

**A NEW SCAPIGEROUS SPECIES OF *IMPATIENS* (BALSAMINACEAE)
FROM INDIA**

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Abstract

Impatiens minae Ratheesh, Anil Kumar & Sivad. a new scapigerous species of *Impatiens* from Wayanad district in Kerala, India is described and illustrated. The new species resembles *Impatiens denisonii* and *I. scapiflora* by its 3-lobed lateral united petals and lower sepal with a long spur; but differs from the latter in having a curved band of dense fleshy clavate papillae at the base of lateral united petals, and from the former in the absence of a dorsal filiform appendage or auricle at the base of the lateral united petals.

Introduction

The genus *Impatiens* L. (Balsaminaceae) is one of the largest and difficult genera of angiosperms comprising over 1000 species (Mabberley, 2008), and several new species are being recognized and described each year. The earliest detailed study of the genus was by Hooker and Thomson (1859); and revision by Warburg and Reiche (1895) with infrageneric classification.

The major contributions on Indian species are those of Hooker (1874-1875, 1904, 1905, 1906). In India the genus is represented by over 203 taxa mainly distributed in three major centres of diversity, i.e. Western Himalayas, North East India and the Western Ghats, each characterized by its own species groups and sections (Hooker, 1910; Gamble, 1915; Rajalal *et al.*, 1996; Vivekananthan *et al.*, 1997). The scapigerous species of *Impatiens* have very restricted distribution in South Indian-Sri Lankan region with very low diversity and high rate of endemism compared to non-scapigerous species (Grey-Wilson, 1980; Nair, 1991; Vivekananthan *et al.*, 1997). Except *Impatiens acaulis*, which is distributed throughout the wet tropical forests of Western Ghats and Sri Lanka, all other species have very narrow distribution pattern in various small microcentres in Western Ghats, especially in its southern part. They are highly delicate ephemerals thriving mainly on moss covered tree-trunks or on wet rocks for a short duration in monsoon season. Classification of the 'Scapigerae' section is mainly based on the lobes of the lateral petals, the spur of the lip and the dorsal auricle on the lateral petals. Vivekananthan *et al.* (1977) reported 19 species of scapigerous *Impatiens* from Western Ghats in his treatment for the flora of India, and the major centre of distribution is considered to be Nilgiri phytogeographical region of southern Western Ghats (Bhaskar, 1981, 2006; Bhaskar and Razi, 1982; Vivekananthan *et al.*, 1997; Viswanathan

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and Manikandan, 2003). Out of the 30 species of *Impatiens* reported from Periyar Tiger Reserve in Kerala, 3 are scapigerous (Augustine *et al.*, 1999). In a recent study Dessai and Janarthanam (2011) recognized seven scapigerous species in the northern and parts of central Western Ghats.

During the floristic exploration of Wayanad district in Kerala which is unique for its rich and diverse flora and home of several endemics (Sivadasan and Balakrishnan, 1989; Sivadasan and Jaleel, 2002; Narayanan *et al.*, 2010a; Narayanan *et al.*, 2010b), interesting specimens of scapigerous *Impatiens* with a spur of lower sepal longer than 3 cm and a curved band of dense fleshy papillae at basal part on the lateral united petals were collected from two different localities in southern Wayanad. Critical examination revealed that the specimens are quite distinct from hitherto known scapigerous species of *Impatiens*, and is described and illustrated here as a new species.

Impatiens minae Ratheesh, Anil Kumar & Sivad., **sp. nov.**

(Figs 1, 2)

Diagnosis: *Impatiens denisonii* Bedd. *et Impatiens scapiflorae* Heyne *ex* Roxb. *connato-lateralio-petalis 3-lobatis, infero-sepalis longe calcaratis similis, sed ab I. denisonii connato-lateralio-petalis dorsaliter base haud filiformio-appendiculatis et ab I. scapiflorae ad minimosupra bases dense carnosopetalloide papillatis, papillis in curvato-vittam dispositis differt.*

Types: India, Kerala: Wayanad District, Chembra hills, Rocky grasslands, 11°30.716' N, 76° 06.239' E, ± 1700 m, 17 August 2006, M. K. Ratheesh Narayanan MSSH 1113 (*Holotype*: CAL; *Isotype*: MH; Community Herbarium, Scarascia Magnozza Genetic Resource Centre, MSSRF, Chennai; Herbarium of the M. S. Swaminathan Research Foundation, Kalpetta).

