



RESEARCH ARTICLE

# On the extended distribution of two species of *Ophiorrhiza* L. (Rubiaceae) from the States of India

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## ARTICLE HISTORY

Received: 22 March 2022

Accepted: 22 June 2022

Available online

Version 1.0: 20 October 2022



## Additional information

**Peer review:** Publisher thanks Sectional Editor and the other anonymous reviewers for their contribution to the peer review of this work.

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## CITE THIS ARTICLE

Bhuyan B, Baruah S. On the extended distribution of two species of *Ophiorrhiza* L. (Rubiaceae) from the States of India. Plant Science Today. 2022; 9(4): 1085–1089. <https://doi.org/10.14719/pst.1769>

## Abstract

*Ophiorrhiza* L. (1753: 150) is a pantropical, herbaceous genus distributed with high diversity in South East Asia. Here, 2 members of genus *Ophiorrhiza*, *Ophiorrhiza brunonis* var. *johnsonii* Hook. f. reported as a new record for North East India and *Ophiorrhiza fasciculata* D. Don for the flora of Assam. Detailed taxonomic descriptions, coloured photographs are provided here for the easy identification of the taxa. Distribution map of the species is also provided.

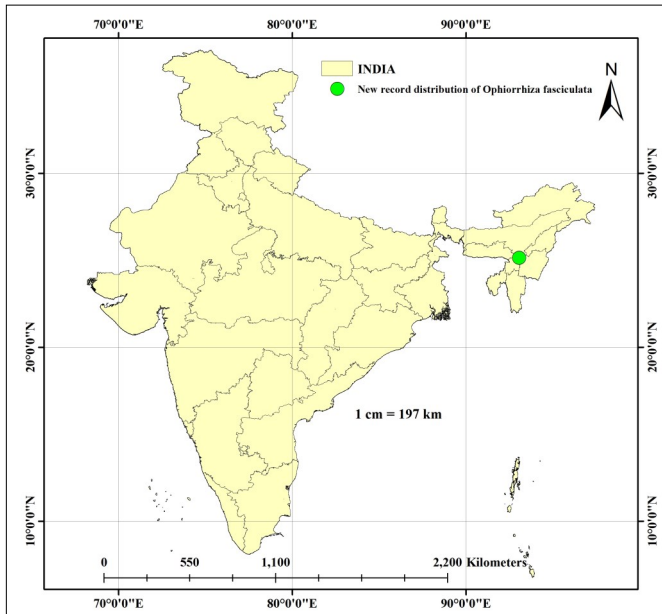
## Keywords

*Ophiorrhiza brunonis* var. *johnsonii*, *Ophiorrhiza fasciculata*, new report, Assam, North-East India

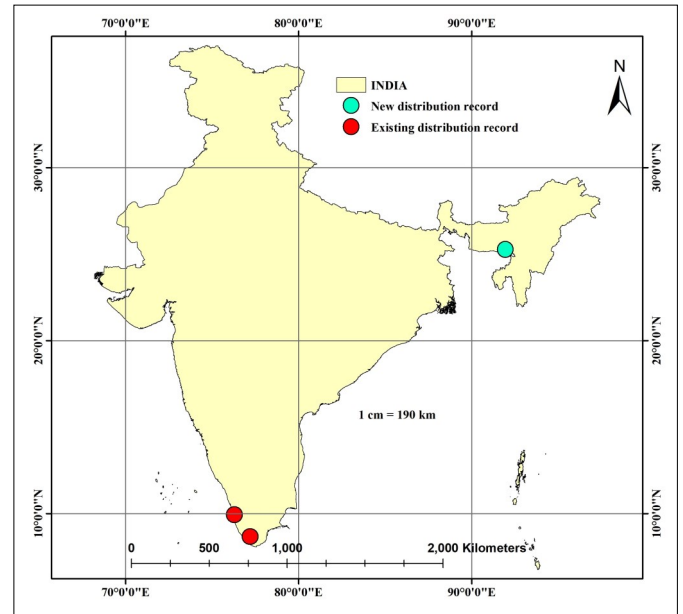
## Introduction

*Ophiorrhiza* L. is a potential medicinally important genus widely distributed in the South East Asia, West Pacific, South China, North Australia and New Guinea. (1-3). The members of genus contain Camptothecin (CPT), an indole alkaloid with anticancer properties also used in the treatment of snake poison, wounds, ulcers, leprosy, breast, ovarian cancer etc (4, 5). It is a taxonomically complicated genus consisting c. 321 species worldwide, 5 varieties and 1 subspecies (6-9). At present, 47 species and 9 varieties of the genus have been recorded from India and out of them, 21 species and 1 variety have been reported from North-East India (10). Recently, few new species of genus were discovered from North-Eastern states of India (11-13).

