



## *Impatiens neo-orchioides*, a striking new balsam (Balsaminaceae: Scapigerae) from Nilgiri Biosphere Reserve, Western Ghats, India

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(Manuscript received 18 November 2022; Accepted 28 March 2023; Online published 12 April 2023)

**ABSTRACT:** *Impatiens neo-orchioides* (Balsaminaceae), a remarkable new species from the Western Ghats of Nilgiri hills, Tamil Nadu state, India is described and illustrated here. The new species is morphologically similar to *I. orchioides* Bedd., but differs mainly by folded leaves, pink-coloured petals, presence of spur, c. 1.5 cm long pedicels and 3-lobed lateral united petals with pink hairs at throat. Detailed description, distribution, conservation status and colour photographic plates are provided here to facilitate the easy identification of the new species.

**KEY WORDS:** Bangitappal, *Impatiens orchioides*, Mukurthi National Park, New species, Nilgiris, Tamil Nadu, Taxonomy.

### INTRODUCTION

The genus *Impatiens* L. (Balsaminaceae) comprises 1093 accepted species, with native range of distribution in Old World, North and Central America (POWO, 2022). This genus is highly diverse in growth forms, from annual or perennial herbs to subshrubs with terrestrial, epiphytic and lithophytic occurrence (Stevens, 2012). It is characterized by the presence of zygomorphic flowers with remarkable diversity in its morphology and flower colour (Yuan *et al.*, 2004). The five major diversity hotspots for the genus are tropical Africa, Madagascar, southern India and Sri Lanka, the Eastern Himalayas, and Southeast Asia (Song *et al.*, 2003; Yuan *et al.*, 2004). In India, *Impatiens* is represented by more than 280 taxa, mostly distributed through the Eastern Himalayas and the Western Ghats (Vivekananthan *et al.*, 1997; Swaminathan *et al.*, 2001; Bhaskar, 2012). According to Bhaskar (2012) over 210 species are endemic to India, of which c. 130 are endemic to the Western Ghats, and 80% of the *Impatiens* in the Western Ghats are categorised as endangered. Apart, many novelties have been described in the past 15–20 years from various parts of the Western Ghats, and most of them are strictly confined to the type locality (Bhaskar 2006, 2012; Narayanan *et al.*, 2011, 2012a,b; Kumar *et al.*, 2011; Hareesh *et al.*, 2015; Prabhukumar *et al.*, 2015a,b, 2016, 2017; Ramasubbu *et al.* 2015a,b, 2017, 2020; Chhabra *et al.*, 2016; Bhaskar and Sringeswara, 2017; Mani and Thomas, 2017; Mani *et al.*, 2018, 2020; Karuppusamy and Ravichandran 2019; Salish *et al.*, 2019; Vishnu *et al.*, 2020; Mohan *et al.*, 2021; Richard *et al.*, 2021). Hooker and Thomson (1860) divided the south Indian *Impatiens* into two sections, namely Scapigerae and Caulescents. The section 'Scapigerae' mostly includes fragile epiphytic or lithophytic ephemerals, growing along with moss for a

short period during monsoon (Narayanan *et al.*, 2011) and are endemic only to the Indo-Sri Lankan region (Nair, 1991; Vivekananthan *et al.*, 1997). The taxa of this section are characterised based on the lobes of the lateral petals, spur as well as the dorsal auricle on the lateral petals (Narayanan *et al.*, 2011). A total of 36 scapigerous *Impatiens* have been recorded from southern India and Sri Lankan region. Recently many scapigerous balsams have been described from the Western Ghats, such as *I. mohana* (Narayanan *et al.*, 2012b), *I. johnsiana* (Narayanan *et al.*, 2012a), *I. theuerkaufiana* (Narayanan *et al.*, 2013), *I. minae* (Narayanan *et al.*, 2011), *I. bhaskarii* (Jyosna *et al.*, 2009), *I. matthewiana* (Ramasubbu *et al.*, 2015a), *I. veerapazhasii* (Narayanan *et al.*, 2011), *I. neo-modesta* (Prabhukumar *et al.*, 2015), *I. kawtityana*, *I. taihmushkulni* and *I. nilgirica* var. *nawtityana* (Chhabra *et al.*, 2016), *I. stolonifera* (Manudev *et al.*, 2017), *I. nidholapathra* and *I. grandispora* (Vishnu *et al.*, 2020) and *I. shailajae* (Arya *et al.*, 2021).

