



Synopsis of *Eulophia* R.Br. (Orchidaceae) in Manipur (India) with a new distributional record to the state

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Abstract

Seven species of *Eulophia* R.Br. (Orchidaceae) including one new distributional record to the state of Manipur viz., *Eulophia macrobulbon* (C.S.P. Parish & Rchb.f.) Hook.f. are enumerated with latest nomenclature, phenology and distribution details. So far, the occurrence of *E. macrobulbon* in India (from Sikkim) has been doubtful because of no evidence of either herbarium or live collection data except a plate of line drawings deposited in CAL. Present report of *E. macrobulbon* from Manipur is the first authentic record from India. Detailed description, key with a colour plate is provided for easy identification of species.

Key words: *Eulophia*, Orchidaceae, *E. macrobulbon*, New record, Manipur.

INTRODUCTION

Manipur is one of the eight states of North-East India and strategically placed at the eastern end of the region between the latitude of 23°83' N – 25°68' N and longitude of 93°03' E – 94°78' E. The natural vegetation of Manipur falls under the Indo-Burma Biodiversity Hotspot area with rich flora and fauna (Singh *et al.* 2010). The orchid genus *Eulophus* established by R. Brown in 1821 was renamed as *Eulophia* and published as a conserved name by J. Lindley (1823). The genus is characterised by terrestrial, autotrophic or rarely mycotrophic habit, hypogean fleshy rhizomes or tubers or rarely epigeal pseudobulbs, presence or absence of leaves during flowering, laxly to densely many flowered raceme or rarely panicle, 3-lobed lip with various ornamentation on disc and usually a small tubular or conical spur at base, column with or without a foot and 2 sub-globose pollinia.

Eulophia is one of the largest terrestrial genera in the family Orchidaceae consisting of about 200 species distributed in tropical and subtropical regions, most diverse in Africa, but also widespread from Madagascar and the Mascarene Islands to Central and tropical Asia, the SW Pacific islands, and North and NW Australia (Chen *et al.* 2009). In India, the genus is represented by 26 species (Misra 2019) of which 6 species are recorded from Manipur (Chauhan 2001; Kumar & Kumar 2005; Nanda *et al.* 2014; Mao & Deori 2018; Singh *et al.* 2019).

During a field trip in March, 2020, to Moreh surroundings of Tengnoupal district of Manipur, few *Eulophia* plants in flowering stage were collected and brought under cultivation. Upon a critical study and based on the available literature (Reichenbach 1874; Hooker 1890; Pradhan 1979; Govaerts *et al.* 2020) the new collection has been identified as *E. macrobulbon* (Parish & Rchb. f.) Hooker which was doubtfully known in India hitherto only from Sikkim (Hooker 1890). It may be mentioned that there is no record of any herbarium specimen of this species collected from Sikkim except a drawing plate deposited in CAL (Hooker 1895).

Therefore, the present report of *E. macrobulbon* from Manipur is not only a new distributional record to the state but also provides an authentic data of herbarium and live collections confirming its occurrence in India. All the seven species of *Eulophia* found in Manipur are enumerated below with latest nomenclature, brief description and distribution data in addition to a detailed description and a colour plate of *E. macrobulbon* prepared from the fresh collections. An identification key also is provided for all the seven species.

Key to the species of *Eulophia* R. Br. in Manipur

- 1a. Plants mycotrophic, leaves totally absent *E. zollingerii*
- 1b. Plants autotrophic, with green leaves 2
- 2a. Plants with green epigeal pseudobulbs, Inflorescence branched *E. graminea*
- 2b. Plants with underground rhizomes, inflorescence unbranched 3
- 3a. Leaves present when plant in flowering 4
- 3b. Leaves absent when plant in flowering 5
- 4a. Column with foot, leaves elliptic-lanceolate, acute, 29-40 cm long *E. nuda*
- 4b. Column without foot, leaves linear-oblong, acuminate, 60-90 cm long .. *E. mannii*
- 5a. Underground rhizomes 3-4, globose, arranged in linearly *E. macrobulbon*
- 5b. Underground rhizome single, horizontal, oblong..... 6
- 6a. Column with foot, spur of lip small conical *E. bicallosa*
- 6b. Column without foot, spur of lip long, tubular *E. dabia*

