

Rediscovery of *Zeuxine rolfiana*, a ‘Critically Endangered’ endemic Indian orchid from Andaman and Nicobar Islands, with a note on its typification

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Zeuxine rolfiana, an endemic Indian orchid is recollected after 121 years of its type-collection and assessed as ‘Critically Endangered’ in the present paper. A detailed description and photo plates (the first published illustration of the species) are provided to facilitate easy identification. A lectotype is also designated here for the name *Z. rolfiana*.

Introduction

Zeuxine, belonging to the subtribe Goodyerinae (tribe Cranichideae, subfamily Orchidoideae; Pridgeon *et al.* 2003), comprises ca. 80 species (Chen *et al.* 2009) and is distributed from tropical Africa to central Asia and the islands of the West Pacific. Bhattacharjee and Chowdhery (2012) mentioned 18 species of *Zeuxine* in India and Misra (2012) further described one more species from the country. During a floristic survey on South Andaman Islands in September 2010, two of the authors (MM and SN) collected an interesting, non-flowering specimen of *Zeuxine*. It was brought to Kerala and planted in the Botanical Garden of St. Joseph's College, Kozhikode. The plant flowered in 2011 and after examination it was identified as *Z. rolfiana*, an orchid endemic to India and so far reported only from the Andaman Islands. The species was known from the

type collection only, and therefore this rediscovery after 121 years in South Andaman is significant. *Zeuxine rolfiana* (Fig. 1) is very similar to *Z. nervosa* but differs in floral details. The main characters of *Z. rolfiana* are its long peduncle, a short rachis with laxly arranged, straight flowers, a saccate labellum hypochile with three short retroflexed, cylindrical and pointed appendages on either side (sometimes they appear as a single trifid appendage), an oblong, divergent and erose labellum-epichile, and a column with two vertical plates nearly touching at their margins, with another smaller pair situated obliquely at their bases.

Note on typification

Zeuxine rolfiana was originally described by King and Pantling (1897) based on speci-

