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## Extended distribution of rare terrestrial orchid *Zeuxine flava* (Wall. ex Lindl.) Trimen (Orchidaceae) from Western Ghats of Karnataka, India

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**ABSTRACT**

*Zeuxine flava* (Wall. ex Lindl.) Trimen is being reported for the first time from Karnataka, Western Ghats, India. We provide type specimens, diagnostic characters, identification of key characters of species and color photo of specimen of *Z. flava* in support of our treatment and to facilitate identification of the species.

**Key words:** Karnataka, New report, Orchidaceae, Western Ghats.

**1. INTRODUCTION**

The genus *Zeuxine* Lindley is represented by about 80 species (Xinqi *et al.*, 2009; Powo, 2021). Its distribution extends from Tropical Africa to Central Asia and West Pacific (Govaerts *et al.*, 2013). In India, listed 19 species of *Zeuxine* have been reported (Misra, 2007; Bhattacharjee, 2010; Bhattacharjee and Sabapathy, 2010). Authors collected specimens of a terrestrial orchid from a single population during floral documentation of Kakkabe forest, Kodagu district, Karnataka, India. After critical examination and study these specimens were identified as *Zeuxine flava* (Wall. ex Lindl.) Trimen, it's hitherto unknown orchid species from Karnataka and first reported here as a new addition to the flora of Karnataka state as well as Western Ghats. Perusal of the literature pertaining to the floras and taxonomic revision revealed that the species is so far been recorded only from the states (Arunachal Pradesh, Rao, 2010; Assam, Gogoi *et al.*, 2012 and 2015; Kerala (Manilal & Kumar, 1993; WCSP, 2017; Nayar *et al.*, 2014) (Tamil Nadu (WCSP 2012, Nayar *et al.*, 2014; Manipur, Devi *et al.*, 2019; West Bengal, Rajendra *et al.*, 2012). Further screening the flora (Saldanha and Nicolson, 1978; Sharma *et al.*, 1984, Gopalakrishna Bhat, 2003 and 2014, Sanjappa, 2019, Ravikumar *et al.*, 2021) revealed that this species has not been collected or recorded from Karnataka State and hence it forms a new distributional record further extending it

known distribution of Western Ghats. *Zeuxine flava* (Wall. ex Lindl.) Trimen is a beautiful and interesting species with bright small yellow or orange flowers and is distributed in Bhutan, Myanmar, Sri Lanka, Thailand, Nepal, China, Vietnam. The panicle of *Z. flava* is similar to the of *Z. gracilis* (Krishna *et al.*, 2011, King & Pantling 1898; Krishna *et al.*, 2011; Devi *et al.*, 2019).

## 2. MATERIAL AND METHODS

During a field study in February 2022 by the authors to Western Ghats of Karnataka, the species was collected in flowering and fruiting stages from an interior forest floor hillslope at the near to Shola forest. After compiling all the data available in the public domain and specimens in different herbaria, it was observed that the collection was from 1821, Wallich, N. (K), K000718636, K000942795, K000942796 and 1854, Thwaites, G.H.K., 3120 (P), P00345079. Taxonomic literature and protologues were studied and compared for identification ((Pearce and Cribb, 2002; Wu and Hong, 2009, Krishna *et al.*, 2011; Devi, 2019). Herbarium sheets were consulted which are available in GBIF as well as various Indian (K, BM, P, NY, AMES and USF). In this species was not collected from its occurrence in Karnataka as well as southern Western Ghats; Field notes recorded included habit, habitat and number of individuals in the population, geo-coordinates, and elevation data. Upon reaching the institute, they were processed in the herbarium following standard herbarium procedures (Jain and Rao, 1977). The collected voucher specimens have been deposited at (FRLH) National herbarium of Medicinal plants, Bangalore. Detailed description, taxonomic notes and colour photographs of *Z. flava* are provided here.

## 3. TAXONOMY TREATMENT



**Figure 1.** *Zeuxine flava* A. Type specimens (Reproduced with kind permission of the Board of Trustees, Royal Botanic Gardens, Kew); B. Voucher specimens.

