

Cylindrolobus gaoligongensis sp. nov. (Orchidaceae, Podochileae) from Yunnan, China, with additional description to *C.* *arunachalensis*

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January 30, 2024

Abstract

A new species of *Cylindrolobus* (Orchidaceae), *C. gaoligongensis* J. D. Ya & H. Jiang from Gongshan county, northwestern Yunnan, China, is described and illustrated. It is morphologically similar to *C. arunachalensis* (A. N. Rao) A. N. Rao, but can be distinguished from it by having 5 veined lateral sepals, orange to pink and triangular-ovate lip mid-lobe and apex mucronate, yellow to white long hairs on the lip, 2 central calli and connected to a keel toward mid-lobe in the disk, 3 rows of white long hairs in the base of the disk. Additionally, a detailed description and illustration of its close species, *C. arunachalensis*, is also provided.

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Keywords

Orchidaceae, *Cylindrolobus*, new species, taxonomy, southwest China.

Introduction

The genus *Cylindrolobus* Blume was first established in 1828. Lindley treated *Cylindrolobus* as a section of *Eria* Lindl. in 1859, this view was generally accepted by subsequent researchers until the rise of molecular

biology. Recent studies of Podochileae show *Eria* s.l. is polyphyletic that needs generic reorganization. Pridgeon et al. (2005) suggested that *Cylindrolobus* should be subsumed into *Callostylis* Blume but its taxonomic position was not supported in the later studies. *Cylindrolobus* was elevated to genus status in Flora of China (Chen et al. 2009). Ng et al. (2018) redefined the genus *Eria* s.l. by the phylogenetics analyses of *Eria* and its related genera, *Cylindrolobus* extracted as a distinct genus characterized by abbreviated inflorescences with one to several flowers, usually with conspicuous bracts that are normally greater in number than the flowers. In this study, we followed the latest delimitation of *Cylindrolobus*, which contains 79 accepted species and distributes from south China to tropical Asia. (POWO 2023).

The Gaoligong Mountain is a biodiversity hotspot that links three global biodiversity hotspots including the Himalayas, Indo-Burma and Mountains of Southwest China (John et al. 2011). It is famous for its rich biodiversity, complex ecosystems, and high concentration of endemic taxa (Li and Li 2020). The Gaoligong Mountain harbors one of the highest orchid diversities in China. There are more than 360 species of orchids in 98 genera distributed in this region, of which 86 species are endemic (Jin et al. 2009, Li and Li 2020). From 2022 to 2023, we contacted field orchid surveys in southwest China and found a little-known species of *Cylindrolobus* in Gaoligong Mountain, northwest Yunnan. After careful morphological investigation, we concluded that this species is new to science. Besides, we collected its close species, *C. arunachalensis* in Xizang and added detailed morphological description.

Materials and methods

Specimens and living plants of this new species and *Cylindrolobus arunachalensis* (A. N. Rao) A. N. Rao were collected from Gaoligong Mountain, northwest Yunnan, and Motuo, southeast Xizang respectively. Morphological characters of both orchid species were observed, measured and photographed based on their living individuals. All voucher specimens were deposited in the Herbaria of the Kunming Institute of Botany (KUN), Chinese Academy of Sciences (CAS), and the Yunnan Academy of Forestry and Grassland (YAF). The living plants were kept in the laboratory greenhouse of the Kunming Institute of Botany, CAS.

Taxonomic treatment

Cylindrolobus gaoligongensis J. D. Ya & H. Jiang sp. nov. (Fig.1) (高黎贡柱兰)

Diagnosis. *Cylindrolobus gaoligongensis* most similar to *C. arunachalensis* (A. N. Rao) A. N. Rao in floral morphology but can be distinguished from it by having 5 veined lateral sepals (vs. 7 veined), lip mid-lobe orange to pink, triangular-ovate and apex mucronate (vs. yellowish green reniform and apex emarginated), lip with yellow to white long hairs (vs. purple red glandular hairs), disk with 2 central calli and connected to a keel toward mid-lobe (vs. disk with 3 lamellae), the base of disk with 3 rows white long hairs (vs. lateral lamellae with purple red glandular hairs).

