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Taxonomic Notes on Genus *Eulophia* R. Brown (Orchidaceae) in Manas National Park, India

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Abstract

The present study records with the update documentation and description of the genus Eulophia in Manas National Park (MNP). A total of 8 species were recorded of which the *Eulophia mannii* is endemic to Assam and 2 species namely *Eulophia dabia* and *Eulophia obtusa* are critically endangered species.

Keywords: *Manas National Park; Diversity; Eulophia*

Introduction

The family Orchidaceae Juss. is one of the largest families of flowering plants. Globally, it comprises approximately 28,000 species across 693 genera (POWO, 2025). In India, orchids are represented by around 1,256 species under 155 genera, of which 388 species are endemic to the country (BSI, 2019). The state of Assam harbors about 477 orchid taxa, including 469 species, 3 subspecies, and 5 varieties, belonging to 107 genera (Hussain et al., 2021).

Among these, the genus *Eulophia* R. Brown (1821: 578) includes about 282 species worldwide (POWO, 2025), and is widely distributed across tropical and subtropical regions. It exhibits its highest diversity in Africa, and also occurs in North and South America, Madagascar, the Mascarene Islands, Central and tropical Asia, southwestern Pacific islands, as well as northern and northwestern Australia (Chen et al., 2009). In India, the genus is represented by 26 species (Misra, 2019); however, with the recent addition of *Eulophia siamensis* Rolfe ex Downie, *Eulophia promensis* Lindl., and *Eulophia hirsuta* Joseph & Vajravelu, the total number of species now increases to 29 species (Chowlu et al., 2020; Joseph, 2024; Pramod et al., 2025).

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Barooah and Ahmed (2014) documented 9 species of *Eulophia* from Assam, most of which are found within Manas National Park, a UNESCO World Heritage Site located in Assam. This national park falls within the Indo-Burma biodiversity hotspot and representing a rich and unique flora. However, its orchid diversity still remains underexplored. Among the diverse orchid genera existing in the park, the *Eulophia* R. Brown (1821: 578) shows a dominant genus among terrestrial orchids with low population, therefore it's necessary to document and conserved the species in natural habitat.

Martial and Method

Study area

Manas National Park is situated at the foothills of the Bhutan Himalayas in the Baksa and Chirang districts of Assam between 26°35'-26°50'N latitude and90°45'-91°15'E longitude. Geographically the national park occupies an area of 500 sq. km. with three ranges namely -the Western Range with Panbari, the Central Range with Bansbari, and the Eastern Range with Bhuyapara. The vegetation of the park includes of Brahmaputra Valley semi-evergreen forests ecoregion and the amalgamation of the Sub-Himalayan Bhabar Terai formation with riverine succession. Hence, the national park exhibits one of the richest biodiversity areas in the world. Therefore, it is necessary to document and updated recorded of the species.

Field survey and Identification

Floristic explorations focusing on the family *Orchidaceae* were conducted in three ranges of Manas National Park from 2023 to 2024. Field surveys were carried out across all seasons to ensure comprehensive documentation. The orchids specifically, the genus *Eulophia* were noted along with their morphological and distribution pattern, altitudes and geographical coordinates within the study aera. A total of 7 species were recorded; Out of this one species *Eulophia mannii is* endemic to Assam and another 2 species namely *Eulophia dabia* and *Eulophia obtusa* are critically endangered species. For identification of species morpho-taxonomic studies were done by dissecting the reproductive parts and examined under a microscope to study key morphological traits. Identification was facilitated using relevant taxonomic literature (Chowdhery, 1998, 2009; Barua, 2001; Luckson, 2007; Barooah and Ahmed, 2014; Rao and Singh, 2015; Borthakur et al, 2018; Baro et al, 2019) and by consulting the herbarium specimens de-posited in Herbarium of Botanical Survey of India, Shil-long (ASSAM). Previous records were reviewed to find out the occurrence and presence of the recorded species in the area. Conservation statuses of the taxa were determined using available literature (Barooah and Ahmed, 2014) and cross-referenced with IUCN Red List assessments.

Result

Taxonomic Enumeration

1. *Eulophia andamanensis* Rchb.f., Flora 55: 276 (1872)

Terrestrial herb upto 40-80 cm tall, Flowers racemes up to 40 cm long. floral bracts shorter than ovary. Flowers pale green, lip white with green margin and dark brown veins. dorsal sepal linear-lanceolate and lateral sepals obliquely linear -lanceolate, Petals obliquely linear-lanceolate, occasionally mucronate, glabrous.

Flowering and Fruiting: March – June

Conservation Status: 'Data Deficient'

2. *Eulophia bicallosa* (D.Don) P.F.Hunt & Summerh., Kew Bull. 20: 60 (1966)

Terrestrial herb, 40-60 cm tall. Pseudobulb subglobose, covered with sheaths. Leaf appears after anthesis, linear-lanceolate 30-50 cm × 1-1.2 cm; Inflorescence racemose, 30-60 cm; bracts lanceolate, shorter than ovary. Flowers pale green, Sepals pale green, with purple veins. Petals pale green, lanceolate -narrowly elliptic, 10-12 × 7-8 mm, apex acute, 3-lobed; Column slender.

