



## *Ophiorrhiza sahyadriensis* (Rubiaceae), a new species from southern Western Ghats, Kerala, India

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### Abstract

A new species of *Ophiorrhiza* (Rubiaceae) is described from southern Western Ghats, Kerala, India. The new species, *Ophiorrhiza sahyadriensis*, is similar to *Ophiorrhiza brunonis*, an endangered species endemic to Western Ghats, to which is compared. Detailed description, distribution, ecology, phenology and relevant taxonomic notes are provided along with colour photographs and illustrations.

**Key words:** Endemic species, Evergreen forest, Muthikulam, Palakkad, Silent Valley National Park

### Introduction

The genus *Ophiorrhiza* Linnaeus (1753: 150) (Rubiaceae) comprises between 150 (Mabberley 2008) and 307 species and 15 uncertain names according to the Plant List (2013), distributed in wet tropical forests of South-East Asia and extends from Sri Lanka and eastern India to China, Formosa, Japan, Micronesia and southeast through Malesia and Fiji to the Society Islands (Darwin 1976). It is a notably species-rich, taxonomically complicated genus (Darwin 1976) that has been little-studied by taxonomists and is poorly known, particularly in southeast Asia (Tao & Taylor, 2011). Although several taxonomic treatments of the genus were published for geographical areas, viz. Pacific, Chinese, Australian and Indian regions (Darwin 1976, Lo 1990, Halford 1991, Deb & Mondal 1997, Tao & Taylor 2011), a worldwide monographic study has yet to be attempted. In India, 47 species are recorded (Deb & Mondal 1997). Peninsular India, especially the Western Ghats, is one of the diversity centers of *Ophiorrhiza* species followed by the north-eastern Himalayas (Deb & Mondal 1997). Nearly 21 taxa are distributed in the evergreen forest of the Western Ghats (Deb & Mondal 1997, Sasidharan 2013). Among these, 18 taxa were reported from Kerala state, and 12 are endemic to Western Ghats (Sasidharan 2013). Some species of *Ophiorrhiza* are reported to possess medicinal properties both in traditional and conventional medicine, e.g., *O. mungos* Linnaeus (1753: 150) and *O. pumilla* Champion ex Benth (1852: 169) (Saito *et al.* 2001, Krishnakumar *et al.* 2012). *Ophiorrhiza incarnata* Fischer (1938: 124) is the only species introduced in the gardens of India (Deb & Mondal 1997) for its ornamental value. While conducting floristic explorations in the Western Ghats, in 2011 the authors came across an interesting *Ophiorrhiza* species in Walakkad, Silent Valley National Park, Palakkad district, Kerala. The Palakkad district is located at the southernmost end of Nilgiri phytogeographical region and northern portion of Anamalais of the Western Ghats, known for its phytodiversity. Later, similar specimens were also collected from the evergreen forests of Sispara, Anguinda (Silent Valley National Park), Muthikulam falls and the western slopes of Velliangiri hills (Muthikkulam) during 2011–2014. Detailed taxonomic studies with the perusal of relevant literature (Darwin 1976, Lo 1990, Halford 1991, Manilal 1988, Deb & Mondal 1997), the new taxon is similar to *Ophiorrhiza brunonis* Wight & Arnott (1834: 404), but shows numerous morphological differences, which are summarized in Table 1. Therefore, after comparing the recent collections with several specimens and the type of *O. brunonis* at K, the new species is here described and illustrated.

Gamble (1919: 227), *Ophiorrhiza hirsutula* Wight ex J. D. Hooker (1880: 81), *Palaquium ellipticum* (Dalzell 1851: 36) Baillon (1884: 1500), *Plectranthus malabaricus* (Bentham 1830: 16) R. H. Willemse (1979: 509), *Schumannianthus virgatus* (Roxburgh 1810: 324) Suksathan & Borchs (2009: 393), *Sarcandra chloranthoides* Gardner (1846: 348) and *Vateria macrocarpa* Gupta (1929: 231)

**Conservation status:**—Known from only four localities and with an extent of occurrence estimated to be less than 100 km<sup>2</sup>. So far, in these localities we encountered populations of approximately 100 individuals. Therefore, the status is here assessed as Data Deficient (DD), and more field studies are necessary to assess its conservation status (IUCN 2012).