During the survey from the month of October to December 2021, the authors have collected few specimens of *Ophiorrhiza* from the forests of Jatinga, Halflong, Assam and from road side at Cherrapunji, Meghalaya. On careful observation and critical examination of the species with perusal of literature (2, 3, 10, 14, 15) and consultation of herbarium available at GBIF and deposited at different herbaria ASSAM, CAL, E, K, MPU, BR (acronym following Thiers 2018) the collected specimen from Halflong was identified as *O. fasciculata* D. Don and the specimens collected from Cherrapunji was identified as *O. brunonis* var. *johnsonii* Hook. f. Of these, *O. fasciculata* is reported here as a new distribution record to the Flora of Assam and *O. brunonis* var. *johnsonii* Hook.f. as the first record for North- East India (Image 1 & Image 2). The voucher specimens are submitted in Bodoland University Botanical Herbarium (BUBH), Kokrajhar, Assam for future reference.



**Image 1.** Map showing the new distribution record of *Ophiorrhiza fasciculata*.



**Image 2.** Map showing the new distribution record of *Ophiorrhiza brunonis* var. *johnsonii*.

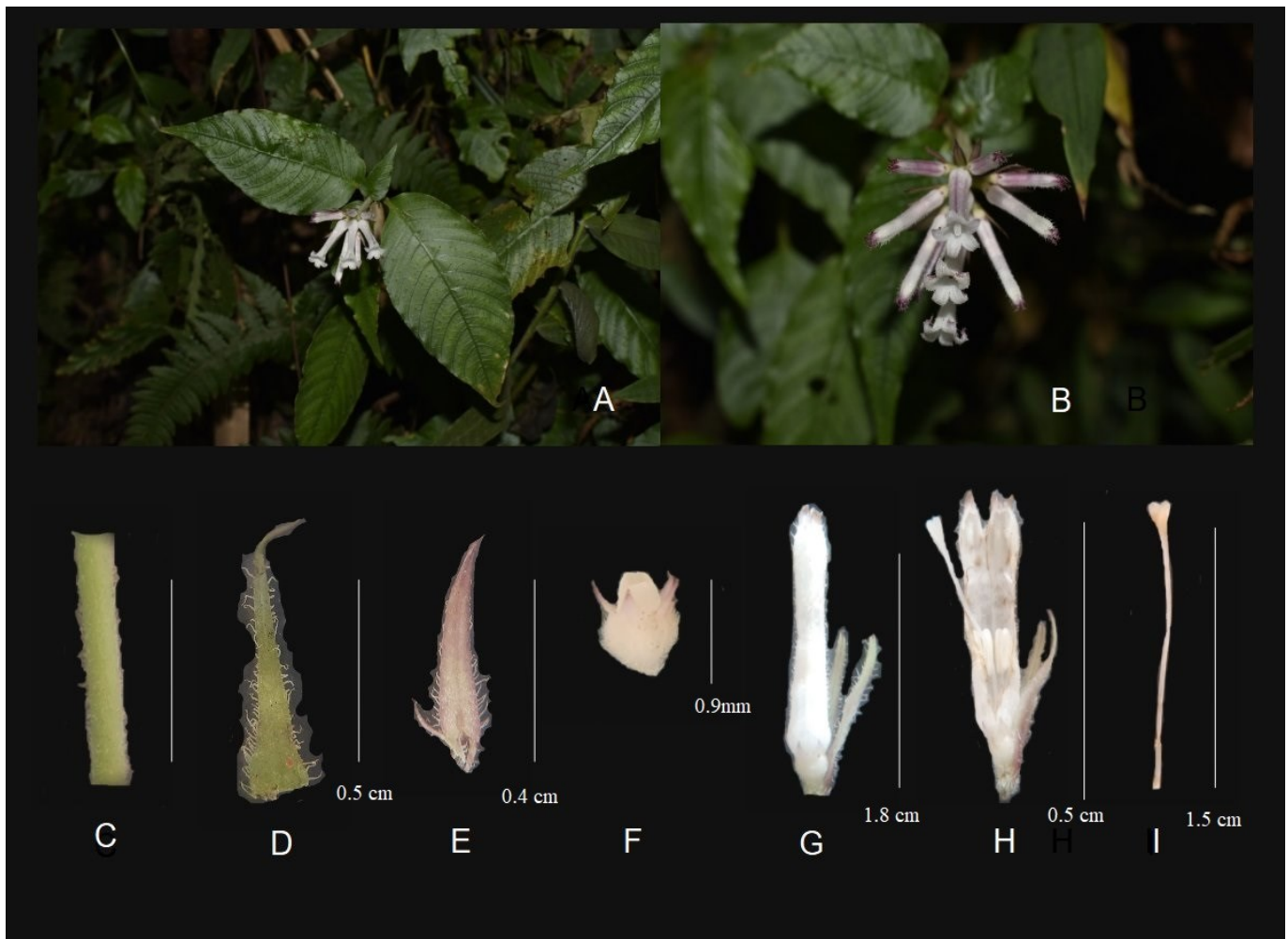
### Taxonomic treatment

#### *Ophiorrhiza brunonis* var. *johnsonii* Hook. f

Hook.f., Fl. Brit. Ind. 3:80. 1880; Deb & Mondal, Bull. Bot. Surv. India 39 (1-4): 34. 1997; Akhilesh *et al.* in Rheedea 31 (4): 307-310, 2021. (Fig. 1).

Perennial Herb, 20-30 cm, high, stem woody at

base, rusty pubescent, terete, green when young, brownish green on maturity; internodes 1.5-5 cm long. Leaves 5-12×3-4cm, ovate-elliptic, broadly acuminate at apex, sub-attenuate at base, small hair in lamina, furfuraceous above, margin hairy, pale beneath, puberulous; primary vein distinct beneath, puberulous, secondary veins 10-12 on either side, puberulous, raised beneath. Stipule sub-