During the botanical explorations in the Nilgiri Mountains, a part of the Western Ghats in north-western Tamil Nadu, as a part of ongoing project work to document the flora of Tamil Nadu state, the authors collected specimens of a balsam belonging to the section Scapigerae (Hooker and Thomson, 1860). Critical examination of the collected specimens with relevant literature (Hooker, 1906; Gamble, 1914; Jyosna *et al.*, 2011; Kumar *et al.*, 2011; Narayanan *et al.*, 2011, 2012a,b, 2013; Bhaskar, 2012; Prabhukumar *et al.*, 2015; Ramasubbu *et al.*, 2015a,b; Manudev *et al.*, 2017; Arya *et al.*, 2021) and type specimens (including images) housed in various herbaria (BM, CAL, CALI, E, K, MH, P; abbreviations after Thiers, 2023 continuously updated) revealed that the specimens are completely distinct from the hitherto known scapigerous species of *Impatiens*. Therefore, it is described here as a new species along with

**Table 1.** Comparison of diagnostic morphological characters of *Impatiens orchioides* and *I. neo-orchioides* sp. nov.

Characters	<i>I. orchioides</i>	<i>I. neo-orchioides</i> sp. nov.
Lamina	ca 5 × 5 cm, deeply cordate at base, nerves prominent, flat, chartaceous	1.5–4 × 1.5–3 cm, slightly cordate at base, nerves inconspicuous, completely folded back, coriaceous
Flower colour	Light to deep maroon	Pink
Pedicel	1–1.5 cm long	2–2.5 cm long
Spur	Absent	Present, up to 7 mm long
Dorsal petal	Greenish	Pinkish
Lateral united petals	Divided distinctly into two lobes; basal lobe conspecific, glabrous at throat; middle lobe linear-oblong, acute or obtuse at apex	Divided distinctly into three lobes; pinkish hairs at throat; middle lobe broadly oblong, slanting on one side towards apex

information on distribution, conservation status and photographic plate.

## TAXONOMIC TREATMENT

*Impatiens neo-orchioides* V.Ravich., Murug., B.Karthik, Tharani & Premk., *sp. nov.* **Fig. 1**

**Type:** INDIA. Tamil Nadu, Nilgiris District, Mukurthi National Park, Bangitappal, 11°15'22" N 76°30'19" E, 2355 m, 24 September 2022, V. Ravichandran *et al.* 151969 (holotype, MH!).

**Diagnosis:** *Impatiens neo-orchioides* resembles *I. orchioides* Bedd. in having scapigerous growth form with radical leaves, flower structure, ovate-lanceolate bracts but differs mainly by coriaceous folded back leaves (*vs* chartaceous, flat leaves), pink colour flowers with pink hairs at throat (*vs* light to deep maroon colour flowers with glabrous throat), presence of spur (*vs* absence of spur), 2–2.5 cm long pedicels (*vs* 1–1.5 cm long pedicels), pinkish dorsal petal (*vs* greenish dorsal petal), 3-lobed lateral united petal with pink hairs at throat (2-lobed lateral united petal without hairs at throat). (**Table 1 & Fig. S1**)

**Description:** Terrestrial, tuberous, *scapigerous herb*. Rootstock tuberous with scattered fleshy roots; tuber irregular, depressed, *c.* 1.2 cm across, brownish. **Leaves** radical, thick, rather fleshy; lamina 1.5–4 × 1.5–3 cm, orbicular to suborbicular, coriaceous, prominently folded back, margins distantly toothed, greenish, sparsely glandular-hairy above, more concentrated near margins, glabrous, pale green and glaucous below, deeply cordate at base, rounded or obtuse at apex, nerves conspicuous; **petioles** 1.5–8.5 cm long, cylindrical, pinkish, glabrous. **Flowers** on scape; scape *c.* 15 cm long, 6–8-flowered, only two flowers mature at a time; flowers pinkish, *c.* 2 cm across, pinkish hairy at throat and pinkish striations above the throat; bracts *c.* 4 × 2 mm, ovate-lanceolate, obtuse, glabrous, pale green, faintly trinerved, margins entire; pedicels 2–2.5 cm long, pinkish, delicate, glabrous. **Lateral sepals** ovate to lanceolate, *c.* 3 × 2 mm, pale greenish with strong dark pink to red striations, obtuse at apex, concave at base, glabrous, margins entire; **lower sepal** boat-shaped, *c.* 7 × 3.5 mm, pale pink to white, margins entire, slightly undulate and recurved, narrowly

