



A new species *Impatiens* L. (Balsaminaceae) from Kodaikkanal Wildlife sanctuary, India

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ABSTRACT: *Impatiens dindigulensis* sp. nov., a new species of Balsaminaceae is described and illustrated from Kodaikkanal Wildlife Sanctuary, the Western Ghats of Tamil Nadu, India. The detailed description of taxon along with diagnostic characters between closely allied species, pollen morphology, illustration and colour photographs are provided.

KEY WORDS: *Impatiens dindigulensis*, *I. tanyae*, *I. tomentosa*, taxonomy, Western Ghats.

INTRODUCTION

Impatiens belong to the family Balsaminaceae which has more than 1,000 species distributed worldwide with two genera, *Hydrocera* Blume ex Wight & Arn. and *Impatiens* L. (Fischer, 2004; Stevens, 2001). The distribution of *Impatiens* are recorded in Southeast Asia and southwestern China, eastern to central Himalayas, Western Ghats, Tropical Africa, and Madagascar (Grey-Wilson, 1980) with limited distribution from temperate Eurasia and North America. In India, about 280 species of *Impatiens* were reported, of which 137 species are endemic (Swaminathan *et al.*, 2001; Bhaskar, 2012) with much concentration in the Western Ghats and Eastern Himalayas. However, this group has been studied sustainably by some researchers along with several new species (Bhaskar, 2012; Gogoi and Borah, 2013; Hareesh *et al.*, 2015, 2016a,b, 2017; Bhaskar and Sringswara, 2017; Mani *et al.*, 2017; Hareesh and Sabu, 2017; Prabhukumar *et al.*, 2016, 2017; Gogoi and Borah, 2015a,b, 2017; Ramasubbu *et al.*, 2015a,b, 2017; Bhaskar and Sringswara, 2017; Mani and Thomas, 2017; Mani *et al.*, 2018; Salish *et al.*, 2019; Vishnu *et al.*, 2020) and added to the Balsaminaceae of India.

During the field exploration at Palni hills (Kodaikkanal Wildlife Sanctuary) of the Western Ghats, Tamil Nadu, India, authors collected a herbaceous member of *Impatiens* with smaller herb with oblong, truncate based densely pubescent leaves, 2 prominent greenish stipular glands, solitary pale purple flowers, large bucciniform lower sepal, unequal 2-lobed spinular dorsal petal and prominent basal lobe in lateral united petals which has a close affinity to *Impatiens tanyae* R. Kr. Singh *et al.* (Arigela *et al.*, 2019) and *I. tomentosa* B. Heyne (Wight and Walker-Arnott, 1834). After careful examination of specimens and analysis of available literature and herbarium specimens, the present collections belong to a hitherto undescribed species.

Hence, the specimen collected was described here as new species with detailed description, line drawings and photographs based on available living materials.

TAXONOMIC TREATMENT

Impatiens dindigulensis Ramas., Anjana & Chandra, *sp. nov.* **Figs. 1 & 2**

Type: India, Tamil Nadu, Dindigul District, Palni hills (Kodaikkanal Wildlife Sanctuary), Poondi, 10°14'44.978N; 77°23'15.441E; 1938msl, 21 August 2018, R. Ramasubbu & Anjana 644 (holotype: TBGT!; isotype: GUD118, TAI).

Description: Annual villose herbs, erect, succulent, 10–15 cm tall. Stem terete, less branched, sometimes unbranched greenish-yellow stem, densely villose with white hairs throughout, appears like velvety, prominently swollen at nodes, rooting at lower nodes, internodes 4–6 cm. Leaves simple, opposite-decussate, oblong, 2.8–3.0 × 1.5–1.8 cm, deep green and villose above, pale green-white below, villous at main nerve, base truncate, apex acute, margin recurved, spinose, leaf blade teeth 0.5–1.0 mm, pinkish, lateral nerves 4–5 pairs, impressed prominently; subsessile, petioles 1–2 mm long, densely villose, two prominent greenish stipular glands, 2–3 mm. Flowers solitary, axillary, 1.4–2.3 cm across, purplish to pale purplish, pedicel 2.8–4.1 cm long, tomentose throughout. Lateral sepals 2, linear, 5.1–6.2 × 0.6–1.0 mm, apex acute, purple-greenish, not keeled, membranous; incurved, densely tomentose above, lower sepal bucciniform, purple with yellow tinge on base, 8.0–9.5 × 5.0–6.3 mm, densely tomentose, tapering into a spur; spur 2–3 mm long, tubular, incurved, pubescent. Dorsal petal broadly ovate, 2-lobed, unequal, 5.3–6.8 × 4.0–4.9 mm, dorsal surface purplish, tomentose with numerous long hairs, cucullate, dorsally keeled, apex spinular; ventral surface pale-purplish to purplish, glabrous; lateral united petals 1.6–1.8 × 0.6–0.9 cm,



