



Impatiens brahmagiriana (Balsaminaceae): A new species from the southern Western Ghats of India

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ABSTRACT: A new species of Balsaminaceae, *Impatiens brahmagiriana*, under the section *Annuae*, collected from the Brahmagiri peak in the Wayanad district of Kerala located in the southern Western Ghats of India, is described here. This species shares morphological similarities with *I. inconspicua* Benth. ex Wight & Arn., and *I. madapurae* Bhaskar & Sringsw., but differs in the leaf character, number of flowers, length and pubescent nature of pedicels, standard petal, lateral sepals, wing petals, dorsal auricle, lip and spur. A detailed description, photographic plate and comparison table are provided to ease species identification.

KEY WORDS: Balsaminaceae, *Impatiens inconspicua*, *Impatiens madapurae*, new species, Taxonomy, Western Ghats.

INTRODUCTION

Impatiens Linnaeus (1753) is the largest genus of the family Balsaminaceae, comprising approximately 1,118 species (POWO, 2023). These species predominantly inhabit tropical and subtropical regions of the Old World, with some also found in temperate northern areas (Mabberley, 2008). In India, the genus encompasses about 280 species, with 162 being endemic (Vivekananthan *et al.*, 1997; Swaminathan *et al.*, 2001; Bhaskar, 2012). Within state of Kerala, *Impatiens* is represented by 110 species, 46 of which are endemic (Anil Kumar *et al.*, 2011; Narayanan *et al.*, 2011, 2012a,b, 2013; Sasidharan, 2011; Hareesh *et al.*, 2015a,b; Ramasubbu, 2015; Prabhukumar *et al.*, 2015a,b, 2016, 2017; Mani and Thomas, 2017; Manudev *et al.*, 2017; Mani *et al.*, 2018, 2020; Salish *et al.*, 2019; Vishnu *et al.*, 2020, 2021; Arya *et al.*, 2021; Balan and Robi, 2021; Biju *et al.*, 2022; Saravanan and Kaliamoorthy, 2022).

During a floristic survey of the Western Ghats, we collected *Impatiens* specimens from the Brahmagiri peak (North Wayanad Division, Begur Range, Tirunelly forest station), located in the Wayanad district of Kerala, India. Following a meticulous examination of live specimens, thorough analysis of existing literature, and consultation of type specimens from national herbaria such as CAL, MH, TBGT, and International virtual herbaria like BM, E, K, and P (herbarium acronyms follow Thiers, 2023, continuously updated), we determined that the collected plant species has not been previously described in available literature. Therefore, we present its description here as a new discovery in the field of science.

TAXONOMIC TREATMENT

Impatiens brahmagiriana Saravanan & Kaliamoorthy, *sp. nov.* **Fig. 1**

Type: INDIA. Kerala: Wayanad District, Brahmagiri peak, 11°55'44"N, 75°58'46"E ± 1322 m, 12 December 2019, Saravanan & Kaliamoorthy 136027 (holotype MH!; isotypes MH!).

Diagnosis: *Impatiens brahmagiriana*, a new species, shares morphological similarities with *Impatiens inconspicua* Benth. ex Wight & Arn., and *I. madapurae* Bhaskar & Sringsw., but differs in having two types of leaves: upper ones linear-lanceolate, lower ones ovate-lanceolate; flowers strictly 2 per axil; pedicels pubescent with 2 rows of hairs; standard petals dorsally pubescent with unicellular trichomes; lateral sepals acuminate at apex, hairy on costa dorsally and side facing downwards; basal lobe of the wing petals deltoid, distal lobes pale pink to dark pinkish, with or without a violet blotch on the throat; dorsal auricles round; lip internally glabrous and externally pubescent; spur minutely pubescent on one side. All three closely related species belong to the section *Annuae* and subsection *Oppositifoliae*. The comprehensive morphological difference between *Impatiens brahmagiriana* and its allied species are given in Table 1 and Figure 2.