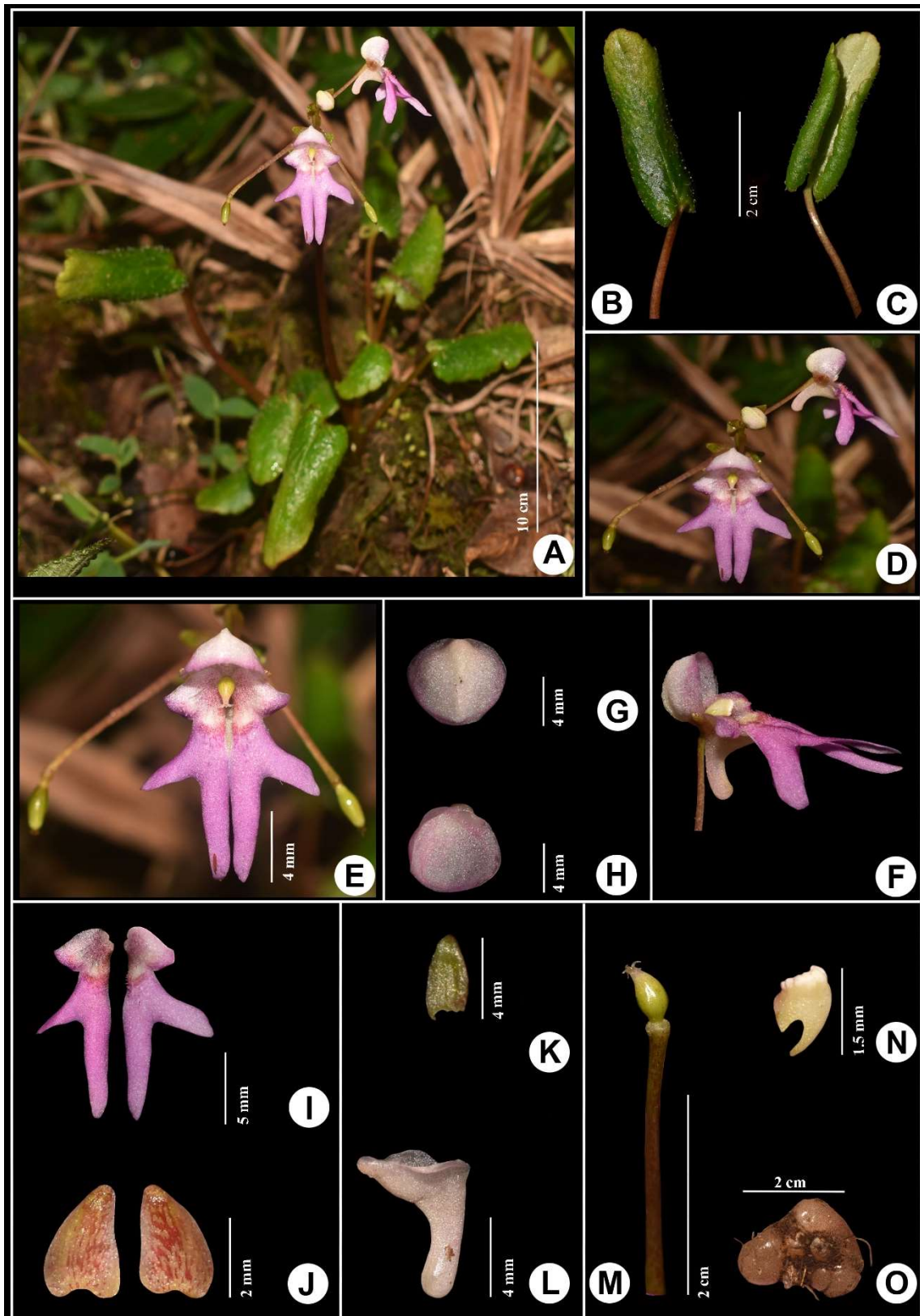
obtuse at apex, mouth wide, rounded at tip; **spur** straight, up to 7 mm long, pale pink to white, glabrous, cylindrical, slightly inflated at middle, obtuse at tip. **Upper petal** suborbicular, longer than broad, *c.* 6 × 5 mm, pale pink, margins entire, concave, glabrous, rounded at apex; **lateral united petals** unequally 3-lobed; **distal lobes** *c.* 1 × 0.2 cm, linear-oblong, pink; **middle lobe** *c.* 7 × 1 mm, oblong, pink, narrowed at tip, slanting on one side towards apex; **basal lobes** ca 5 × 2 mm, oblong-ovate, obtuse or acute at apex, notched at base; **anther column** *c.* 1.5 mm long, pale yellowish; **ovary** oblong-ovoid, *c.* 2 × 2 mm, slightly beaked with brownish hairs at apex, glabrous. **Capsules** greenish, oblong-ellipsoid, *c.* 4 mm long, inconspicuously ribbed, glabrous. (**Fig. 1**)