Paratypes: India, Kerala: Wayanad District, Chembra hills, Rocky grasslands, 11°30.716' N, 76°06.239' E, ± 1700 m, 23 July 2009, Ratheesh Narayanan MSSH 4815 (MH; Community Herbarium, Scarascia Magnozza Genetic Resource Centre, MSSRF, Chennai; Herbarium of the M. S. Swaminathan Research Foundation, Kalpetta).

Scapigerous terrestrial herbs, 25-30 cm high; rootstock tuberous. Leaves 3-5, radical, fleshy, 5-8 × 5-7 cm, ovate-orbicular or reniform, obtuse or rounded at apex, base cordate, margin crenate or serrate, finely hairy, pinkish green above, glabrous, pale green below, primary veins usually 6, palmate; petioles up to 8 cm long, pink. Scape racemose, many-flowered (up to 15), 25-30 cm long, glabrous. Flowers clustered at the apex, deep pink, each c. 2.5 cm across; pedicels 2.0-2.5 cm long; bracts thick, fleshy, broadly ovate, obtuse, 3-5 × 2-3 mm, reddish green. Lateral sepals 2, each 3.0-4.0 × 2.0-2.2 mm; lower sepals long-spurred, spur slender, 3.0-3.5 cm long, pink, slightly recurved or pendent. Dorsal petals broadly orbicular, saccate, 5-6 × 5-7 mm; lateral united petals 3-lobed, pink, with a slightly curved band of dense red-tipped clavate papillae just above base; basal lobes slightly larger than the distal lobes, curved outwards, c. 1 cm long, broadly oblong, rounded; middle lobes broader towards tip, c. 8 mm long, broadly obovate; distal lobes strap-shaped, c. 8 mm long. Stamens 5, connate, c. 1.8 × 1.4 mm; filaments white with pink tinge above; anthers pale blue. Ovary pale yellowish green, 1.7-1.8 × 1.0-1.3 mm, elliptic, broadly acute