**Fig. 1.** *Ophiorrhiza brunonis* var. *johnsonii*. A. Habit, B. Inflorescence, C. Pubescent stem, D. Stipule, E. Bracts, F. Calyx, G. Flower bud with bracts, H. Split open flower, I. Long style.

late, base broad, margin hairy, pinkish green, bifid, 0.4–0.6 cm long, persistent. Petiole 0.5–1 cm long, slender, puberulous. Inflorescence terminal, 0.8–1 cm across; peduncle 2–2.5 cm long, pubescent, slender; bracts lanceolate, margin hairy, 0.4–0.5 cm long, pinkish brown, persistent; bracteoles in pairs, c. 0.4 cm long, pinkish, persistent, subulate, margin hairy. Flowers pinkish white, 1.9–2 cm, long, hairy outside; Calyx lobe subulate with broad base, apex acuminate, pinkish, 0.8–1 mm × 0.4–0.5 mm, pubescent. Corolla tube c. 1.5 cm long, pubescent, infundibuliform, rusty villous hair ring below the corolla lobe within, prominently veined outside, apex acute, spreading; corolla lobes c. 0.3 × 0.2 cm, slightly curved inward, pubescent, ovate. Stamen inserted near the base of the corolla tube; adnate, filament c. 0.2 cm long; anther c. 0.3 cm long, creamy white; Ovary c. 1.5 cm long, style filiform, c. 1.3 cm long, glabrous, stigma 2 lobed, c. 0.2 cm long (Fig. 1).

#### Habitat

Found in the moist shady areas, near streams, along the forest roadsides and on hilly slopes.

#### Flowering

August–December

#### Fruiting

December–February

#### Distribution

Endemic to India (14), it has been found in Cochin, Chemunji hills in Agasthyamala Biosphere Reserve, Kerala. (Image 1).

#### Specimen examined

India, Meghalaya, Shillong, Cherrapunji, 22-12-2021, B. Bhuyan BB0030 (BUBH).

