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continued on the back inside cover

Cover: Emperor Tamarin *Saguinus imperator*: a look into a better world through the mustache lens – mixed media illustration. © Maya Santhanakrishnan.



## *Epipogium* Borkh. (Orchidaceae): a new generic record for Andhra Pradesh, India

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**Abstract:** *Epipogium roseum* (D.Don) Lindl., an ephemeral, achlorophyllous, mycoheterotrophic, terrestrial orchid is reported as a new state record after its first collection from the Paderu hills of Andhra Pradesh, India. Detailed descriptions, information on the type, ecology, photographs, and details of voucher specimens are provided.

**Keywords:** Achlorophyllous, Alluri Sitharama Raju District, Eastern Ghats, Epidendroideae, Ephemeral, Mycoheterotrophic, Paderu hills, Photosynthesis, terrestrial orchid.

Orchidaceae is the second largest family of flowering plants, with around 29,481 species found worldwide (Kumar 2024) and India has 1,256 species belonging to 155 genera (Singh et al. 2019). Orchids feature a highly specialized flower structure, and unique pollination process, a peculiar interaction with mycorrhiza, and tiny seeds that lack reserve food stores (Arditti & Ghani 2000). This fungus-dependent life of leafless orchids is known as the mycoheterotrophic mode of growth because they cannot photosynthesise due to a lack of chlorophyll pigments (Jalal & Jayanthi 2013).

The genus *Epipogium* Borkh. is an ephemeral,

achlorophyllous, mycoheterotrophic, terrestrial orchid that belongs to the family Orchidaceae (Chase et al. 2015); usually grows in organic matter-rich habitats of evergreen and semi-evergreen forests and is distributed in tropical Africa, tropical & temperate Asia, Australia, and Europe (POWO 2024). So far, this genus is represented by six species: *Epipogium aphyllum* Sw., *E. japonicum* Makino, *E. kentingense* T.P.Lin & Shu H.Wu, *E. meridianum* T.P.Lin, *E. roseum* (D.Don) Lindl., and *E. taiwanense* T.C.Hsu (Wu et al. 2020; POWO 2024; IPNI 2024). India has only three species, i.e., *E. aphyllum* Sw., *E. japonicum* Makino, and *E. roseum* (D.Don) Lindl. (Kumar et al. 2019). Odisha and Tamil Nadu have *E. roseum* from the Eastern Ghats region (Truptirekha et al. 2017), hence the occurrence in Andhra Pradesh was not unexpected, however there is not report of this genus from this state (Venkaiah et al. 2020).

### MATERIALS AND METHODS

In July 2021, during field explorations in the Eastern Ghats of Andhra Pradesh, the first author discovered

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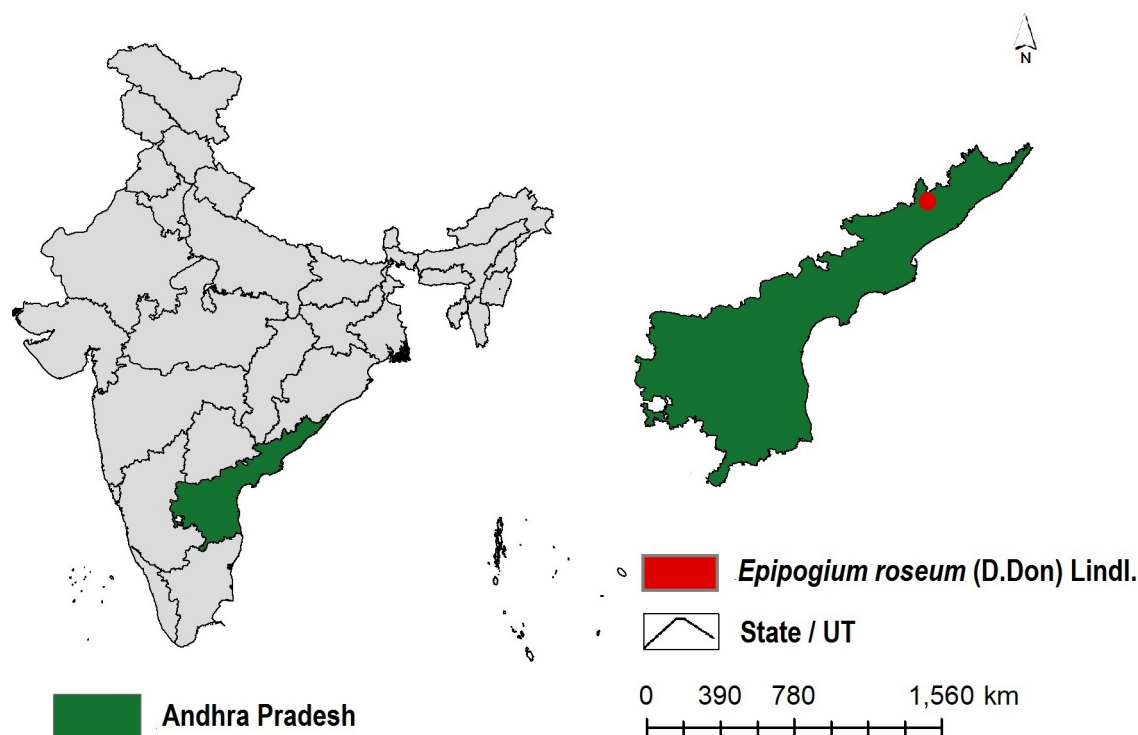