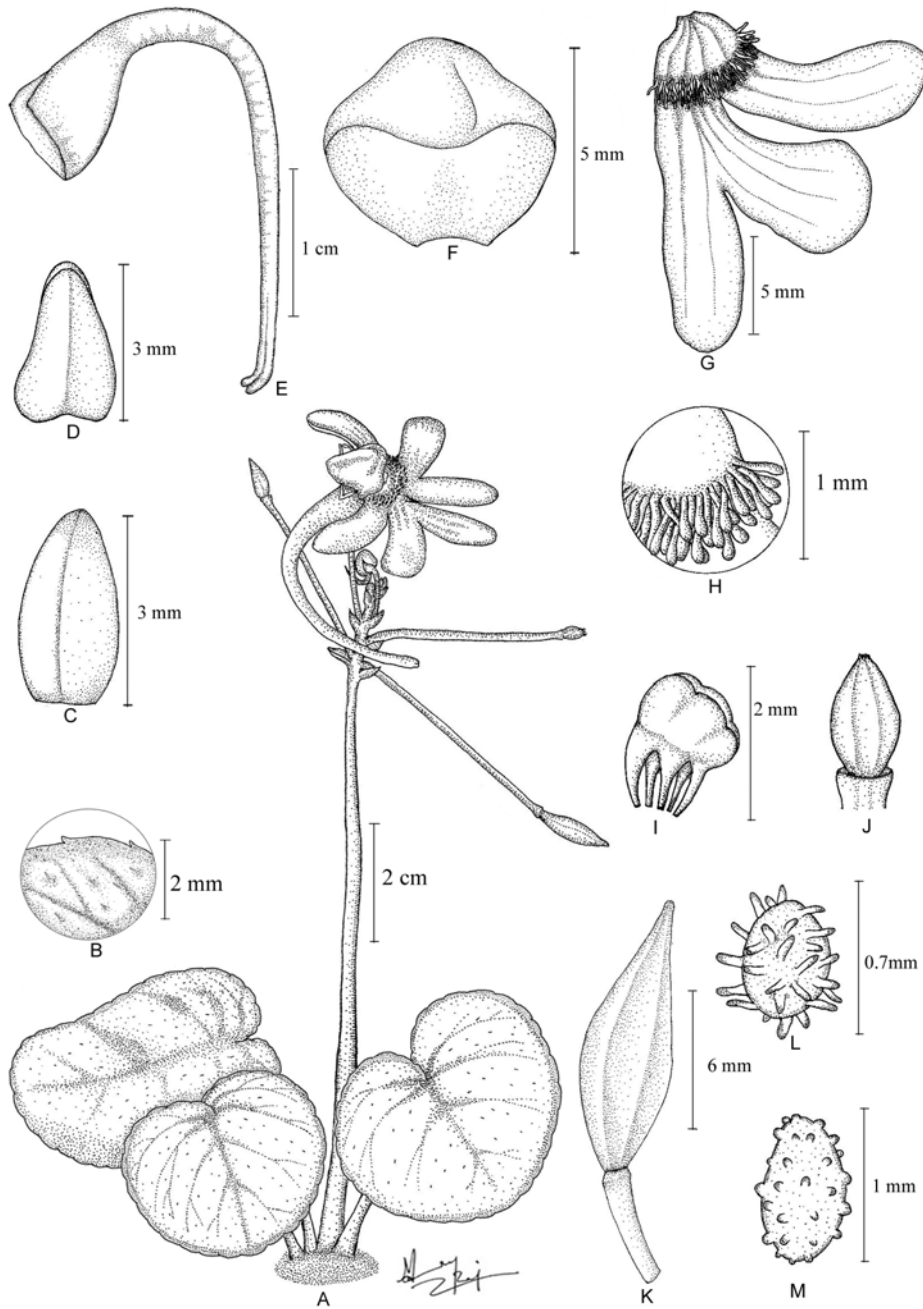


Fig. 1. *Impatiens minae* Ratheesh, Anil Kumar & Sivad. sp. nov. A, Habit; B, A portion of leaf margin - enlarged; C, Bract; D, Lateral sepal; E, Lower spurred sepal; F, Standard petal; G, Lateral united petals; H, Papillae on the lateral united petals - enlarged; I, Anthers; J, Gynoecium; K, Fruit; L, Immature seed; M, Mature seed. (Drawn from *M. K Ratheesh Narayanan MSSH 4815*, Community Herbarium, Scarascia Magnozza Genetic Resource Centre, MSSRF, Chennai).

at apex, glabrous. Capsule glabrous, reddish green, broadly ellipsoid, apex acute, 1.3-1.8 cm long. Seeds numerous, c. 1 mm long, outside short-blunt spinous.

Impatiens minae is allied to *Impatiens denisonii* Bedd. and *Impatiens scapiflora* Heyne *ex* Roxb., but distinctly differs from both by the characters given in the Table 1

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

Characters	<i>I. denisonii</i>	<i>I. minae</i>	<i>I. scapiflora</i>
Leaves	Ovate, apex acute, base cordate, with deep sinus, densely hairy, pink, 7.0-15.0 × 7.5-10.0 cm	Broadly ovate-orbicular, thick, fleshy, apex obtuse or rounded, base cordate, densely hairy, deep pink, 5-8 × 5-7 cm	Orbicular or broadly ovate, base cordate with deep sinus, sparsely hairy, green, 8-15 × 5-12 cm
Spur of flower	3-4 cm long, strongly recurved, pink	3.0-3.5 cm long, slightly curved or pendent, pink	4-6 cm long, strongly recurved, white
Lateral united petals	With long dorsal filamentous appendage/auricle produced into the spur	Without a dorsal appendage/auricle	Without a dorsal appendage/auricle
Papillae on lateral united petals	A curved band of pink with red-tipped petaline papillae present just above the base of lateral united petals	A curved band of pink with red-tipped petaline papillae present just above the base of lateral united petals	Band of petaline papillae absent on the lateral united petals
Seeds	Surface covered with spiral hairs	Surface with short blunt spinous projections	Surface hispid

Etymology: The specific epithet of the new taxon is in honour of Ms. Mina Swaminathan, Advisor, M. S. Swaminathan Research Foundation, who has dedicated her life for the education and empowerment of underprivileged children and women in rural areas, and also in creating awareness among them on values and importance of biodiversity and its conservation.

Notes: *Impatiens minae* resembles *I. denisonii* Bedd. and *I. scapiflora* Heyne *ex* Roxb. in having 3-lobed lateral united petals and lower sepal with a long spur, but differs from *I. denisonii* by its fleshy, broadly ovate-orbicular leaves, absence of a dorsal filamentous appendage or auricle at the base of lateral united petals, and seeds having short, blunt spinous projections. It differs from *I. scapiflora* in having a slightly curved band of dense clavate papillae just above the base of lateral united petals. The seed-surface in *I. scapiflora* are hispid in contrast to the short, blunt spinous projections in *I. minae*.