#### Notes

*Ophiorrhiza brunonis* var. *johnsonii* resembles with *O. brunonis* in most of the characters but differs in having puberulous stem, long and pubescent corolla tube, villous within at middle of corolla tube, style as long as the corolla tube, in contrast to *O. brunonis* has glabrous stem, short and glabrous corolla tube, villous below the corolla lobes within, styles  $1/3^{\text{rd}}$  as long as corolla tube. *Ophiorrhiza brunonis* var. *johnsonii* Hook.f. is an endemic species reported from India (16). It was first collected by Rev. Johnson in between 1860–1865 from Cochin, Kerala. Hooker (14) described the species based on Johnson collection. The revisionary work on *Ophiorrhiza* (10) included it as a variety based upon the original specimen collected by Johnson. Recently, the variety was rediscovered after a lapse of more than 140 years from Chemunji hills in Agasthyamala Biosphere Reserve, Kerala (16). Scrutiny of the literature revealed that other than the present collec-



**Fig. 2.** *Ophiorrhiza fasciculata*. A–B. Habit, C. Plant showing long peduncle, D. Single flower, E. Split open flower, F. Short style, G. Inflorescence showing capsules with long bracts, H. Single capsule.

tion of the species from Meghalaya, there is no previous report of the variety from the states of North-East India.

### *O. fasciculata*. D. Don

D. Don, Prodr. 136. 1 825 (Type: Nepal, Suembu, 22.6.1802, Buchanon s.n. BM. CAL). DC. Prodr. 4:416.1830. (Fig. 2).

Perennial herb, 10-30 cm tall; stems erect, woody at base, branched, pubescent. Leaves 3-13 × 2-5.5 cm long, ovate-lanceolate, acute apex, tapering at base, glabrous above, pubescent on the nerves beneath, membranous; lateral nerves 5-15 on either side; petioles 1-4 cm long, slender, pubescent; stipules 3-12 mm long, lanceolate with broad base, acute, entire, pubescent. Inflorescence terminal, fascicled, 1-4 cm across, 3-5 branched, pubescent; peduncles 2-8 cm long, elongating in fruit, slender, pubescent. Flowers 1.5-2 cm long, white, bracts persistent, 0.5-1 cm long, lanceolate, pubescent, pinkish; bracteoles persistent, 0.3-0.6 cm long, narrowly lanceolate, pubescent, pinkish; pedicels 0.1-0.2 cm long, pubescent. Hypanthium obovoid, pubescent. Calyx lobe ovate, acute at apex, pubescent; Corolla tube 1.3-1.8 cm long, infundibuliform; tube slender, puberulous outside, glabrous; lobes 1.5-2.25 × 1.25-1.75 mm, broadly ovate-oblong, acute. Stamens adnate to the base of corolla or slightly above, inserted; filaments 1.4-1.7 mm long; anthers 1.6-1.7 mm long, linear oblong. Ovary 1.5×1.25 mm, obovoid; style 1.25-1.5 mm long; stigma 2-lobed, 1.8-2.3 mm long, glabrous. Capsule 1.5-3.5 × 4-8.5 mm, pubescent, locules ovate with straight tip. Seeds, 5-6-angular, brown. (Fig. 2).

### Habitat

The species was found growing on the forest foothill of Jatinga, Halflong, Dima Hasao district of Assam.

### Flowering & Fruiting

Flowering and fruiting observed in the month of November.

### Distribution

Western Himalaya, Myanmar, Nepal, Bhutan, Sikkim, West Bengal, Orissa, Khasi hills and Mizo hills.

### Specimen examined

India, Assam, Dima Hasao district, Halflong, Jatinga forest, 25.11410° N, 93.03795° E, ± 794 m 04 November 2021, *B.Bhuyan BB0026* (BUBH).

### Notes

*O. fasciculata* was mentioned in the flora of Assam (15) without description and the author refers Flora of British India Vol. III (1882) for description. In the flora of British India by Hooker (14) mentioned *O. fasciculata* from Khasia, Sikkim and Bhutan. However, it is to be mentioned that the Khasi hills was once in the integral part of erstwhile Assam. On scrutiny of revision work on genus *Ophiorrhiza* L. Rubiaceae in Indian subcontinent by Deb and Mondal (10) mentioned the distributional record of *O. fasciculata* from different states but not from Assam. Barooah and Ahmed 2014, do not include *O. fasciculata* in their book (17).

### Acknowledgements

The first author is grateful to Assam Biodiversity Board and Principal Chief Conservator of forest for granting permission to survey in forest of Assam. The first author would like to thank Mr. Sanswring Basumatary for his help and suggestions.