Figure 1. Location map of the *Epipogium roseum* in Andhra Pradesh.

an interesting ground orchid in bloom in the Paderu hill ranges (Figure 1). After careful examination of literature, protologue, and herbarium specimens (Lindley 1857; Prasad et al. 2019; Singh et al. 2019; POWO 2024), it was identified as *Epipogium roseum*. Notably, this genus had not been previously recorded in Andhra Pradesh, prompting the documentation of this finding as a new generic record and addition to the state's flora. A voucher specimen was prepared according to standard methods (Jain & Rao 1977) and stored in the Herbarium (AUV) at Andhra University. Photographs were captured with a Canon 500D camera, and a location map was created using ArcMap software.

## RESULTS

***Epipogium roseum* (D. Don) Lindl.** J. Proc. Linn. Soc., Bot. 1: 177 (1857). *Limodorum roseum* D. Don, Prodr. Fl. Nepal. 30. 1825; Murugan et al., Indian J. Forestry 18(2): 174. 1995. *Epigonium nutans* (Blume) Rchb.f., Bonplandia 5: 36. 1857; Hook.f., Fl. Brit. India 6: 124. 1890; C.E.C. Fisch. Fl. Madras 1460. 1928. *Epipogium tuberosum* Duthie, Ann. Roy. Bot. Gard. (Calcutta) 9(2): 151. 1906. *Epipogium africanus* Schltr., Bot. Jahrb. Syst. 45: 399. 1911. *Epipogium sessanum* S.N. Hegde & A.N. Rao, L. Econ. Taxon. Bot. 3: 598. 1982. *Epipogium indicum* H.J. Chowdhery, G.D. Pal & G.S. Giri, Nordic. Bot.

13: 419. 1993. (Image 2 & 3). Type: Nepal: Wallich s.n. (BM-Holotype).

**Specimen examined:** India, Andhra Pradesh, Alluri Sitharama Raju District, Allangiputtu Village, 18.1868°N; 82.6149°E, elevation 1,087 m, 15 July 2021, P. Janaki Rao 23400 (AUV).

**Description:** A terrestrial, ephemeral, achlorophyllous, mycoheterotrophic, slender, orchid, growing up to 40–50 cm in height. Rhizome tuberous, ellipsoid, wrinkled, ca. 3–4 × 2–3 cm, pale brown. Aerial stalk, slender, fleshy, hollow, ca. 10–20 × 0.6–0.7 cm, glabrous, terete or inflated, sterile bracts ovate to lanceolate, membranous. Inflorescence racemose, ca. 15–30 in number, ca. 15–20 × 0.5–0.6 cm. Fertile bracts membranous, ovate-lanceolate, ca. 1–1.3 × 0.5–0.6 cm, nerves 2 or 3 purple dotted, inconspicuous. Flowers drooping, resupinate, creamy-white with a purple tinge, not opening widely, ca. 1.3–1.5 × 0.8–0.9 cm. Pedicel ca. 0.8 × 0.1 cm, slightly recurved at the apex. Dorsal sepal linear-lanceolate or oblanceolate, ca. 0.7–0.8 × 0.2–0.3 cm, 3-nerved, apex sub-acute. Lateral sepals lanceolate, ca. 0.8–0.9 × 0.1–0.2 cm, margins slightly upcurved, apex acuminate. Petals 2, slightly shorter and wider than sepals, ca. 0.6–0.8 × 0.2–0.4 cm, obtuse or apex acute. Lip ovate-lanceolate, concave, ca. 1–1.2 × 0.6–0.7 cm, spurred at the base, margins crenulated, midvein