Herbs, up to 25.7 cm long. Stem terete, glabrous, green with purple, much branched; branches opposite. Leaves opposite-decussate, petiolate, acuminate at apex, round at base, margins distantly serrulate to denticulate, 0.4 cm between serratures, teeth 0.1 cm long, acute at apex, tinged with red, abaxially glabrous, pale green, adaxially pubescent, dark green, nerves 4–5 pairs; basal leaves 4.3 × 1.8 cm, ovate-lanceolate; distal leaves 5.1 ×



Fig. 1. Photo plate of *Impatiens brahmagiriana* T. S. Saravanan & S. Kaliamoorthy **A.** A portion of plant; **B.** Flower with violet blotch on throat; **C.** Flower without violet blotch; **D.** Lateral view of the flower; **E.** Standard petal; **F.** Lateral sepal; **G.** Wing petal; **H.** Lip; **I.** Lip showing the spur; **J.** Ovary with pedicel; **K.** Androecium; **L.** Mature fruit with pedicel; **M.** Seed. (Photographs by T. S. Saravanan)

**Table 1.** Diagnostic morphological characters of *Impatiens brahmagiriana* and related species.

Characters	<i>Impatiens brahmagiriana</i>	<i>I. inconspicua</i> *	<i>I. madapurae</i> **
Height	26 cm long.	38 cm long.	48 cm long.
Leaves	2 types; upper leaves linear-lanceolate, lower ones ovate-lanceolate, margins distantly serrated.	All leaves linear-lanceolate, margins distantly serrated.	All leaves linear-lanceolate, margins closely serrated.
Flowers	2 per axil, 1.2 cm across, pale pink to dark pinkish, with/without violet blotch on throat.	1-3 per axil, 0.6 cm across, white.	Solitary, 0.5 cm across, pink.
Pedicel	2.6 cm long in flowers, 3.1 cm long in fruits, pubescent with 2 rows of hairs.	1.1 cm long in flowers, 1.6 cm long in fruits, pubescent with a line of hairs.	1.9 cm long in flowers, 2.8 cm long in fruits, minutely pubescent with a line of hairs.
Standard petal	0.3 × 0.3 cm, dorsally pubescent with unicellular trichomes.	0.2 × 0.2 cm, dorsally glabrous.	0.3 × 0.3 cm, dorsally glabrous.
Lateral sepals	0.5 × 0.1 cm, acuminate at apex, hairy on costa dorsally and side facing downwards.	0.2 × 0.1 cm, acute at apex, glabrous.	0.2 × 0.1 cm, acute at apex, glabrous.
Wing petals	Basal lobe 0.2 × 0.1 cm, deltoid, acute; distal lobe 0.9 × 0.6 cm, asymmetrically obovate-sub-orbicular, pale pink to dark white, pinkish, with/without violet blotch on throat.	Basal lobe 0.2 × 0.1 cm, linear; distal lobe 0.6 × 0.4 cm, obovate, like.	Basal lobe 0.1 × 0.01 cm, thumb like, acute; distal lobe 0.3 × 0.3 cm, sub-orbicular, pink.
Dorsal auricle	Minute, round, green.	Minute, spiniform, white.	Minute, acute, green.
Lip	0.5 × 0.2 × 0.1 cm, glabrous internally, pubescent externally.	0.4 × 0.2 × 0.1 cm, glabrous on both surfaces.	0.4 × 0.2 × 0.1 cm, glabrous on both surfaces.
Spur	0.1 cm long, slightly recurved, pubescent on one side.	Spur-less.	0.1 cm long, straight or slightly recurved, glabrous.
Anthers	Yellow.	Yellow/white.	Light pink.

*Based on the original protologue (Benth. ex Wight & Arn., Prodr. Fl. Ind. Orient. 139. 1834), type specimens (Wall. Numer. L. No. 4741 – K001039801, K000720273, G00237322 and G00237323) and Bhaskar thesis (141: 2012); **based on the original protologue (Bhaskar and Sringswara, 2017).

**Fig. 2.** Morphological comparison of three related species. **A.** *Impatiens brahmagiriana*; **B.** *I. inconspicua*; **C.** *I. madapurae*.

1.1 cm, linear-lanceolate; stipules subulate, dark red; petiole 0.3 cm long, glabrous, green. Flowers 2 per axil, 1.0–1.3 × 1.0–1.2 cm, pale pink to dark pinkish, with/without violet blotch on throat, pedicellate; pedicel 2.6 cm long in flowering and 3.1 cm long in fruiting, pubescent with 2 rows of hairs; bracts 0.1 × 0.1 cm, ovate-lanceolate, acute at apex, pinkish, glabrous; standard petal 0.3 × 0.3 cm, orbicular, concave, margins hyaline, dorsally pubescent with unicellular trichomes and keeled at apex; keel mucronate; mucro 1 mm long, glabrous; lateral sepals 0.5 × 0.1 cm, linear-lanceolate, acuminate at apex, hairy on costa dorsally and side facing downwards, pale pinkish with pale greenish towards apex; wing petals 1.1 × 0.6 cm, subequally 2-lobed, pale pink to dark pinkish, with/without violet blotches on the throat, stipitate; stipe 0.1 × 0.1 cm; basal lobe much smaller than distal lobe, arising from the base of the stipe, 0.2 × 0.1 cm, deltoid, acute at apex; distal lobe 0.9 × 0.6 cm,