Phenology: Flowering starts from July and peak time is August. Fruit matured during September-October.

Distribution and ecology: So far known only from the Chembra-Vellarimala hill ranges of Wayanad district in Kerala (Fig. 3). Grows in open wet and dripping rocky slopes in grasslands at

altitudes of 1600-2000 m associated with *Habenaria rariflora* A. Rich., *Ipsea malabarica* Hook. f., *Satyrium nepalense* D. Don, *Chlorophytum malabaricum* Baker, *Eriocaulon* spp., etc.

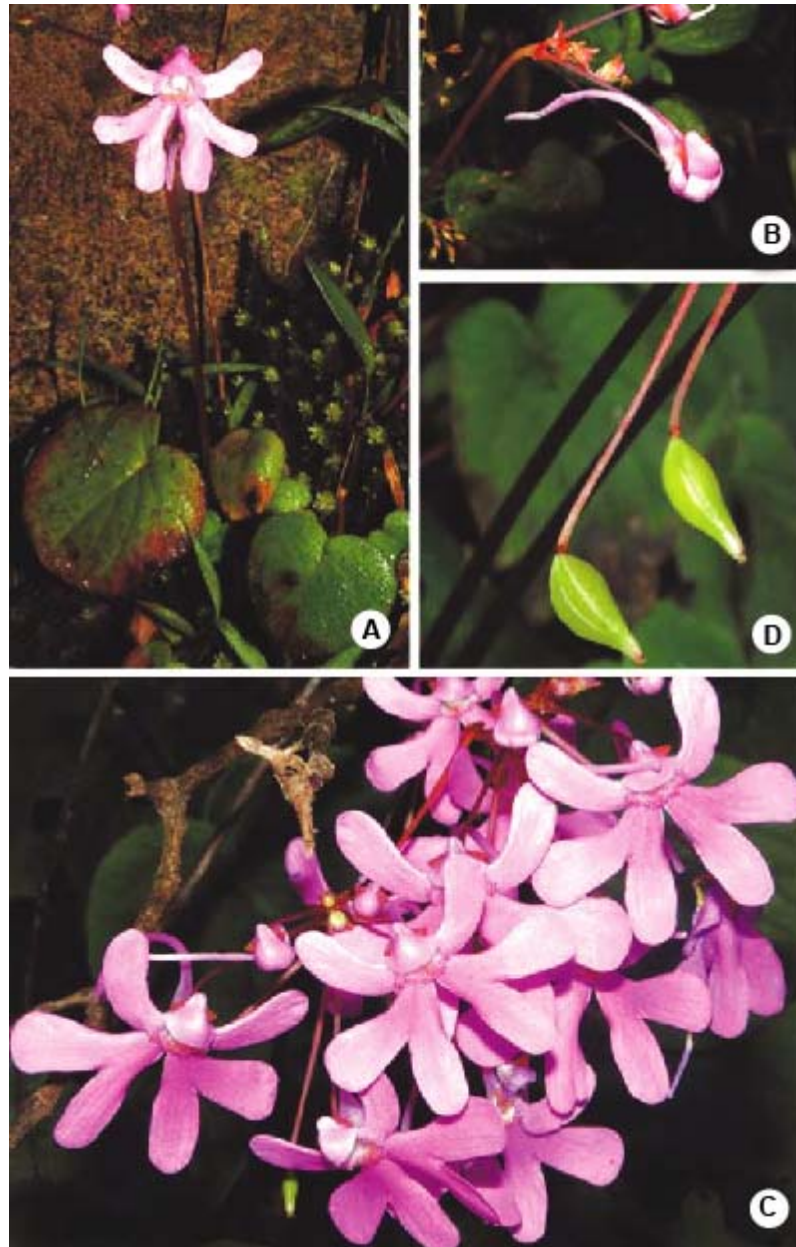


Fig. 2. *Impatiens minae* Ratheesh, Anil Kumar & Sivad. sp. nov. A, Habit; B, Flower bud; C, Flowers; D, Young fruits.