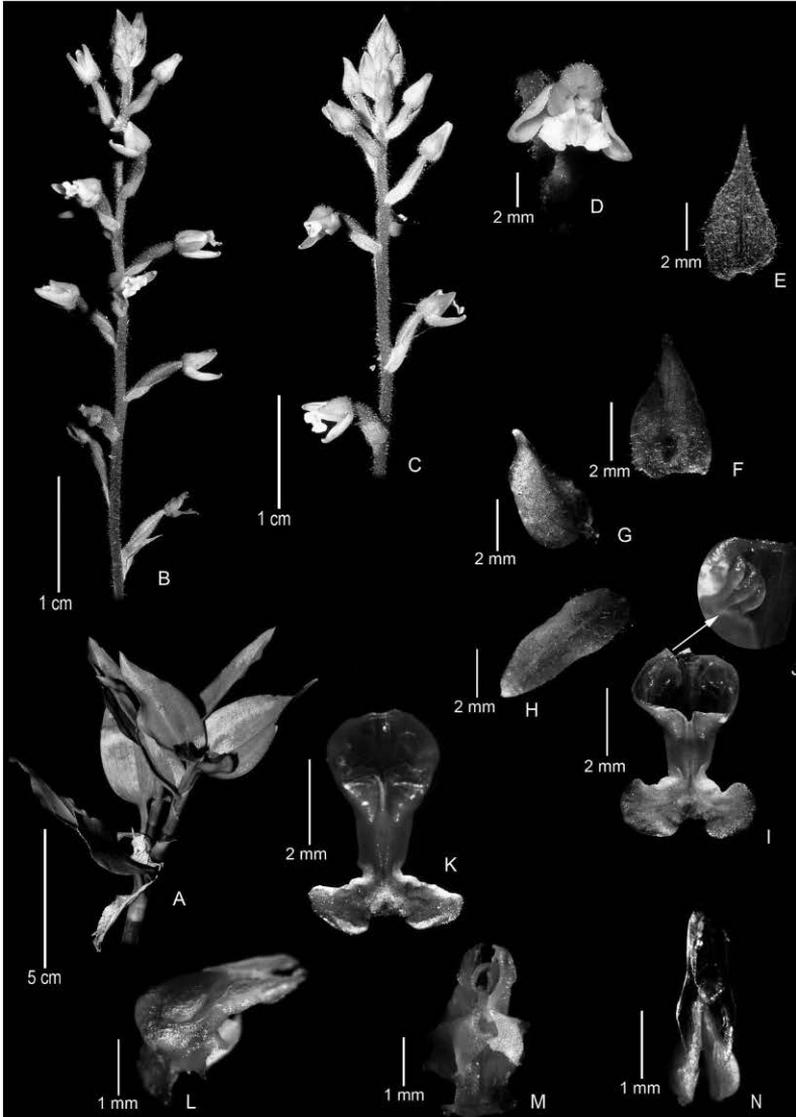


Fig. 1. *Zeuxine rolfiana* (from Manudev K.M. & Santhosh Nampy 135327, CALI). — **A**: Portion of stem with leaves. — **B** and **C**: Inflorescence. — **D**: Flower. — **E**: Bract. — **F**: Dorsal sepal. — **G**: Petal. — **H**: Lateral sepal. — **I**: Labellum. — **J**: Close-up of hypochile. — **K**: Labellum of another flower. — **L**: Column (lateral view) with pollinarium. — **M**: Column (front view). — **N**: Pollinarium.

mens collected by Sir George King from the Dhanikhari Hills of South Andamans. They had been preserved at CAL (Acc. No. 459475, 459476) and none of them was specifically designated as the holotype. No other ‘original material’ is available in any other herbarium where King and Pantling’s specimens are deposited. During a revisionary study of the subtribe Goodyerinae for “Flora of India” one of us (AB) had the opportunity to study King’s above-cited material (Fig. 2). A detailed study of these types, including hand-written notes and pencil-sketches (on the sheet) by Robert Pantling, indicated that

King and Pantling (1897) described *Z. rolfiana* mainly based on ‘King s.n.’, which is CAL Acc. No. 459475, here designated as the lectotype (Fig. 2A) (McNeill *et al.* 2012: Art. 9.2).

Taxonomic treatment

Zeuxine rolfiana King & Pantl. (Figs. 1 and 2)

J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 599. 1897. —
 TYPES: S. Andamans, Dhani Khari jungle hill, 7 March 1891,

