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Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

NOTE

OCCURRENCE OF VIVIPARY IN *OPHIORRHIZA RUGOSA* WALL. (RUBIACEAE)

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26 July 2021 | Vol. 13 | No. 8 | Pages: 19189–19190

DOI: 10.11609/jott.6218.13.8.19189-19190



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Occurrence of vivipary in *Ophiorrhiza rugosa* Wall. (Rubiaceae)

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Ophiorrhiza rugosa Wall. (Family Rubiaceae), a highly valuable medicinal herb and a potential source of Camptothecin (CPT) used as an anticancer alkaloid producing plant (Gharpure et al. 2010). There are many natural varieties of *O. rugosa* Wall., which are now considered as strong candidates for the CPT (Hsiang et al. 1985; Vineesh et al. 2007).

Vivipary is the process by which seeds germinate within the fruits followed by embryo development before the seeds are dispersed from the parent plant. Vivipary has been considered as a precocious germination, relatively unusual phenomenon in angiosperms (Farnsworth 2000).

Here, we report an unusual occurrence of the viviparous germination of seeds of *Ophiorrhiza rugosa* in the wild. This rare phenomenon was observed during the field visit to Karbi Anglong District, Assam in the last week of May 2019. The sites were located in 25.954°N and 92.603°E, at 128m. The rainy season in this area is with 90% of the rainfall during April–June (60–70 days). On an average, the area receives 1,400–2,000 mm of rainfall; and the soil is clayey loam.

The authors observed an occurrence of the true viviparous germination in the plant growing on hill slopes (Image 1). The plant is fully grown and contains the mature capsules. The capsules of the plant contain

two halves and the seedlings were growing within the halves. The germination of seeds was epigeal and one capsule contains an average of 4–5 seedlings (Image 2D). Of the total seeds in a capsule, 75% showed viviparous germination. The species which show viviparous germination were collected during a period of almost continuous rainfall in the region. The location of plant was along the sloppy mountain where splash water could easily accommodate the capsule which might be triggered the germination inside the capsule. We presume that due to continuous precipitation and splashing of water from the stream resulting in inducing vivipary in the species. It has been suggested that vivipary is a specialized feature of evolutionary and biological importance that ensures survival of plant (Cota-Sanchez 2004). The results may be useful in large-scale propagation to meet increasing CPT demand and conservation of this valuable medicinal herb.

References

- Cota-Sanchez, J.H. (2004). Vivipary in the Cactaceae: Its taxonomic occurrence and biological significance. *Flora - Morphology Distribution Functional Ecology of Plants* 199(6): 481–490. <https://doi.org/10.1078/0367-2530-00175>
- Farnsworth, E. (2000). Ecology and Physiology of Viviparous and Recalcitrant Seeds. *Annual Review of Ecology and Systematics* 31: 107–138. <https://doi.org/10.1146/annurev.ecolsys.31.1.107>

Editor: V. Sampath Kumar, Botanical Survey of India, Coimbatore, India.

Date of publication: 26 July 2021 (online & print)

Citation: Bhuyan, B. & S. Baruah (2021). Occurrence of vivipary in *Ophiorrhiza rugosa* Wall. (Rubiaceae). *Journal of Threatened Taxa* 13(8): 19189–19190. <https://doi.org/10.11609/jott.6218.13.8.19189-19190>

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Funding: Self-funded.

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors gratefully acknowledge the Assam State Biodiversity Board for granting permission to explore the study area. The first author is indebted to Selim Mehmud, Department of Botany, Cotton University and Kensing Tisso, Karbi Anglong, Assam for their support during the field visit.





Image 1. The collection site of the plant.

Gharpure, G., B. Chavan, U. Lele, A. Hastak, A. Bhawe, N. Malpure, R. Vasudeva & A. Patwardhan (2010). Camptothecin accumulation in *Ophiorrhizarugosa* var. *prostrata* from northern Western Ghats. *Current Science* 98(3): 302–304.

Hsiang, Y.H., R. Hertzberg, S. Hecht & L.F. Liu (1985). Camptothecin induces protein-linked DNA breaks via mammalian DNA topoisomerase I. *Journal of Biological Chemistry* 260(27): 14873–14878.

Vineesh, V.R., P.V. Fijesh, C.J. Louis, V.K. Jaimsha & J. Padikkala (2007). In vitro production of camptothecin (an anticancer drug) through albino plants of *Ophiorrhizarugosa* var. *decumbens*. *Current Science* 92(9): 1216–1218.