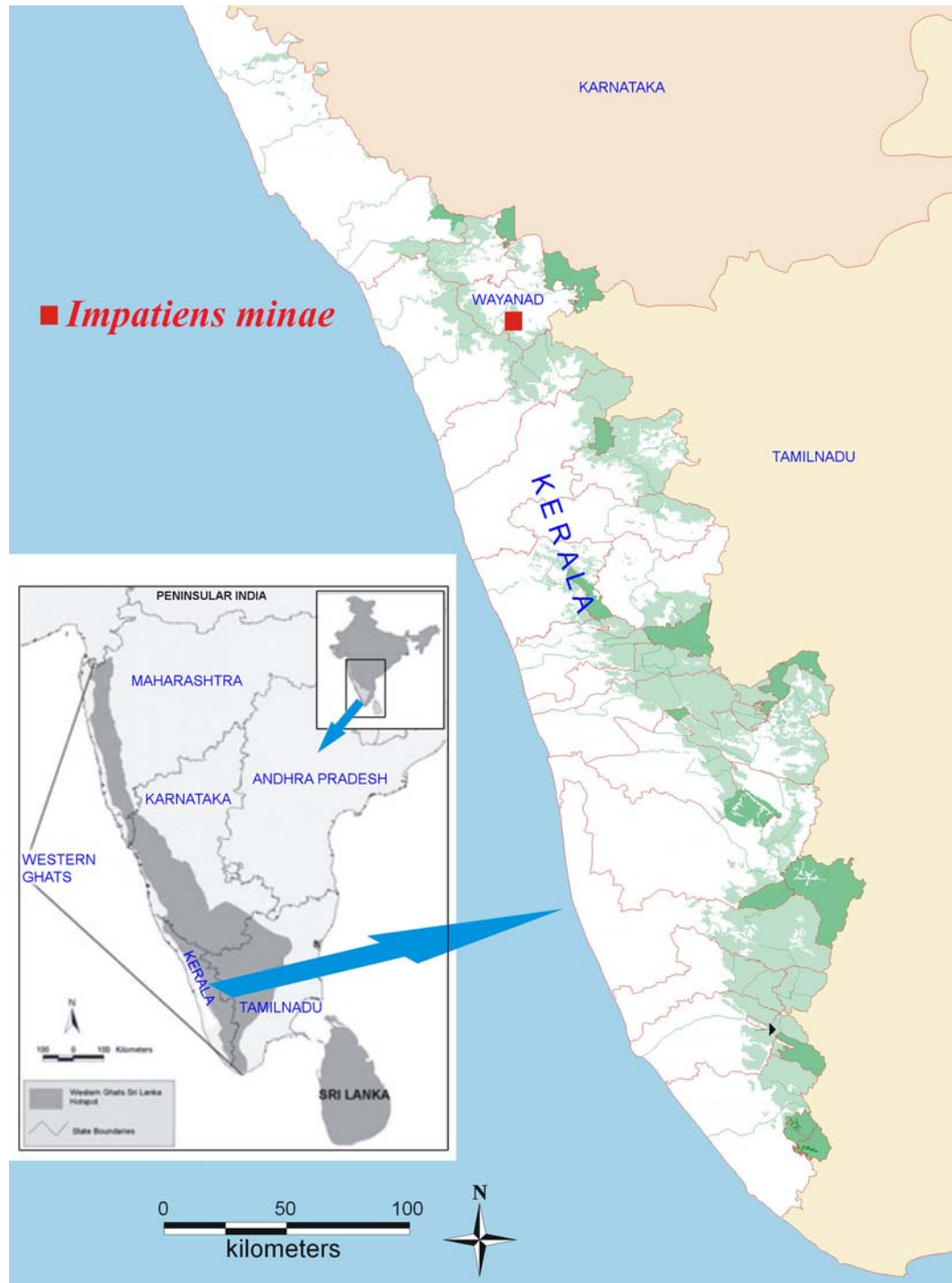


Fig. 3. Distribution of *Impatiens minae* Ratheesh, Anil Kumar & Sivad. sp. nov. in India.

Population structure and conservation status: The species is seen in open grassy slopes in clusters along with grasses, mainly along the slopes between 1500 and 1700 m above the sea level of Chembra-Vellarimala hill ranges. It is observed that they are distributed in isolated patches from southern to northern part of the hill ranges. The southern most population is located in the high altitude grassy slopes of south-east side of Chembra hills of Meppady forest range and major population is in the north-west slopes of the Chembra hills belonging to the same forest range of Wayanad district. The populations are small and scattered along this hill ranges and are restricted to 30 sq. km area. This hill ranges are not under any protected areas. Increased anthropogenic interference in the form of tourism and forest fire enhance the crisis. Its geographic range (extent of occurrence) and the quality of habitat are declining continuously. By following IUCN criteria (IUCN, 2001) for assessing the status of Rare and Threatened plants, *M. minae* is assessed as belonging to Critically Endangered (CR) category.

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