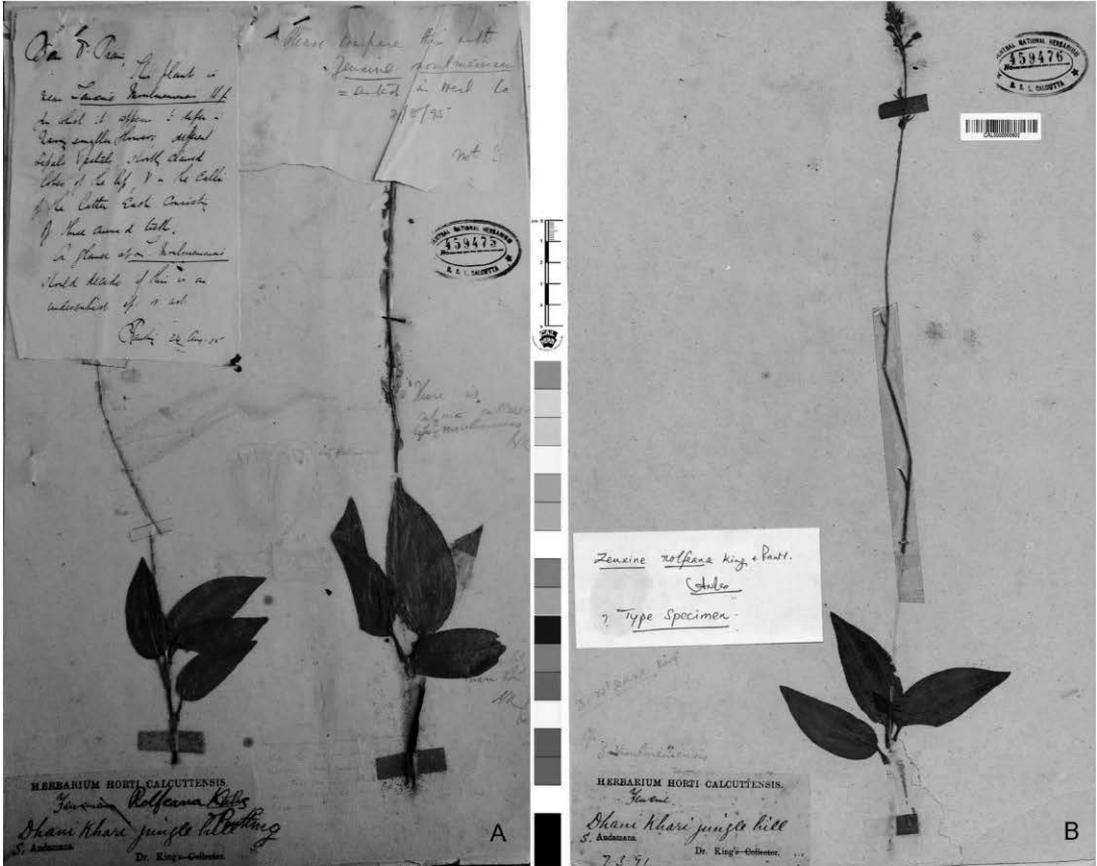


Fig. 2. *Zeuxine rolfiana*. — A: Lectotype (CAL 459475). — B: Isolectotype (CAL 459476). With permission of Central National Herbarium, Botanical Survey of India, Howrah.

Dr. King s.n. (lectotype, designated here: CAL 459475, photo!; isolectotype: CAL 459476!).

ETYMOLOGY: The species was named after Robert Allen Rolfe (1855–1921), a British botanist and the first Curator of the Orchid Herbarium at the Royal Botanic Gardens, Kew.

Terrestrial herbs, 30–50 cm tall. Rhizome 5–10 cm long, 2–5 mm thick, terete, creeping, rooting at nodes. Roots 1–4 cm long, fleshy, with minute root hairs. Stems 5–8 cm long, 2–4 mm thick, erect, unbranched, glabrous, with a few membranous sheaths formed by withered leaf-bases. Leaves 3 or 4, 2.2–7.5 cm long, crowded near stem-apex, glabrous; petiole 0.6–1.6 cm long, sheathing at base; lamina 1.6–6.3 × 0.9–2.7 cm, obliquely lanceolate to ovate-lanceolate, obtuse at base, subacute to acute at apex, 3-veined. Inflorescence a terminal raceme, subdensely many-flowered, pubescent; peduncle up to 28 cm long, with 2–4 sheathing bracts; sheath-

ing bracts 0.8–1.2 cm long, ovate-lanceolate, acuminate at apex, clasping, pubescent; rachis up to 6 cm long, sometimes curved near apex; floral bracts 5–9 × 2–3 mm, lanceolate, acuminate at apex, usually as long as pedicel plus ovary, pubescent, 1-veined. Flowers 0.7–1 cm long, erect, resupinate. Sepals free, pubescent; dorsal sepal 3.2–4.7 × 1.6–2 mm, ovate-elliptic to subtriangular, subacute at apex, adnate to petals to form a hood around column; lateral sepals 3–5 × 1.5–1.8 mm, ovate-lanceolate, subacute at apex. Petals 3–4.5 × 1.3–2 mm (at widest portion), broadly triangular-falcate, acute at apex, glabrous, 1-veined. Labellum 4–5.5 mm long, longer than sepals and petals, smooth in living state, wrinkled and rough in dry state; hypochile 1.3–1.8 × 1.3–2 mm, cymbiformly saccate, with three short retroflexed cylindrical pointed appendages on either side (sometimes appearing