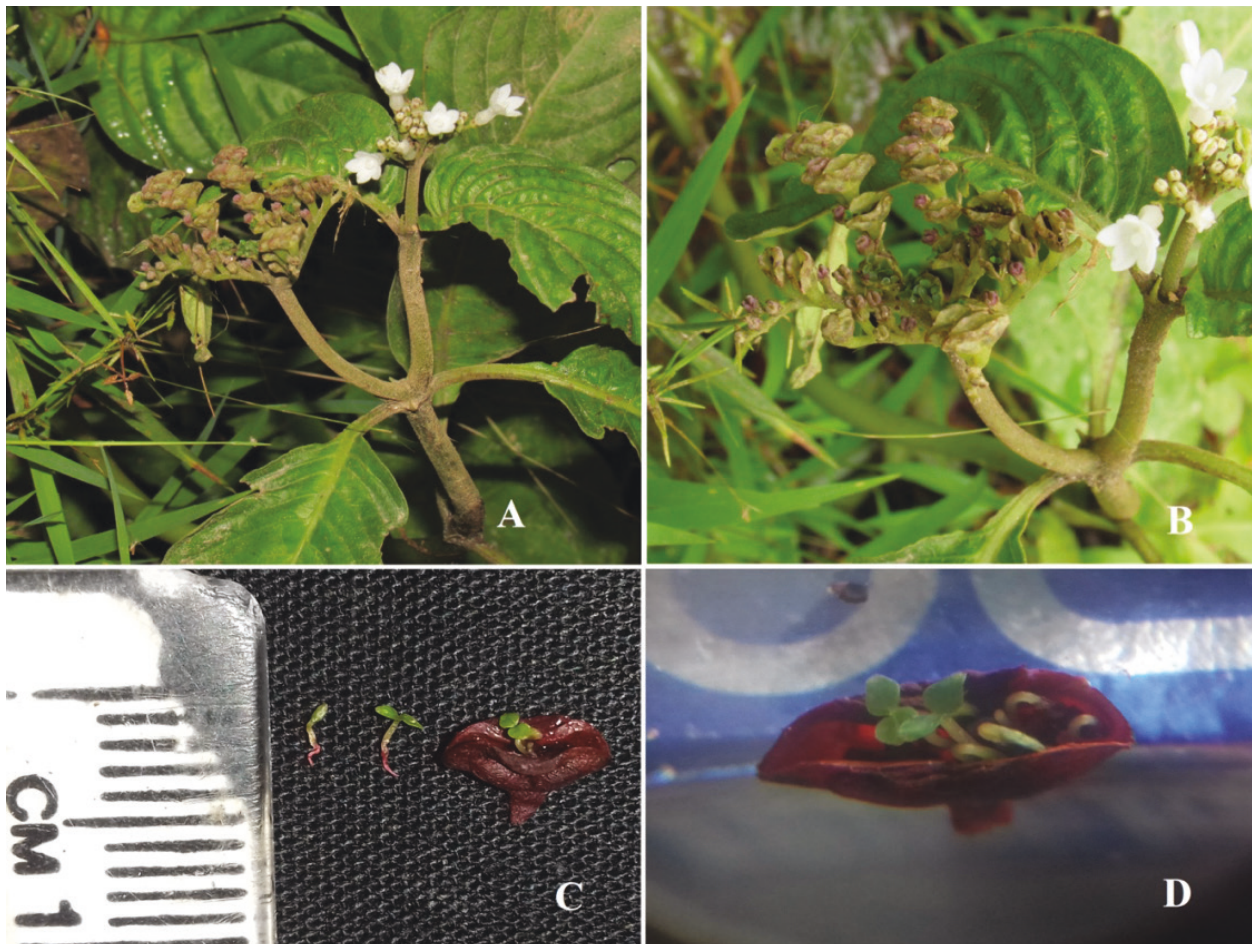


Image 2. Viviparous germination in *Ophiorrhiza rugosa* Wall: A—plant with inflorescence | B—fruits with viviparous germination | C—viviparous seedlings | D—viviparous seedlings arising from single capsule. © Birina Bhuyan.



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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

July 2021 | Vol. 13 | No. 8 | Pages: 18959–19190

Date of Publication: 26 July 2021 (Online & Print)

DOI: 10.11609/jott.2021.13.8.18959-19190

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