ENUMERATION

Eulophia bicallosa (D. Don) Hunt & Summerh., in Kew Bull. 20: 60. 1966; Chauhan in Pathak, Sehgal, R. N., Shekar, N., Sharma, M. & Sood, A. (eds.), Orchid Science & Commerce: 91. 2001; Kumar & Kumar, in Rheedea 15 (1): 39. 2005; A. N. Rao & V. Kumar, in Turczaninowia 21(4): 119.2018; A. A. Mao & C. Deori, Check-list Orch. Manipur: 78. 2018. *Bletillabicallosa* D. Don, Prodr. Fl Nepal: 30. 1825. *Cyrtopera bicarinata* Lindl., Gen. Sp. Orchid. Pl.: 190. 1833. *Eulophia bicarinata* (Lindl.) Hook. f., Fl. Brit. India 6: 6. 1890. *Eulophia candida* (Lindl.) Hook. f., Fl. Brit. India 6: 6.1890; Mukerjee, in Notes Roy. Bot. Gard. Edinburgh 21 (3): 152. 1953.

Flowering & Fruiting: March - June.

Occurrence in Manipur: Ukhrul dist., Chammu, 1300m., S.K. Mukerjee 3023 (CAL).

Distribution: India (Arunachal Pradesh, Manipur), Nepal, Myanmar, Thailand, Taiwan, Sumatra, New Guinea, Australia.

Eulophia dabia (D. Don) Hochr., in Bull. New York Bot. Gard. 6: 270. 1910; Chauhan in Pathak, P., Sehgal, R.N., Shekar, N., Sharma, M. & Sood, A. (eds.) Orchid Science & Commerce 91. 2001; Kumar & Kumar, in Rheedea 15 (1): 39. 2005; A. N. Rao & V. Kumar, in Turczaninowia 21(4): 119. 2018; A.A. Mao & C. Deori, Check-list Orch. Manipur: 78. 2018. *Bletiadabia* D. Don, Prodr. Fl. Nepal. : 30. 1825. *Eulophia campestris* Wall. ex Lindl., Gen. Sp. Orchid. Pl.: 185.1833; Mukerjee, in Notes Royal Botanic Garden Edinburgh 21 (3): 52. 1953; Deb, in Bull. Bot. Surv. India 3(3): 127. 1961.

Flowering & Fruiting: May - June

Occurrence in Manipur: Ukhrul, 1800 m, S.K. Mukerjee 2717 (CAL).

Distribution: India (Arunachal Pradesh, Manipur), Afganisan, Pakistan, Myanmar, China.

Eulophia graminea Lindl., Gen. Sp. Orchid. Pl.: 182.1833; A. A. Mao & C. Deori, Check-list Orch. Manipur: 79. 2018. *E. ucbii* Malhotra & Balodi, in Bull. Bot. Surv. India 26: 92 (1984 publ. 1985).