Fig. 1. *Impatiens dindigulensis* Ramas., Anjana and Chandra, sp. nov. **A.** Habit; **B.** Leaves, abaxial view; **C.** Leaves, adaxial view; **D.** Pair of stipular glands; **E.** Leaves; margin with spines; **F.** Stem with hairs; **G.** Flower, lateral view; **H.** Flower basal view; **I.** Flower front view; **J.** Dorsal petal. **K.** Lateral united petal; **L.** Lateral view of lower sepal; **M.** SEM view of Pollen; **N.** Fruit; **O.** Seeds.

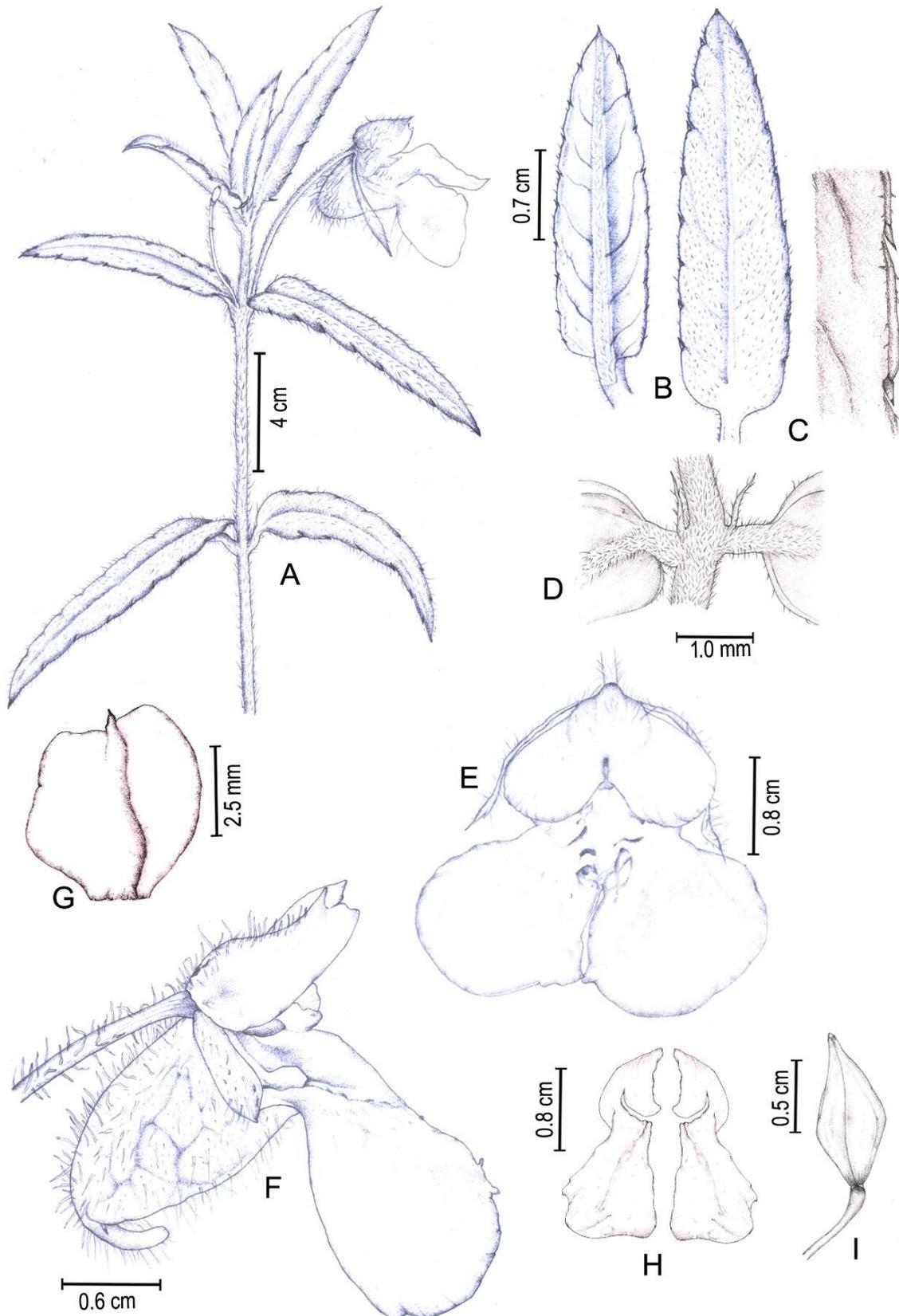


Fig. 2. *Impatiens dindigulensis* Ramas. Anjana and Chandra, sp. nov. **A.** Habit; **B.** Leaves, abaxial view; **C.** Leaves, adaxial view; **D.** Pair of stipular glands; **E.** Flower front view; **F.** Flower, lateral view; **G.** Dorsal petal; **H.** Lateral united petal; **I.** Fruit.