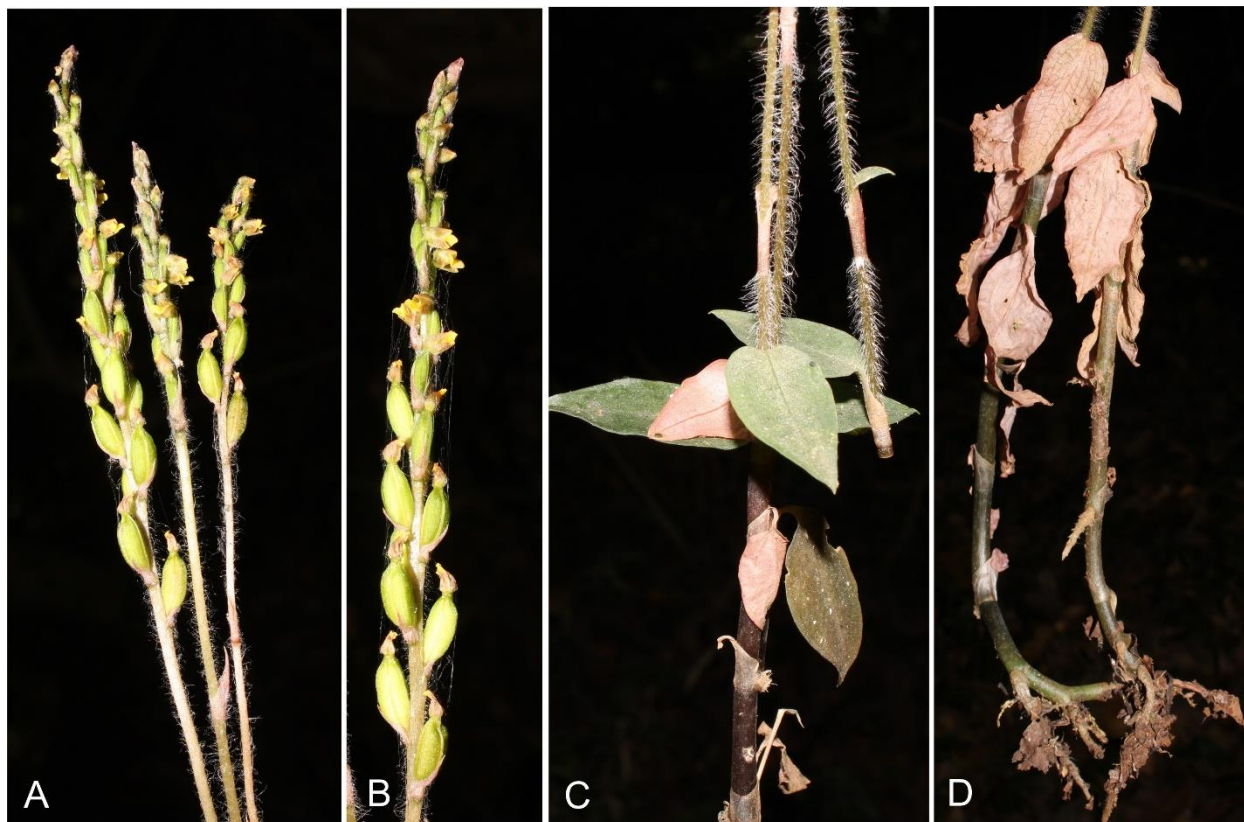
**Key to species**

- 1a. Petals obliquely oblong-elliptic; labellum white with orange-yellow base; appendages inside hypochile filiform ..... *Z. gracilis*
- 1b. Petals obliquely oblong to slightly rectangular; labellum bright yellow and occasionally with yellowish-white base, appendages inside hypochile oblong-obconical ..... *Z. flava*

**Description**

*Zeuxine flava* (Wall. ex Lindl.) Trimen, Syst. Cat. Fl. Pl. Ceylon 90. 1885. (Fig. 2 A, B, C, D). *Monochilus flavus* Wall. ex Lindl., Gen. Sp. Orchid. Pl. 487. 1840. *Haplochilus flavus* (Wall. ex Lindl.) D.Dietr., Syn. Pl. [D. Dietrich] 5: 172. 1852.

TYPE: Nepal, without precise locality, coll. Wallich Wall. Cat. 7380A (holo. K-LINDL!, iso, KW!). (Fig. 1A).