Type. CHINA. Yunnan: Nujiang prefecture, Gongshan county, Dulongjiang, alt. 1229 m, epiphytic on the tree trunks in the subtropical evergreen seasonal rainforest, 3 Mar. 2023, Ting Zhang et al. Mar 23CS24126 (holotype: KUN!).

Description

Epiphytic herb. Roots terete, slender, pubescent, ca. 0.5-1.0 mm thick. Rhizome inconspicuous. Stem clustered, terete, narrowly cylindric, thicker from base, 4-7-leaved apically, covered by close-fitting sheaths, 15-25 cm long, 0.5-1.2 cm thick. Leaves lanceolate, acuminate, 5-9 × 1.4-2.0 cm. Inflorescences axillary, pubescent, borne on near the apical of the stem, 3.0-5.5 cm long, 2 flowered; peduncle 1.3-1.8 cm long; floral bracts yellowish green to reddish brown, fleshy, ovate-oblong, mucronate, concave, sparsely brown tomentose both surface, ca. 1.5 × 0.9 mm. Flowers white, sepal externally with brown tomentum, lip mid-lobe and calli orange to pink, long hairs yellow to white; peduncle and ovary ca. 1.5-1.8 cm long, densely brown tomentum. Dorsal sepal oblong-lanceolate, subacute, 5 lateral sepals, ca. 1.7 × 0.5 cm; lateral sepals falcate-ovate, 5 veined, ca 1.4 × 0.8 cm, base oblique, abruptly contracted above middle, apex mucronate, mentum subglobose and obtuse; petals lanceolate, slightly oblique, acute, 3 veined, ca 1.7 × 0.8 cm; labellum obovate in outline, curved, ca. 0.6 × 0.5 cm, 3-lobed; lateral lobes suberect, oblong, ca. 0.6 × 0.3 cm, front margin

little glandular hairs gradually transition to densely long hairs 1-2 mm; mid-lobe small, triangular-ovate, ca. 1.5 x 0.8 mm, apex mucronate; disk with 2 central calli and connected to a keel toward mid-lobe, keel densely long hairs, 3 rows of long hairs from base of lip extend to base of calli. Column semiterete, ca. 0.6 cm long, ventrally narrow winged; foot U-bent, ca. 1.0 cm. Anther cap hemispherical, ca. 2.0 x 1.6 mm; pollinia 8, yellowish-white, compressed rectangular, posterior 4 smaller.

Phenology: Flowering from February to April.

Distribution and habitat: *Cylindrolobus gaoligongensis* currently known from the northern Gaoligong Mountain, northwest Yunnan. It is a predominantly epiphytic species that grows on tree trunks in the subtropical evergreen seasonal rainforest at elevations from 1100m to 1600m.

Etymology: The new species is named after its type locality, Gaoligong Mountain.

Additional specimens examined (paratypes):

CHINA. Yunnan: Nujiang Prefecture, Gongshan County, Dulongjiang, Kunzhongtu village, 27deg47'46.04"N, 98deg19'43.6" E, alt. 1417 m, growing on trees near the river, 13 Feb. 2023, H. Jiang and Q.-C. Liao, 12004 (KUN!, YAF!); Kunming, a voucher from cultivated plants at Kunming Institute of Botany, CAS, 17 Feb 2023, J.-D. Ya BC230203, originally collected in northwest Yunnan: Gongshan county, Dulongjiang, subtropical evergreen seasonal rain forest, alt. 1200 m.

Conservation status : *Cylindrolobus gaoligongensis* is distributed in the northern Gaoligong Mountain Nature Reserve. We found some populations with abundant individuals during our field expeditions. The new species is considered as Least Concern (LC) according to the IUCN Red List category (IUCN 2023).