**Table 1.** Comparative vegetative and floral morphology of *Impatiens tanyae*, *I. tomentosa* and *I. dindigulensis*.

Characters	<i>Impatiens tanyae</i>	<i>Impatiens tomentosa</i>	<i>Impatiens dindigulensis</i> sp.nov.
Habit	70 cm tall pubescent	30 cm tall, pubescent	10–15 cm, villous
Leaves	ovate, base cordate	oblong-lanceolate or oblanceolate, base cordate,	oblong, base truncate
Petiole	sessile	petiole 1–2 mm	petiole 0.5–1.0 mm
Stipules	absent	absent	two prominent greenish stipular glands, 2–3mm,
Flowers	1–2 per axil	1 – 5 per axil	solitary
Lateral sepals	falcate, apex acute, dorsally not keeled	linear-narrowly lanceolate, apex acute-acuminate, dorsally keeled	linear, apex acute, not keeled
Lower sepal	7–9.5 × 4.5–5.5 mm, navicular, spur 7–8 mm	1–1.2 × 5.5–6 mm, navicular, spur 3–4 mm	8.0–9.5 × 5.0–6.3 mm, bucciniform, spur 2–3 mm
Dorsal petal	broadly ovate, apex spinular	suborbicular-orbicular, apex apiculate	broadly ovate, 2-lobed, unequal, apex spinular
Lateral united petals	basal lobe absent; claw 2.5– 3 mm long	basal lobe absent; claw 4–5 mm long	basal lobe oblong/ spherical, claw 2.5–3 mm long, oblong

bilobed, subequal, basal lobe prominent oblong/spherical, distal lobe unevenly triangular, obtuse at apex, clawed, claw 2.5–3 mm long, oblong, purple with yellow tinge on margin. Stamens 2.6–3.2 mm long, pale purple-white, glabrous, enclosing ovary; anther ca. 0.5 mm long. Pistil 1.7–2.4 × 0.6–1 mm; ovary oblong, glabrous. Capsule lanceoloid, 1.2–1.6 × 0.4–0.6 cm, turgid at middle, green, glabrous, apiculate at apex; seeds 9–13, ovoid, ca. 1 mm across, shining, dark brown-black on maturity.

Habitat, Phenology and Conservation status: *Impatiens dindigulensis* is recorded from Kodaikanal Wildlife Sanctuary, Dindigul district, Tamil Nadu. This species is growing in degraded shola forests associated with *Pinus*, *Eucalyptus* and *Acacia* plantations. This species is associated with *Habenaria longicorniculata* J. Graham, *Cyanotis villosa* (Spreng.) Schult. & Schult. f., *Drosera peltata* Thunb., *Drosera burmanni* Vahl, *Isachne kunthiana* (Wight & Arn. ex Steud.) Miq., *Utricularia arcuate* Wight etc. *Impatiens dindigulensis* is assessed as Endangered (EN) by the preliminary survey. However, more field studies are required to observe details as to the extent of decline.

Distribution: This taxon has been collected only from the Kodaikkanal Wildlife Sanctuary of the Western Ghats, Tamil Nadu, India with altitude ranging from 1931–1949 msl.

Etymology: The species is named after Dindigul district (Tamil Nadu) where the type locality Kodaikkanal Wildlife Sanctuary is located.

Notes: *Impatiens dindigulensis* is collected from degraded shola forests of Poondi, Kodaikkanal Wildlife Sanctuary, Dindigul, Tamil Nadu. Also, the mature pollen grains were collected from fresh specimens and processed for acetolysis and SEM preparation and analysed the morphological features. *Impatiens dindigulensis* is closely allied with *Impatiens tanyae* R. Kr. Singh *et al.* and *Impatiens tomentosa* B. Heyne, but differ by its smaller sized herb with oblong, truncate based densely pubescent leaves, two prominent greenish stipular glands, solitary pale purple flowers, large

bucciniform lower sepal, unequal 2-lobed spinular dorsal petal and prominent basal lobe in lateral united petals.

Ecology: This herb is growing under shady areas of Semi-evergreen forests with altitude ranging from 1931–1949 msl.

Distribution: The distribution of this species has restricted to about 5–7 kms with about 250–300 individuals. All collections were made from a different location and furthermore field studies are required to observe the rate of decline.

Phenology: Flowering period was observed in the month of September with peak (individuals with more number of flowers) in November whereas fruiting period was observed at the end of October with peak fruiting in December.

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