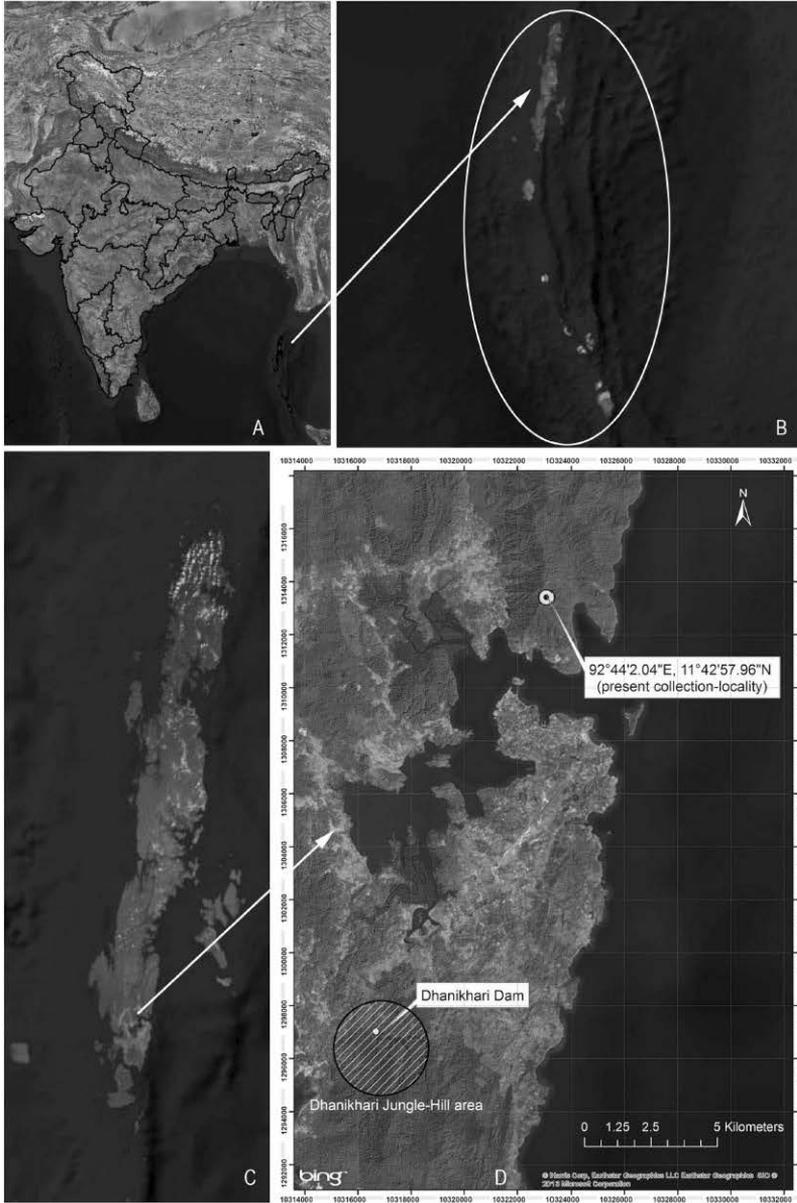


Fig. 3. Map. — **A:** India. — **B:** Andaman and Nicobar Islands. — **C:** Andaman Islands. — **D:** The distribution (probable type locality and location of the present collection) of *Zeuxine rolifiana*.

as a single trifold appendage); mesochile 0.6–1 × 1–1.3 mm, oblong, margin incurved; epichile bilobed, lobules 2–3 × 1.2–1.8 mm, oblong, divergent, subtruncate to rounded at apex, erose. Column 1–1.5 mm long, with two vertical plates nearly touching by their margins and another smaller pair situated obliquely at their bases. Stigma 2-lobed, elliptic, somewhat oblique. Anther ca. 2.5 × 1.5 mm. Pollinarium ca. 2.3 mm long; pollinia 2, obclavate-oblong, sectile, bifid,

attached to semi-transparent tegula by very short caudicles; viscidium elliptic. Ovary including pedicel 5–8 × 2–3 mm, elliptic-oblong, twisted, pubescent. Flowering and fruiting March–April.

HABITAT AND DISTRIBUTION: The species grows in humus in the shade of trees in dense forest at ca. 300 m a.s.l., and is endemic to the Andaman and Nicobar Islands (Fig. 3).