asymmetrically obovate-sub orbicular, obtuse at apex; dorsal auricle minute, rounded, green; lip saccate, 0.5 × 0.2 cm, 0.1 cm deep, ovate in outline, acuminate at apex, glabrous internally, slightly pubescent externally, 3 longitudinal lines from base to apex, spurred; spur slightly recurved, 0.1 cm long, oblong, obtuse at apex, often slightly pubescent on one side, appearing spur-less when budding. Column 0.5 × 0.3 cm, incurved; filaments 0.4 × 0.1 cm, pale pinkish white; anthers yellow; pistil 0.2 × 0.1 cm, green, glabrous. Capsules 0.8 cm long, turgid, acuminate with a long beak, glabrous; seeds 4–6, 1 mm long, round, black, smooth and shining.

Phenology: Flowering & fruiting: September–December.

Distribution and Ecology: The new species is currently known only from its type locality and survives in various habitats, including the borders of evergreen forests, open plains, and on rock faces. It shares its habitat

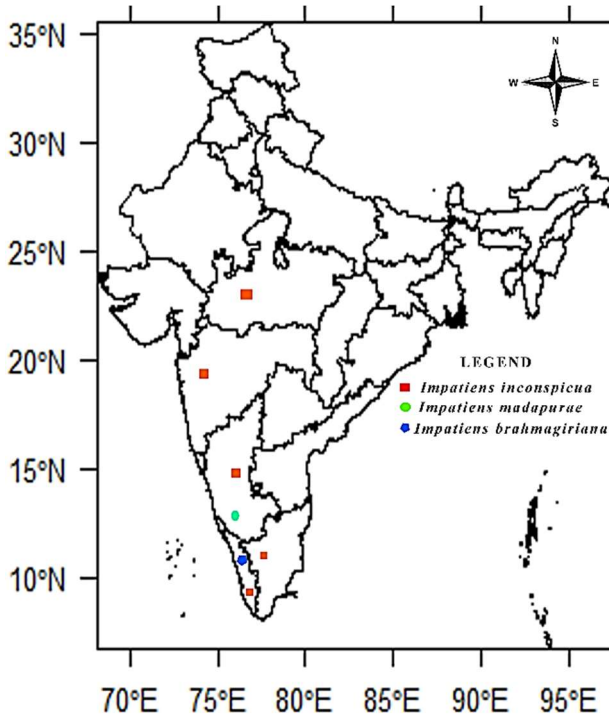


Fig. 3. Distribution map of three related species.

with several other plant species, such as *Chrysoglossum ornatum* Blume (1825), *Impatiens herbicola* Hook. f. (1911), *Impatiens scabriuscula* B. Heyne ex Wall. (1824), *Liparis biloba* Wight (1851), *Satyrium nepalense* D. Don (1825), *Zeuxine longilabris* (Lindl.) Trimen (1885), among others. The described new species can be found at elevations ranging from 1100 to 1400 meters.

On the one hand, *I. inconspicua* is typically a slender, flaccid herb that grows on grassy windswept slopes and moist rocky crevices within the evergreen forests of the southern Western Ghats, covering the states of Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, and Tamil Nadu, at elevations ranging from 1300 to 2200 meters. Similarly, *I. madapurae* is characterized by its erect, flaccid growth habit and prefers to grow on open exposed slopes, rocky crevices, and marshland areas within the evergreen forests of the southern Western Ghats in Karnataka, at an altitude of around 1620 meters (Fig. 3)

Etymology: The specific epithet "brahmagiriana" refers to the type locality, the Brahmagiri hills in the Wayanad District of Kerala, India.

Conservation Status: Based on its extent of occurrence, area of occupancy, number of populations, and number of individuals per population (which varies from 4 to 10 individuals per population), the collected plant species falls under the category of critically endangered (CR B1 ab (i, ii, v); 2ab (i, ii, iv); D) in accordance with the IUCN guidelines (IUCN, 2019).

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