**Additional specimens examined (paratypes):**—INDIA. Kerala: Palakkad district, Silent Valley, Sispara, 2150 m, 25 July 2012, *V.S. Hareesh & V.B. Sreekumar* 28525 (KFRI); Walakkad, 1100 m, 1 November 2013, *V.S. Hareesh & V.B. Sreekumar* 28850 (KFRI); Muthikulam falls, 1350 m, 23 November 2013, *V.S. Hareesh & K. M. Prabhu Kumar* 28851 (KFRI); Muthikulam falls, 1350 m, 23 November 2013, *K. M. Prabhu Kumar & V. S. Hareesh* 7772 (CMPR).

## Acknowledgments

The authors are grateful to the Director, KFRI for providing all the facilities and the Kerala State Council for Science, Technology and Environment for the financial assistance. We are extremely thankful to Dr. N. Sasidharan (KFRI) for his valuable comments on the identity of the new taxon. Thanks are also due to the staff of Kew Botanic Gardens for sending the type specimens on loan, and two anonymous reviewers for their positive suggestions. We express our sincere thanks to Mr. Sabik, Mr. Sukumaran, Mr. Prajeesh, Mr. Dennis Joseph and Mr. Herald Wilson for their assistance in the field.

## References

- Arnott, G.A.W. (1839) Description of some new or rare Indian plants. *Annals of Natural History* 3: 20–23.  
<http://dx.doi.org/10.1080/03745483909443191>
- Baillon, H.E. (1884) *Traité de Botanique Médicale Phanérogamique*, vol. 2. Hachette, Paris, pp. 721–1500.
- Bentham, G. (1830) *Ophiorrhiza*. Synopsis of the genera and species of Indian Labiatae enumerated in the catalogue of the collection. In: Wallich, N. (Ed.) *Plantae Asiaticae rariores*, vol. 2. Treuttel & Wurtz, London, pp. 12–19.
- Bhat, K.G. (1988) Studies on Zingiberaceae of Karnataka: A new species and a new record for India. *Indian Journal of Forestry* 11: 322–326
- Champion, J.G. (1852) *Ophiorrhiza*. Florula Hong Kongensis: an enumeration of the plants collected in the islands of Hong Kong. In: Bentham, G. (Ed.) The determination raised and the new species described. *Hooker's Journal of Botany and Kew Garden Miscellany* 4: 164–172.
- Dalzell, N.A. (1851) Contributions to the botany of western India. *Hooker's Journal of Botany and Kew Garden Miscellany* 3: 31–40.
- Darwin, S.P. (1976) The Pacific species of *Ophiorrhiza* L. (Rubiaceae). *Lyonia* 1: 48–101.
- Deb, D.B. & Mondal, D.C. (1997) Taxonomic revision of the genus *Ophiorrhiza* L. (Rubiaceae) in Indian subcontinent. *Bulletin of Botanical Survey of India* 39: 1–148.
- Fischer, C.E.C. (1938) New or little-known plants from southern India. *Bulletin of Miscellaneous Information Kew* 3: 123–127.
- Gamble, J.S. (1919) Decades Kewenses: Regi conservatarum XCII & XCIII. *Bulletin of Miscellaneous information Kew* 5: 221–231.
- Gardner, G. (1846) Contribution towards a flora of Ceylon. *Calcutta Journal of Natural History, and Miscellany of the Arts and Sciences in India* 6: 343–352.
- Gupta, B.L. (1929) A new species of *Vateria*. *Indian Forester* 55: 231–232
- Halford, D.A. (1991) The genus *Ophiorrhiza* L. (Rubiaceae) in Australia. *Austrobaileya* 3: 369–375.
- IUCN (2012) *IUCN Red List Categories and Criteria: Version 3.1*. Second Edition. International Union for Conservation of Nature and Natural Resources. Gland, Switzerland and Cambridge, UK, pp. 1–32
- Linnaeus, C. (1753) *Species Plantarum*, Salvius, Stockholm, 150 pp.
- Lo, H.S. (1990) Taxonomic revision of the Chinese species of *Ophiorrhiza* (Rubiaceae). *Bulletin of Botanical Research* 10: 1–82.
- Krishnakumar, G, Rameshkumar, K.B., Priya, S., Satheeshkumar, K. & Krishnan P.N. (2012) Estimation of camptothecin and