ADDITIONAL SPECIMEN EXAMINED: **India.** Andaman and Nicobar Islands, South Andaman, Mount Harriet, way to

Kalapatthar, 5 Oct. 2010 (flowered on 07 March 2011 at St. Joseph's College, Kozhikode), K.M. Manudev & Santhosh Nampy 135327 (CALI).

Conservation status

Walter and Gillett (1998) treated *Z. rolfiana* as an indeterminate (I) species. The species was not re-found earlier in its type locality (Dhanikhari, South Andaman) or any other locality during several field surveys undertaken by the researchers of several Indian institutions or universities as parts of their floristic or revisionary studies. *Zeuxine rolfiana* was also not recorded in the list of plants conserved at the Experimental Garden of Botanical Survey of India at Dhanikhari where several rare, endangered, threatened and endemic plants, including orchids, had been conserved (Srivastava & Rao 2001).

We found the species on Mount Harriet, on the way to Kalapatthar (Fig. 3). There were 18 sterile plants growing in a single patch and we collected three specimens, which flowered at the Botanical Garden of St. Joseph's College, Kozhikode, in March 2011. Based on 'Extent of Occurrence' Criterion B1: EOO < 100 km²) and 'Area of Occupancy' (Criterion B2: AOO < 10 km²) together with the number of locations = 1 (subcriterion 'a'), and projected decline in area, extent and/or quality of habitat (subcriterion 'b (iii)'), *Z. rolfiana* is assessed here as 'Critically Endangered [CR B1 B2 a, b(iii)]' according to IUCN's guidelines (IUCN SPS 2013). The species is in great danger of extinction due to several anthropogenic activities in South Andaman, such as construction of the Great Andaman Trunk Road, roads connecting the Dhanikhari Dam, the rapid increase of immigration from the beginning of the 20th century, encroachment of forests for development and rehabilitation, conversion of forest areas into agricultural lands, promotion of tourism, and so on. Trampling by wild animals is a further threat. We tried our best to conserve the species at the Botanical Garden of St. Joseph's College, Kozhikode and a few plants flowered in March 2012, but finally did not survive after flowering. It is high time to take initiative to conserve the remaining individuals and to increase conservation by *ex-situ* methods.

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References

- Bhattacharjee A. & Chowdhery H.J. 2012: On the status of two Indian species of *Zeuxine* (Orchidaceae). — *Kew Bulletin* 67: 97–102.
- Chen X., Gale S.W., Cribb P.J. & Ormerod P. 2009: *Zeuxine* Lindl. — In: Wu Z.Y., Raven P.H. & Hong D.Y. (eds.), *Flora of China*, vol. 25 (Orchidaceae): 71–76. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis.
- IUCN Standards and Petitions Subcommittee (IUCN-SPS) 2013: *Guidelines for Using the IUCN Red List Categories and Criteria*, ver. 10. — Available at <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- King G. & Pantling R. 1897: New Indo-Malayan Orchids. — *Journal of the Asiatic Society of Bengal, Part 2, Natural History* 66: 578–605.
- McNeill J., Barrie F.R., Buck W.R., Demoulin V., Greuter W., Hawksworth D.L., Herendeen P., Knapp S., Marhold K., Prado J., Prud'homme Van Reine W.F., Smith G.F., Wiersema J.H. & Turland N.J. (eds.) 2012: International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. — *Regnum Vegetabile* 154: 1–208.
- Misra S. 2012: A new species of *Zeuxine* (Orchidaceae) from Rehana forest of Odisha, India. — *Nelumbo* 54: 17–19.
- Pridgeon A.M., Cribb P.J., Chase M.W. & Rasmussen F.N. 2003: *Genera Orchidacearum*, vol. 3: Orchidoideae (Part 2), Vanilloideae. — Oxford University Press, Oxford.
- Srivastava S.K. & Rao P.S.N. 2001: Flora of Dhanikhari Experimental Garden-cum-Arboretum, Port Blair, Andaman and Nicobar Islands. — *Bulletin of the Botanical Survey of India* 43: 1–82.
- Walter K.S. & Gillett H.J. (eds.) 1998: *1997 IUCN Red List of threatened plants*. — IUCN, Gland & Cambridge.