Image 1. a—*Epipogium roseuma* natural habitat | b—Tip of the inflorescence | c—Rhizome | d—Flower lateral view | e—Flower front view | f—Opened perianth | g—Opened lip | h—Later view of the lip with spur | i—Matured capsules | j—Close up of opened capsule showing seeds.  
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prominent, slightly lobed, two densely papillose ridges, and purple dotted. Spur ca.  $0.4 \times 0.2$  cm, projecting backward, scrotiform or cylindrical, parallel to the ovary, fleshy, transparent. Column truncate, 0.2–0.3 cm long, anther sub-globose, pollinia 2, ovoid. Ovary broadly ovoid,  $0.8\text{--}1 \times 0.3\text{--}0.6$  cm, creamy white, ovules many. Fruit capsule, ca.  $0.9\text{--}1 \times 0.5\text{--}0.6$  cm, ovoid-ellipsoid, many seeded.

**Flowering and fruiting:** June–October, the present collection of this species along with flowering and fruiting was observed in July.

**Habitat and Ecology:** Rarely found in moist deciduous forest adjacent to the coffee, silver oak, and pepper plantations in Allangiputtu Village in Alluri Sitharama Raju District of Andhra Pradesh, with an association of trees like *Mangifera indica* L., *Syzygium heyneanum* (Duthie) Gamble, *Pterocarpus marsupium* Roxb., *Terminalia bellirica* (Gaertn.) Roxb., *Neolitsea foliosa* (Nees) Gamble, *Diospyros sylvatica* Roxb., *Zanthoxylum*

*aromaticum* Miq., shrubs: *Ageratina adenophora* (Spreng.) R.M.King & H.Rob., *Colebrookea oppositifolia* G. Lodd., *Clausena heptaphylla* (Roxb.) Wight & Arn., *Lantana camara* L., *Eupatorium odoratum* L., climbers: *Clematis gouriana* Roxb. ex DC., *Clematis smilacifolia* Wall., *Clematis zeylanica* (L.) Poir., *Phanera vahlii* (Wight & Arn.) Benth., *Dioscorea pentaphylla* L., herbs; *Orthosiphon rubicundus* (D.Don) Benth., *Globba bulbifera* Roxb., and *Curculigo orchioides* Gaertn.

**Distribution:** Angola, Borneo, Cameroon, Fiji, Ghana, Guinea, Gulf of Guinea Is., Hainan, India, Japan, Jawa, Kenya, Laos, Lesser Sunda Is., Liberia, Malawi, Malaya, Maluku, Myanmar, Nansei-shoto, Nepal, New Caledonia, New Guinea, New South Wales, Nigeria, Pakistan, Philippines, Queensland, Solomon Is., Sri Lanka, Sudan, Sulawesi, Sumatera, Taiwan, Tanzania, Thailand, Tibet, Uganda, Vanuatu, Vietnam, Zaïre (POWO 2024). In India, it was reported from Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala,