- pharmacological evaluation of *Ophiorrhiza prostrata* D. Don and *Ophiorrhiza mungos* L. *Asian Pacific Journal of Tropical Biomedicine* 2: 727–731.  
[http://dx.doi.org/10.1016/S2221-1691\(12\)60304-9](http://dx.doi.org/10.1016/S2221-1691(12)60304-9)
- Mabberley, D.J. (2008) *Mabberley's Plant-Book: A Portable Dictionary of Plants, Their Classification and Uses Utilizing Kubitzki's The Families and Genera of Vascular Plants (1990-onwards) and Current Botanical Literature; Arranged According to The Principles of Molecular Systematics* (Third Edition). Cambridge University Press, Cambridge, UK, 603 pp.
- Manilal, K.S. (1988) *Flora of Silent Valley Tropical Rain Forests of India*. The Mathrubhumi Press, Calicut, pp. 139–140.
- Plant List (2013) The PlantList - working list of all plant species, Version 1.1 September 2013. Available from <http://www.theplantlist.org/browse/A/Rubiaceae/Ophiorrhiza/> (accessed 26 January 2015).
- Robyns, A. (1970) Revision of the genus *Cullenia* Wight (Bombacaceae-Durioneae). *Bulletin of Jardin Botanique National de Belgique* 40: 241–254.  
<http://dx.doi.org/10.2307/3667646>
- Roxburgh, E. (1810) *Descriptions of several of the monandrous plants of India, belonging to the natural order-called Scitaminae by Linnaeus, Cannae by Jussieu & Drimyrhizae by Ventenat. Asiatick Researches* 11: 318–362.
- Saito, K., Sudo, H., Yamazaki, M., Koseki Nakamura, M., Kitajima, M., Takayama, H. & Aimi, N. (2001) Feasible production of camptothecin by hairy root culture of *Ophiorrhiza pumilla*. *Plant Cell Reports* 20: 267–271  
<http://dx.doi.org/10.1007/s002990100320>
- Sasidharan, N. (2013) *Flowering plants of Kerala: CD-ROM ver 2.0*. Kerala Forest Research Institute, Peechi.
- Suksathan, P., Gustapsson, M.H. & Borchs, F. (2009) Phylogeny and generic delimitation of Asian Marantaceae. *Botanical Journal of the Linnean Society* 159: 381–395.  
<http://dx.doi.org/10.1111/j.1095-8339.2009.00949.x>
- Tao, C. & Taylor, C.M. (2011) *Ophiorrhiza*. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (Eds.) *Flora of China* 19. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, pp. 258–282.
- Wight, R. (1840) *Illustrations of Indian Botany* vol.1. J.B. Pharoah, Madras, 160 pp.
- Wight, R. & Arnott, G.A.W. (1834) *Prodromus Florae Peninsulae Indiae Orientalis*, vol. 1. Parbury, Allen & Co., London, xxxvii + 404 pp.
- Willemse, R.H. (1979) New combinations and a new name for Sri Lankan *Coleus* species (Labiatae). *Blumea* 25: 507–511.