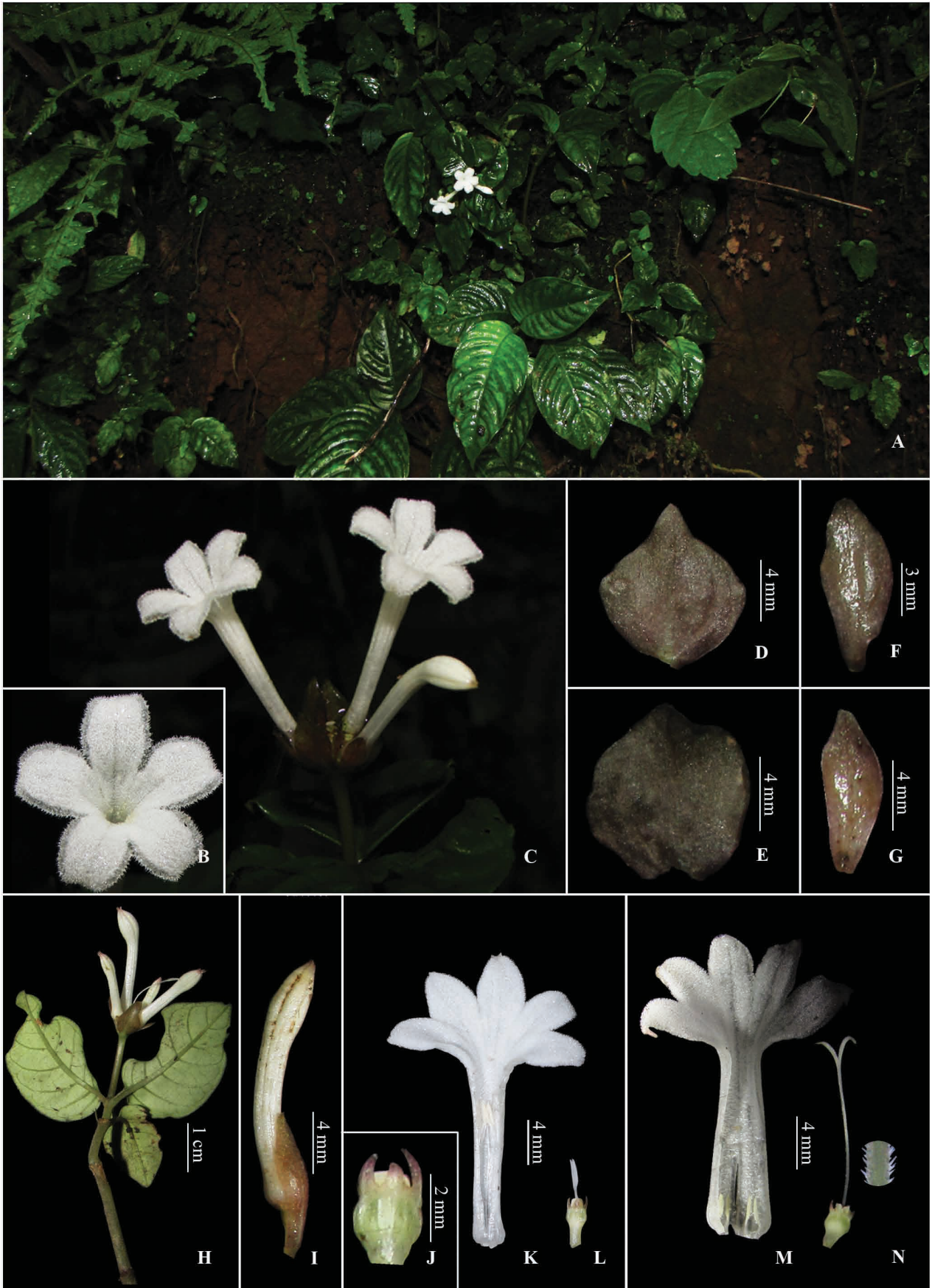


FIGURE 1. *Ophiorrhiza debiana*. A. Habitat. B. Front view of flower. C & H. Inflorescence. D. & E. Bract adaxial and abaxial surface. F. & G. Bracteole adaxial and abaxial surface. I. Flower bud with bracteoles. J. Hypanthium. K. Split opened corolla of short styled flower. L. Short style with stigma and hypanthium. M. Split opened corolla of long styled flower. N. Short style with stigma and hypanthium. (inset portion of style enlarged). (Photos by V.S. Hareesh & Alfred Joe).