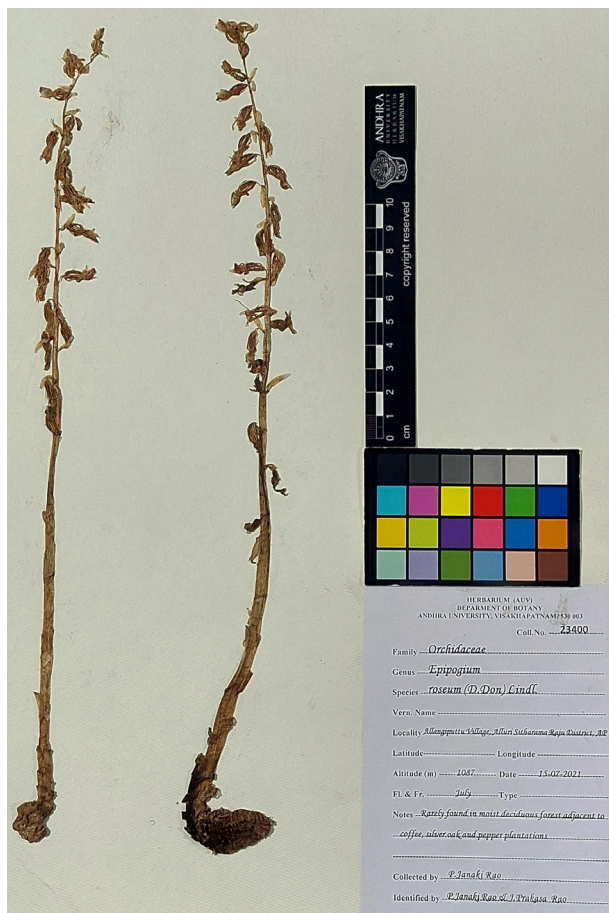


Image 2. Herbarium of *Epipogium roseum* (D. Don) Lindl. © P. Janaki Rao & J. Prakasa Rao.

Maharashtra, Meghalaya, Mizoram, Odisha, Sikkim, Tamil Nadu, Uttarakhand, West Bengal (Kar et al. 2017; Prasad et al. 2019; Singh et al. 2019).

## DISCUSSION

The distribution of *E. roseum* is quite diverse, ranging from tropical to chilly temperate climates of India, and rarely found in the Eastern Ghats region of Tamil Nadu, Odisha, and Andhra Pradesh (present report) between 900–3,000 m (Kuruppusamy et al. 2009; Jalal & Jayanthi 2013; Kar et al. 2017).

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## Articles

### Measuring people's attitude towards conservation of Leopard *Panthera pardus* (Mammalia: Carnivora) in the foothills of Himalayan region

– Megha Rani, Sujeet Kumar Singh, Maximilian L. Allen, Puneet Pandey & Randeep Singh, Pp. 25283–25298

### Empirical evidence of Tiger *Panthera tigris* (Mammalia: Carnivora: Felidae) dispersal towards south from Similipal Tiger Reserve to Kuldiha Wildlife Sanctuary: potential implications for its conservation in the Greater Similipal Landscape

– Harshvardhan Singh Rathore, Jagyandatt Pati, Samrat Gowda, D.N. Sai Kiran, M. Yogajayananda, Yadvendradev V. Jhala, Manoj V. Nair, Bivash Pandav & Samrat Mondol, Pp. 25299–25304

### Philippine Warty Pig *Sus philippensis* Nehring, 1886: level of awareness and conservation practices in Datal Bad, West Lamidan, Don Marcelino, Davao Occidental, Philippines

– Pedro M. Avenido, Pp. 25305–25317

### Understanding Human-Nilgai negative interactions in India: a systematic review through print media report analysis

– Chandrapratap Singh Chandel, Sangeeta Madan, Dhruv Jain, Lallianpuui Kawlni, Vishnu Priya Kolipakam & Qamar Qureshi, Pp. 25318–25329

### Harmonizing ecology and society: an integrated analysis of vulture conservation in the Nilgiri Biosphere Reserve, India

– S. Manigandan, H. Byju & P. Kannan, Pp. 25330–25344

### Nesting habits of Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) on power and television cables in the agricultural landscape of Kallakurichi district, Tamil Nadu, India

– M. Pandian, Pp. 25345–25359

### Factors influencing the occurrence of the House Sparrow *Passer domesticus* (Linnaeus, 1758) (Aves: Passeriformes: Passeridae) in Bhavnagar, Gujarat, India

– Foram P. Patel, Pravinsang P. Dodia & Deven M. Mehta, Pp. 25360–25372

### Waterbird diversity of Saman Wetland Complex in Uttar Pradesh: a crucial site for the India's National Action Plan on migratory birds

– Omkar Joshi, Nisha Singh & P. Sathiyaselvam, Pp. 25373–25384

### First record of two species of venomous snakes *Bungarus suzhenae* and *Ovophis zayuensis* (Serpentes: Elapidae, Viperidae) from India

– Jason Dominic Gerard, Bitupan Boruah, V. Deepak & Abhijit Das, Pp. 25385–25399

### Bio-ecology of the bush cricket *Tarbinskiellus portentosus* (Lichtenstein, 1796) (Insecta: Orthoptera: Gryllidae): a relished edible insect in Nagaland, India