Supplementary and revised descriptions of *Cylindrolobus arunachalensis*

Cylindrolobus arunachalensis (A. N. Rao) A. N. Rao in Bulletin of Arunachal Forest Research 26 (1&2): 82-110, 2010. - *Eria arunachalensis* Nageswara Rao in J. Econ. Tax. Bot. 21(3):711.1997. (Fig.2) (藏南柱兰)

Type: China, Xizang: Motuo, A. N. Rao 3018-A (orchid herbarium Tipi-Holotype); A. N. Rao 3018-B (CAL-paratype)

Description. Epiphytic herb. Roots terete, slender, pubescent, ca. 0.5-1.5 mm thick. Rhizome inconspicuous. Stem clustered, terete, slender, 2-5-leaved apically, covered by close-fitting sheaths, 15-35 cm long, 3.0-8.0 mm thick. Leaves lanceolate, acuminate, 6.0-12.0 x 1.5-3.5 cm. Inflorescences axillary, pubescent, borne on near the apical of the stem, 3.0-4.5 cm long, 2 flowered; peduncle 1.0-2.0 cm long; basal bracts 2, light brown, membranous, lanceolate, ca. 1.1 x 0.4 cm; floral bracts yellowish green, fleshy, ovate-oblong, 1.2-1.6 x 1.0-1.2 cm, acute, concave, base externally sparsely brown tomentose. Flowers white; peduncle and ovary ca. 1.0-1.7 cm long, densely brown tomentum. Sepal externally densely brown tomentum; dorsal sepal oblong-lanceolate, subacute, 5 veined, ca. 1.6 x 0.5 cm; lateral sepals falcate-ovate, acute, 7 veined, ca. 1.4 x 1.0 cm, base adnate to column foot form a subglobose and obtuse mentum; petals lanceolate, slightly oblique, acute, 3 veined, ca. 1.4 x 0.5 cm; labellum yellowish green, obovate in outline, ca. 1.0 x 0.7 cm, 3-lobed; lateral lobes suberect, subovate, ca. 0.6 x 0.3 cm, front margin densely purple red long glandular hairs, mid-lobe reniform, ca. 4.0 x 1.5 mm, apex emarginated, margin densely purple red long glandular hairs; disk with 3 lamellae, central lamellae extending to mid-lobe and densely yellow glandular hairs, lateral 2 reddish brown and running from the base of disk to central lamellae, densely purple red glandular hairs, thickened and glabrous in apical. Column semiterete, ca. 7.0 mm long, ventrally narrow winged; foot U-bent, ca. 1.0 cm. Anther cap hemispherical, ca. 1.6 x 1.6 mm, pollinia 8, yellowish-white, compressed rectangular, anterior ca. 0.8 x 0.7 mm, posterior 4 smaller. Fl. January-February.

Phenology: Flowering from January to February.

Additional specimen examined:

China. Xizang: Motuo, subtropical, evergreen broad-leaved forest, alt. 2000 m, 17 Jan. 2019, Ji-Dong Ya, Cheng Liu18HT2520.

Discussion

Cylindrolobus gaoligongensis shares the same habitat with the other two *Cylindrolobus* species, *C. motuoensis* and *C. glabriflorus*, in the northern Gaoligong Mountain, the two later species were newly described from Motuo, southeastern Xizang and the border region between China and Myanmar in 2019 (Ya et al. 2019). All three species have similar slender and terete stems that are difficult to identify without floral traits. To date, the genus *Cylindrolobus* consists of 9 species in the tropical and subtropical regions of southwest China (Rao 1997, Chen et al. 2009, Hu et al. 2010, Liu et al. 2013, Ya et al. 2019). The key to the Chinese species of *Cylindrolobus* is provided here.

Key to the Chinese species of *Cylindrolobus*

- 1 Stems stout, clavate.....2
- Stems slender, terete.....4
- 2 Lip yellow..... *C. cristatus*
- Lip lateral lobes with purple edges, mid-lobe with lighter purple edges and patch.....3
- 3 Inflorescence glabrous, the lateral lobes bigger than mid-lobe..... *C. clavicaulis*
- Inflorescence pubescent, the lateral lobes smaller than mid-lobe..... *C. marginatus*
- 4 Inflorescence glabrous.....5
- Inflorescence pubescent.....6
- 5 lip mid-lobe thickened and papillate on margin..... *C. tenuicaulis*
- lip mid-lobe not thickened and smoothly on margin..... *C. glabriflorus*
- 6 Flowers yellow..... *C. foetidus*
- Flowers white.....7
- 7 Lip oblong and front margin papillate..... *C. motuoensis*
- Lip obovate and front margin with long hairs or long glandular hairs.....8
- 8 lip mid-lobe triangular-ovate and apex mucronate..... *C. gaoligongensis*
- lip mid-lobe reniform and apex emarginated..... *C. arunachalensis*

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