sub-cordate or attenuate at base, acute or obtuse at apex, glabrous above, pale beneath; secondary veins 4–7 each side, glabrous or puberulous below. *Inflorescence* terminal, sub-corymbose, 1.5–2 cm in diameter; rachis glabrous/puberulous; peduncle 1.5–2.5 cm long, slender, glabrous/puberulous; bract orbicular, 10–12 × 8–10 mm, acute to acuminate at apex, prominently nerved, glabrous, brown, persistent; bracteoles elliptic-oblong, 9–10 × 3–4 mm, acute to obtuse, prominently nerved, persistent. *Pedicels* c. 0.5 mm long, glabrous. Flowers 20–25 mm long, glabrous. *Hypanthium* obovoid, 1.75–2 × 1.6–1.8 mm, 10-ribbed; disc 0.5–0.7 mm tall, glabrous. *Calyx* lobes triangular, 0.8–1 × 0.45–0.6 mm, pale brown or pale green, acute, glabrous. *Corolla* infundibuliform, 18–23 mm long, white, glabrous outside, rusty villous at the middle inside and rusty small hairs above the villous ring, prominently veined; lobes ovate, 4–4.5 × 3–3.5 mm, incurved, spreading, apex acute with 1 mm long horn, pale brown. *Long-styled flower*: *Stamens* inserted at the base of corolla tube; filaments 0.60–0.75 mm long; anthers oblong-linear 1.75–1.9 mm long, white or pale yellow; style filiform, 10–11 mm long, puberulous; style branches 2, linear-lanceolate, 1.75–2 mm long, glabrous. *Short-styled flower*: *Stamens* inserted at the middle of corolla tube; filaments 2.3–2.5 mm long; anthers oblong-linear 1.85–2 mm long, white or pale yellow; style filiform, 0.75–1 mm long, glabrous; style branches 2, linear-lanceolate, 2.5–2.75 mm long, glabrous. *Capsules* obcordate in outline, 2–2.5 × 3–4 mm, glabrous, green; seeds many, angular, 0.4–0.6 × 0.3–0.5 mm, brown.

Discussion:—*Ophiorrhiza debiana* is similar to *O. cordata*, a Chinese species reported from Guanxi. Both the species possess creeping habit, terminal inflorescence with foliaceous bracts, short pedicels, white infundibuliform corolla with glabrous outer surface, 10-ribbed obovoid hypanthium, triangular calyx lobes and long, filiform pubescent style. The differences are listed in the Table. 1.

TABLE 1. Diagnostic morphological characters of *Ophiorrhiza cordata* with *O. debiana* sp. nov.

Characters	<i>O. cordata</i>	<i>O. debiana</i> sp. nov
Stem	Densely villous	Puberulous
Stipule	Caducous, apex bifid	Persistent, apex entire
Lamina base	Cordate	Rounded to sub-cordate or attenuate
Rachis	Pubescent	Glabrous or puberulous
Bract	Elliptic-oblong, 3.5–6 mm long, margin ciliate	Orbicular, 10–12 mm long, margin glabrous
Corolla tube	11–15 mm long	18–23 mm long
Corolla inner side vestiture	Glabrous above the villous ring	Rusty small hairs above the villous ring
Corolla lobe	Apex acute, dorsal side deeply keeled	Apex with 1 mm long horn, dorsal side non-keeled

Flowering and fruiting:—May–September.

Eponymy:—The species is named in honour of Dr. D.B. Deb, Botanical Survey of India, Kolkata, who revised the genus *Ophiorrhiza* in Indian subcontinent and also for his immense contributions to the family Rubiaceae.

Distribution and ecology:—*Ophiorrhiza debiana* is known only from Sessa village and Ziro point of West Kameng district of Arunachal Pradesh, North-East India. Populations were observed in the moist shady areas in association with *Begonia* Linnaeus (1753: 1056) sp., *Impatiens* Linnaeus (1753: 937) sp., *Musa cheesmannii* N.W. Simmonds (1957: 479), *M. sikkimensis* Kurz (1878: 164), *Pilea* Lindley (1821: tab. 4) sp. etc.

Conservation status:—*Ophiorrhiza debiana* known to exist only in a single location and the area of occupancy estimated to be less than 10 km². Therefore, the new taxon is tentatively classified as Critically Endangered (CR B1ab(ii, iii)+B2ab(i,ii))(IUCN 2013). The major threat we observed is the clearing of roadsides and continued deforestation in the area.

Additional specimens examined (paratype):—INDIA. Arunachal Pradesh: West Kameng district, Ziro point, on the way to Bomdilla from Balukpong, 30 May 2017, *V.S. Hareesh 152696*.

Acknowledgments

The authors grateful to Dr. Sheng-Xiang Yu, State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, Chinese Academy of Sciences, Beijing, China for providing literatures. The authors express their sincere gratitude to Department of Science and Technology (New Delhi) for the financial assistance for the research project (SERB/SB/SO/PS/92/2013 dt. 09.07.2014) and Arunachal Pradesh Forest Department for granting permission and providing necessary helps for the field studies in the forest. VSH grateful to the International Association for Plant Taxonomy for the ‘IAPT Research Grant 2017’.

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