### Authors contributions

SB and BB prepared the manuscript for correspondence in the journal. BB had collected and identified the plant species. All the authors read and approved the manuscript.

### Compliance with ethical standards

**Conflict of interest:** The authors have no competing interest.

**Ethical issues:** None.

### References

- Schanzer IA. Three new species of *Ophiorrhiza* (Rubiaceae- Ophiorrhizeae) from Thailand. Thai Forest Bulletin. 2005; 33:161-70.
- Darwin SP. The Pacific species of *Ophiorrhiza* L. (Rubiaceae). *Lyonia*. 1976; 1: 48-101.
- Chen T, Taylor CM. *Ophiorrhiza*. – In: Wu, ZY. and Raven, PH. (eds), Flora of China, Vol. 19. Science Press: Missouri Botanical Garden Press. 2011.
- Lorence A, Nessler CL. Camptothecin, over four decades of surprising findings. *Phytochemistry*. 2004;65: 2735-49. <https://doi.org/10.1016/j.phytochem.2004.09.001>
- Taher M, Shari SS, Susanti D, Arbain D, Zakaria ZA. Genus *Ophiorrhiza*: A review of its distribution, traditional uses, phytochemistry, biological activities and propagation. *Molecules*. 2020;25 (11):2611. <https://doi.org/10.3390/molecules25112611>
- WCSPF 2017. World checklist of selected plant families. – R. Bot. Gard. Kew.
- Hareesh VS, Salish MJ, Wu L, Joseph G, Sabu M. *Ophiorrhiza jacobii* (Rubiaceae) sp. nov. from Western Ghats, India. *Nordic Journal of Botany*. 2017;1-3. <https://doi.org/10.1111/njb.01519>
- Wu L, Tan Y, Hareesh VS, Liu QR. *Ophiorrhiza macrocarpa* (Rubiaceae), a new viviparous species from Yunnan, south western China. *Nordic Journal of Botany*. 2018;36:1-5. <https://doi.org/10.1111/njb.01637>
- Yang CD, He XZ, Gou GQ. *Ophiorrhiza guizhouensis* (Rubiaceae), a new species from Guizhou Province, south western China. *Phytokeys*. 2018;95:121-26. <https://doi.org/10.3897/phytokeys.95.22506>
- Deb DB, Mondal DC. Taxonomic revision of the genus *Ophiorrhiza* L. (Rubiaceae) in Indian subcontinent. *Bulletin of the Botanical Survey of India*. 1997;39:1-148. <https://doi.org/10.20324/nelumbo/v39/1997/74298>
- Bhuyan B, Baruah S, Mehmud S. *Ophiorrhiza recurvipetala* (Rubiaceae) sp. nov. from Assam, India. *Nordic Journal of Botany*. 2021;39(3). <https://doi.org/10.1111/njb.03048>
- Hareesh VS, Lie W, Joe A, Sabu M. *Ophiorrhiza meghalayensis* (Rubiaceae: Ophiorrhizeae), a new species from Meghalaya, North-East India. *Phytotaxa*. 2017;307(4):297-300. <https://doi.org/10.11646/phytotaxa.307.4.8>
- Hareesh VS, Joe A, Sabu M. *Ophiorrhiza debiana* (Rubiaceae, Rubioideae), a new species from North-East India. *Phytotaxa*. 2017;309(3):291-94. <https://doi.org/10.11646/phytotaxa.309.3.13>

14. Hooker JD. Flora of British India Vol.3. L. Reeve and Co., 5 Henrietta Street, Convent Garden, London. 1880; p. 77-84.
15. Kanjilal UN, Kanjilal PC, Das A, De RN. Flora of Assam. Vol. 3. Assam Govt. Press. Shillong. 1939; p. 42-43.
16. Akhilesh SVN, Gangaprasad A, Rameshkumar KB. Rediscovery and lectotypification of *Ophiorrhiza brunonis* var. *johnsonii* (Rubiaceae)- an endemic variety of the southern Western Ghats, India. 2021;31(4):307-10. <https://dx.doi.org/10.22244/rheedea.2021.31.04.08>
17. Barooah C, Ahmed I. Plant diversity of Assam: A checklist of Angiosperm and Gymnosperms. Assam science and Technology and Environmental Council, Assam. 2014.
18. Thiers B. Index Herbarium: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. 2018.

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