**Figure 2.** *Zeuxine flava* A. Close-up of the inflorescence; B. Close-up of the flowers and fruits; C-D Close-up of the stem and leaf. (Photos by N. Dhatchanamoorthy).

Terrestrial herbs, up to 35 cm high. Stem erect, purplish in lower and greenish in upper. Leaves broadly narrowly ovate to oblong-lanceolate, 5.5-6 × 1.5-2 cm, acuminate at apex; petiole-like base including tubular sheath 1-1.2 cm, hairy. Inflorescence up to 13 up to cm long, with several sterile bracts, pubescent; rachis 4-5 cm long, 8-15-flowered; floral bracts lanceolate, *c.* 4-5 mm long, hairy abaxially, acuminate-caudate at apex. Flowers small, fully opening after sunlight, bright yellow or orange; pedicel and ovary glabrescent, 5-10 mm long. Dorsal sepal subovate, concave, 3-3.5 × 2 mm long; lateral sepals oblique, 2.1-3 × 1.2 mm long. Petals oblong, 2.3-2.5 × 1 mm long; lip T-shaped, *c.* 3 mm long, 3-partite, short; hypochile saccate, inside with 2 hooked calli; mesochile *c.* 1 mm long, with involute margins; epichile transversely oblong, *c.* 1 mm long, with 2 lobes diverging at nearly right angles to axis of lip. Column short, stout, curving forward, *c.* 1.5 mm long, glabrous.

**Etymology:** From the Latin *flavus* (Yellow) in reference to the lip of colour.

**Phenology:** Flowering; February-March.

**Ecology:** In Open Semi-evergreen forests (c. 1150 m) floor growing with *Cyrtococcum longipes* (Wight & Arn. ex Hook.f.) A.Camus, *Dicliptera cuneata* Nees, *Digitaria longiflora* (Retz.) Pers., *Lepidagathis incurva* Buch.-Ham. ex D.Don, *Oplismenus compositus* (L.) P.Beauv., *Panicum psilopodium* Trin., *Phaulopsis imbricata* (Forssk.) Sweet, *Physalis peruviana* L., *Staurogyne zeylanica* (Nees) Kuntze and *Zeuxine gracilis* (Breda) Blume.

**Distribution:** India ; Arunachal Pradesh, Meghalaya, Kerala, Uttarakhand, West Bengal, Manipur and Recently, it has been reported from Karnataka (Kakkabe, Kodagu (Coorg), district.

World Distribution: Bhutan, Myanmar, Sri Lanka, Thailand, Nepal, China and Vietnam.

**Specimens examined:** **India**, Poomale estate, Kodagu district, Karnataka, 12.03.2022, 1150 m, N. Dhatchanamoorthy & R. Pattraaj 124620 (FRLH). (Fig. 1B). **Thailand**, No locality, 200m, 1926, Kerr, A.F.G., 0301 (K), K000596044; No locality, 1000m, 1931, Kerr, A.F.G., 0301 (K), K000596043; **China**, Shweli-Salwin Divide, Yunnan, 2438.4m, 1931, George Forrest 11914 (BM), Isotype (BM000076363); Tibet & S.W. China, No altitude and Year, Forrest, G. 11914 (K), K000942801; **Nepal**, No localities, 1821, Wallich, N. coll. s.n. (K), K000718636, K000942795, K000942796; **Sri Lanka**, No locality, No altitude, 1854, Thwaites, G.H.K., 3120 (P), P00345079.

**Note:** The species was found to be growing under the shade of trees rich in humus with leaf litters in moist deciduous and semi-evergreen forests and forest floor covered with moss. Only 15 individuals were recorded at the location. The present collection of this rare and interesting species from Kodagu district from new report to the state as well as extends the known distribution of Western Ghats in Karnataka. The current population is a disjunction distribution of *Zeuxine flava* from the Western Ghats of Karnataka, India.

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#### Authors Contribution

All authors have contributed equally to manuscript.

#### Ethical approval

*Zeuxine flava* (Wall. ex Lindl.) Trimen (Orchidaceae) from Western Ghats of Karnataka, India was recorded in the study. The ethical guidelines for plants & plant materials are followed in the study for sample collection & identification.

#### Funding

This study has not received any external funding.

#### Conflicts of interests

The authors declare that there are no conflicts of interests.

#### Data and materials availability

All data associated with this study are present in the paper.

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