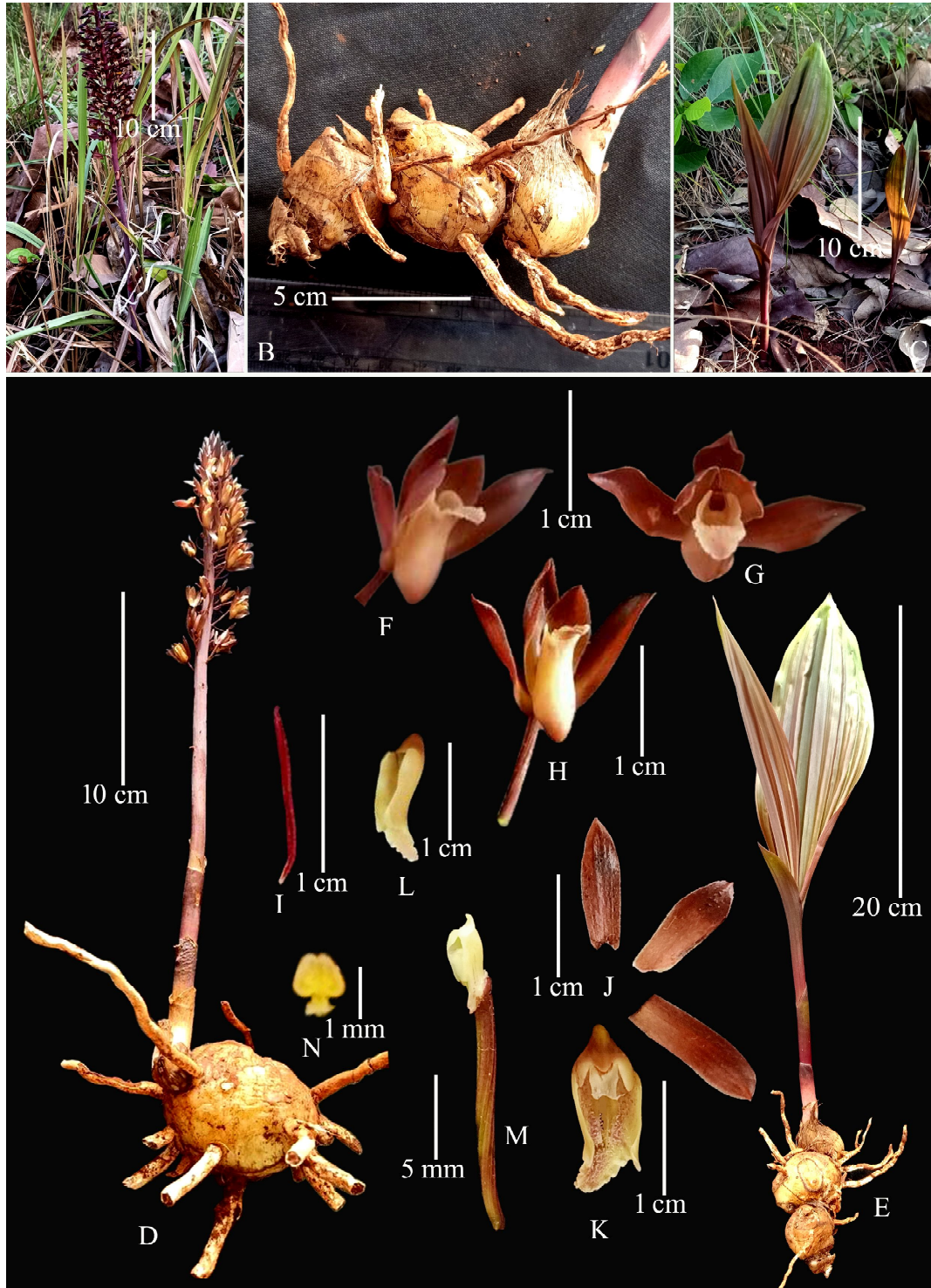


PLATE I. *Eulophia macrobulbon* (Parish & Rchb. f.) Hook. f.: **A.** Plant in natural habitat; **B.** Under-ground tubers; **C.** Plant in leaf stage in natural habitat; **D.** Plant in flowering stage; **E.** Plant in leaf stage; **F-H.** Flower- lateral & front view; **I.** Bract; **J.** Sepal & Petal; **K.** Lip (front view); **L.** Lip (side view); **M.** Pedicellate ovary and Column; **N.** Pollinarium.

Flowering & Fruiting: May – June

Occurrence in Manipur: Yangoupokpi Lokchao Wild Life Sanctuary, KhujaiLok, Tengnoupal district, Moreh, 412 m, *Chowlu* 41803 (ARUN).

Distribution: India: (Arunachal Pradesh, Manipur), China, Myanmar; Thailand. Malaysia, Sumatra.

Eulophia macrobulbon (Parish & Rchb.f.) Hook.f., Fl. Brit. India 6: 7.1890. *Cyrtopera macrobulbon* Parish & Rchb. f. in Trans. Linn. Soc. London 30: 144. 1874. *Eulophia burmannica* Hook.f., Fl. Brit. India 6: 5. 1890.