– Patricia Kiewhuo, Lirikum Jing, Bendang Ao & Lakhminandan Kakati, Pp. 25400–25409

### Addition to the liverwort flora (Marchantiophyta) of Arunachal Pradesh, India

– Nonya Chimyang, Pherkop Mossang, Anshul Dhyani, Heikham Evelin, Prem Lal Uniyal, Devendra Singh, Meghna Paul & S.K. Nasim Ali, Pp. 25410–25421

## Communications

### A preliminary assessment of the bat fauna (Mammalia: Chiroptera) of Murlen National Park, Mizoram, India: distribution, morphology, and echolocation

– Uttam Saikia & Rohit Chakravarty, Pp. 25422–25432

### First record of albinism in Lesser Woolly Horseshoe Bat *Rhinolophus beddomei* (Chiroptera: Rhinolophidae) with an updated list of chromatic aberrations in bats in India

– Pratiksha Sail & Manoj R. Borkar, Pp. 25433–25439

### First record of *Garra kemp* Hora, 1921 (Cypriniformes: Cyprinidae) from Lohandra River of Nepal

– Jash Hang Limbu, Dipak Rajbanshi, Laxman Khanal & Ram Chandra Adhikari, Pp. 25440–25445

### Earthworm (*Oligochaeta*) diversity of Kumaun Himalaya with a new record of *Drawida japonica* (Michaelsen, 1892) (Moniligastridae) from Nainital, Uttarakhand, India

– Shikha Bora, Deepak Chandra Melkani, Ajay Kumar, Mansi Arya, Kulbhushan Kumar, Netrapal Sharma & Satpal Singh Bisht, Pp. 25446–25452

### Woody flora of Karumpuliyuthu Hill, Tenkasi, Tamil Nadu, India: a checklist

– K. Lalithalakshmi, A. Selvam & M. Udayakumar, Pp. 25453–25460

## Short Communications

### First record of Croaking Gourami *Trichopsis vittata* (Cuvier, 1831) from West Bengal, India

– Sujal Dutta, Bakul Biswas & Bibhas Guha, Pp. 25461–25464

### *Lasioptera sharma*, a new species of gall midge (Diptera: Cecidomyiidae) feeding on *Leea indica* (Vitaceae) in India

– Duraikannu Vasanthakumar, Rajiv Loganathan & Palanisamy Senthilkumar, Pp. 25465–25469

### *Epipogium* Borkh. (Orchidaceae): a new generic record for Andhra Pradesh, India

– P. Janaki Rao, J. Prakasa Rao & S.B. Padal, Pp. 25470–25473

### *Physcomitrium eurystomum* Sendtn. (Funariaceae): a rare species recorded for Assam, India

– Twinkle Chetia & Himu Roy, Pp. 25474–25477

## Notes

### First photographic evidence of Mainland Serow *Capricornis sumatraensis thar* (Bechstein, 1799) in Raimona National Park, Assam, India

– Dipankar Lahkar, Mohammad Firoz Ahmed, Bhanu Sinha, Pranjal Talukdar, Biswajit Basumatary, Tunu Basumatary, Ramie H. Begum, Nibir Medhi, Nitul Kalita & Abishek Harihar, Pp. 25478–25481

### Design and field installation of automated electronic Asian Elephant signage for human safety

– Sanjoy Deb, Ramkumar Ravindran & Saravana Kumar Radhakrishnan, Pp. 25482–25485

### First nesting record of Black-necked Stork *Ephippiorhynchus asiaticus* (Aves: Ciconiiformes) in Kumana National Park, Sri Lanka

– W.D.C.N. Gunathilaka, B.K.P.D. Rodrigo, D.M.A. Kumara, E.G.D.P. Jayasekara & W.A.D. Mahaulpatha, Pp. 25486–25488

### Mugger Crocodile *Crocodylus palustris* (Lesson, 1831) predation on Brown Fish Owl *Ketupa zeylonensis* (J.F. Gmelin, 1788), with notes on existing literature regarding their predation on birds

– Jon Hakim & Jack Pravin Sharma, Pp. 25489–25491

### New distribution records of two jumping spiders of the genus *Stenaelurillus* Simon, 1886 (Araneae: Salticidae) from Gujarat, India

– Subhash I. Parmar, Pranav J. Pandya & Dhruv A. Prajapati, Pp. 25492–25494

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