Flowering and Fruiting: June-July

Conservation Status: Vulnerable

3. *Eulophia mannii* (Rchb.f.) Hook.f. Fl. Brit. India 6: 4 (1890)

Terristraial rhozomatous hebs upto 2-3 m tall, Leaves linear lanceolate, inflorescence raceme 50-70 cm in lenght; Flowers yellow in colour, bracts lanceolate, sepals oblong lanceolate, apex acute, ovary length longer than bracts.

Flowering and Fruiting: May-June

Conservation Status: Endemic, rare

4. *Eulophia graminea* Lindl., Gen. Sp. Orchid. Pl.: 182 (1833)

Terristraial herbs 30-80 cm tall. Pseudobulb erect, ovoid, subglobose, leaves linear-lanceolate, 12-34 × 0.6-1 cm, apex acuminate. Inflorescence racemose and paniculate, 30-80 cm, with scattered sheaths, rachis 10-38 cm, with more than10-flowered; floral bracts linear-lanceolate, shorter than ovary; both sepals and petals olive-green with dark green vein. ovary upto15-20 mm. Capsule ellipsoid.

Flowering and Fruiting: April-June

Conservation Status: Not Evaluated (NE)

5. *Eulophia dabia* (D.Don) Hochr. in Bull. New York Bot. Gard. 6: 270 (1910)
Terristraial herbs. Pseudobulb triangular or subglobose, 1-3 cm in diam., Leaves emerging after anthesis, linear, 15-35 × 0.3-0.6 cm, pseudostem 10-12 cm. Inflorescence racemose, 15-45 cm, rachis 5-14 cm, laxly 4-15-flowered; floral bracts ovate-lanceolate, 5-10 × 3-5 mm, shorter than ovary, apex acuminate. Flowers pale pink to maroon, Sepals oblong, apex mucronate; Petals obovate-oblong, shorter than sepals, apex mucronate; lip broadly oblong-obovate, 12-15 × 8-10 mm, Capsule ellipsoid.
Flowering and Fruiting: April-June
Conservation Status: critically endangered

6. *Eulophia obtusa* Hook.f. , Fl. Brit. India 6(17): 3 (1890).
Terrestrial, herb, Leaves linear-lanceolate, grass-like. Inflorescence unbranched with terete peduncle. Flowers 4 to 12, white with pink lip, both dorsal and lateral sepal oblong-lanceolate; petals oblong-lanceolate, Column with short foot.
Flowering and Fruiting: June-July
Conservation Status: Critically Endangered

7. *Eulophia picta* (R.Br.) Ormerod in Checkl. Papuasian Orchids: 293 (2017)
Terrestrial, herb, 30-40 cm tall. Pseudobulbs tuberous, ellipsoid to triangular-ovoid, Leaves developed at anthesis, elliptic, or oblong-lanceolate, 15-35 × 5-9 cm, apex acuminate or acute; Inflorescence 20-40 cm, sheaths tubular, 4-6 cm, Flower Creamy white, lips pink in dorsal side. pedicel and ovary 7-8 mm. Sepals oblong, 10-12 × 3-4 mm, apex acute; lateral sepals oblique. Petals obovate-oblong, apex mucronate; Capsule oblong.
Flowering and Fruiting: June-July
Conservation Status: Not Evaluated (NE)

8. *Eulophia zollingeri* (Rchb.f.) J.J.Sm. Orch. Java: 228 (1905)
Terrestrial herb, 40-60 cm tall, Tubers white, ellipsoid or elongate, floral bracts linear-lanceolate; Flowers dull reddish brown, Sepals subequal, dorsal sepal elliptic, 1.5-2 cm × 0.5-0.7 mm, acute to acuminate; lateral sepals oblong, 3.1 ×1.5 cm. Capsules ellipsoid-fusiform, 3-4 cm long.
Flowering and Fruiting: April-May
Conservation Status: Not evaluate

Fig.1: a. *Eulophia andamanensis,* **b.** *Eulophia bicallosa*, **c.** *Eulophia dabia*, **d.** *Eulophia picta,* **e.** *Eulophia mannii*

Discussion

The genus *Eulophia* R. Brown, represents a group of rare and ecologically significant terrestrial orchids. In Manas National Park, *the* genus *Eulophia* R. Brown characterize a dominant genus of terrestrial orchids. Several species within this genus, viz., *E. mannii* and *E. obtusa*, are listed as rare and endangered according to the IUCN Red List. One of the major threats to *Eulophia* species in Manas deforestation, agricultural expansion, encroachment etc., Moreover, illegal collection for commercial and medicinal purposes have severely impacted their wild populations (Borah and Das, 2021). Therefore, to ensure the survival of this genus, it is crucial to implement both in-situ and ex-situ conservation strategies. Additionally, it is essential to promote awareness among Fringe villages of the park. Given that encroachment creates a major threat to the survival of *Eulophia* species, it is imperative that authorities adopt strong policies to educate and involve fringe villages communities in conservation activities.

Conclusion

A total of eight species of the genus *Eulophia* was recorded from Manas National Park is considered significant finding. Among these, one species is endemic, two are categorised as Critically Endangered, and one as Vulnerable Cited by IUCN Red List. Despite the presence of various anthropogenic and natural pressures in the region, the park continues to offer a suitable and supportive habitat for orchids.

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Declarations

Conflict of interest: The authors declare that they have no conflict of interest

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