Plants terrestrial, up to 45 cm tall. Underground tubers ovoid to spherical, 4–9 × 2–4 cm, arranged in horizontal row, 2-3 noded, producing long thick roots from basal half. Stem formed with sheathing leaf bases, erect, up to 1 cm thick, covered with 2 tubular sheaths towards base. Leaves 2-3, unequal, strongly plaited, purplish green on upside and purple beneath, appearing after the flowering stage; large leaf 20–27 × 6.5–8.0 cm, broadly elliptic, acute or apiculate; middle leaf 19–24 × 4–6 cm, narrowly elliptic lanceolate, acuminate, lowest leaf smaller, 5 × 2.5–4 cm, ovate, acute. Inflorescence erect, 28–37 cm long, densely many flowered; peduncle robust, terete, reddish purple, with 3–5 tubular clasping sheaths at small intervals towards base. Floral bracts 1.0–1.2 × 0.3–0.4 cm, as long as the pedicellate ovary, linear-oblong, acute to acuminate, maroon. Flowers many, about 1 cm across, reddish brown with pale yellow lip; pedicel and ovary 1–1.4 cm long, glabrous. Sepals subequal, spreading, oblong lanceolate, straight acute or shortly apiculate at apex; dorsal sepal 1.2–1.5 × 0.35–0.5 cm, laterals slightly longer than dorsal, slightly falcate. Petals 0.8–1.2 × 0.5–0.6 cm, oblong lanceolate, acute to apiculate, Lip 1.5–1.7 × 0.7–0.8 cm, creamy yellow, 3 lobed; lateral lobes erect, oblong, obtuse; mid lobe ovate, subacute, undulate at margins, recurved; disc with two rows of purplish crenate ridges running from the base of lip to base of lateral lobes and join with 3 crenate ridges on middle region; spur short, 3–4 mm long, conical, obtuse, reddish brown. Column erect, 4–5 mm long, pale yellow. Anther cap short, 1.5–2.0 mm long, ovate, with obtusely bifid projection at top, reddish brown. Pollinia 2, sub-triangular, 1–1.5 mm long, porate, yellow, with oblong caudicle and ovate viscidium.

Flowering & fruiting: March – June.

Occurrence in Manipur: India, Manipur, Tengnoupal district, Moreh, 412 m, *Chowlu* 42802 (ARUN).

Distribution: India (Arunachal Pradesh), Myanmar, Thailand, Laos, Vietnam.

Eulophia mannii (Rchb.f.) Hook. f., Fl. Brit. India 6: 4.1890 & Icon. Pl. ser. 4 (22): t. 2115. 1894; A.N. Rao & V. Kumar in *Turczaninowia* 21(4):119.2018. *Cyrtopera mannii* Rchb.f., *Flora* 55: 274. 1872.

Flowering & Fruiting: June – August.

Occurrence in Manipur: Tummo Hill, *Prazer* 155 (CAL).

Distribution: India: (Assam, Manipur, Sikkim, West Bengal).

Eulophia nuda Lindl., Gen. Sp. Orchid. Pl.: 180. 1833. Chauhan in Pathak, P., Sehgal, R.N., Shekar, N., Sharma, M. & Sood, A. (eds.) *Orchid Science & Commerce* 91: 2001; A.N. Rao & V. Kumar, in *Turczaninowia* 21(4): 119. 2018. *Eulophia spectabilis* Suresh in D.H. Nicolson, C.R. Suresh & K.S. Manilal, *Interpr. Van Rheedee's Hort. Malab.*: 300. 1988, *nom. Superfl.*; Kumar & Kumar in *Rheedea* 15 (1): 39. 2005; A.A. Mao & C. Deori, *Check-list Orch. Manipur.*: 79. 2018.

Flowering & Fruiting: April–July.

Occurrence in Manipur: Senapati district, Kangpokpi; *sine loc.*, N.L. Bor 17986 (ASSAM).

Distribution: India (Arunachal Pradesh, Manipur); China, Indonesia, Malaysia, New Guinea, Philippines, Sri Lanka.

Eulophia zollingeri (Rchb.f.) J.J. Sm., Orch. Java: 228.1905; Nanda *et al.* in Bull. Bot. Surv. India 56: 248. 2014; A. N. Rao & V. Kumar, in Turczaninowia 21(4): 119. 2018; A.A. Mao & C. Deori, Checkl. Orch. Manipur: 79. 2018. *Cyrtopera zollingeri* H.G. Reichenbach in Bonpalandia 5: 38. 1857. *Cyrtopera sanguine* Lindl., in J. Proc. Linn. Soc., Bot. 3: 32. 1858. *Eulophia sanguine* (Lindl.) Hook.f., Fl. Brit. India 6: 8. 1890.

Flowering & Fruiting: June – July.

Occurrence in Manipur: Senapati district, Hengbung, 1252 m, *Akimpon* 00531(COGCEHR Herbarium, Hengbung, Manipur).

Distribution: India (Arunachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal, Karnataka & Kerala), Australia, China, Indonesia, Japan, Malaysia, New Guinea, Philippines, Thailand.

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