**Flowering and fruiting:** September–October.

**Distribution and Ecology:** The plants are growing in grasslands on the margins of streams in montane evergreen forests at an elevation of 2300 m. The associated plants species are *Arundinella fuscata* Nees ex Buse, *A. pumila* (Hochst. ex A. Rich.) Steud., *Drosera peltata* Thunb., *Ilex wightiana* Wall. ex Wight, *Impatiens lawsonii* Hook.f., *Impatiens* sp., *Isachne bourneorum* C.E.C. Fisch., *I. kunthiana* (Wight & Arn. ex Steud.) Miq., *Parnassia mysorensis* B.Heyne ex Wight & Arn., *Polytrias indica* (Houtt.) Veldkamp, *Senecio neelgherryanus* DC., *Strobilanthes wightiana* Nees and *Youngia nilgiriensis* Bab. Presently, the new species is known only from the Bangitappal area of Mukurthi National Park, Nilgiri Biosphere Reserve, Tamil Nadu.

**Etymology:** The species is named after its closely allied species *I. orchioides* as it resembles in the flower structure.

**Preliminary conservation status assessment:** *Impatiens neo-orchioides* has less than 10 km<sup>2</sup> of Extent of Occurrence (EOO) and less than 5 km<sup>2</sup> Area of Occupancy (AOO). The total number of mature individuals recorded is only 5; since the habitats of this species found within the limits of the protected area the chance of decline in number of individuals due to anthropogenic pressure is very less however due to existence of only a limited number of individuals the species is provisionally assessed here as a Critically Endangered (CR) species following IUCN Red List Categories and Criteria (IUCN 2022-2 ver.).



**Fig. 1:** *Impatiens neo-orchioides* V.Ravich., Murug., B.Karthik, Tharani & Premk. **A.** Habit. **B.** Leaf front view. **C.** Leaf back view. **D.** Inflorescence. **E.** Flower front view. **F.** Flower side view close up **G.** & **H.** Dorsal petal front and back view. **I.** Lateral united petals. **J.** Lateral sepal. **K.** Bract. **L.** Spur. **M.** Pedicel with ovary. **N.** Anther column. **O.** Tuber. Photographs by M. Premkumar.



## ACKNOWLEDGMENTS

The authors express their profound gratitude to the Dr. A.A. Mao, Director, Botanical Survey of India, Kolkata and Dr. M.U. Sharief, The Scientist "F" & Head of Office, Botanical Survey of India, Southern Regional Centre, Coimbatore for the facilities and support. The authors sincerely thank to Dr. W. Arisdason, Scientist-'E', Botanical Survey of India, Southern Regional Centre, Coimbatore for corrections and suggestions for the improvement of manuscript. The authors are grateful to the Principal Chief Conservator of Forests (PCCF) and Chief Wildlife Warden, Tamil Nadu for granting necessary permission and also highly thankful to the Field Director, Mudumalai Tiger Reserve & Mukurthi National Park, District Forest Officers of Nilgiris Division, Forest Range Officer and other field staff of Mukurthi National Park, for their help and support during the field surveys.

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