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### SCULLY'S BALSAM *IMPATIENS SCULLYI* HOOK.F. (BALSAMINACEAE): A NEW RECORD FOR INDIA FROM HIMACHAL PRADESH

Ashutosh Sharma, Nidhan Singh & Wojciech Adamowski

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## SCULLY'S BALSAM *IMPATIENS SCULLYI* HOOK.F. (BALSAMINACEAE): A NEW RECORD FOR INDIA FROM HIMACHAL PRADESH

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**Abstract:** *Impatiens scullyi* Hook.f. is reported here as a new record for India as well as for the western Himalaya from Kullu and Mandi districts of Himachal Pradesh. To facilitate its identification, detailed description along with colour images are provided here.

**Keywords:** Angiosperm, balsam, flora, western Himalaya.

*Impatiens* L. (Balsaminaceae) is one of the largest genera of angiosperms in the world represented by over 1,000 recognized species (Bhaskar 2012; Yu 2012; Mabberley 2018) distributed in the tropical, subtropical, and northern temperate regions of the Old World, with several species reaching North America. In India, the genus is represented by more than 210 taxa, mostly distributed across the Himalaya and the Western Ghats (Vivekananthan et al. 1997; Bhaskar 2012). According to Gogoi et al. (2018), there are at present around 235 species of the genus in India.

During the recent botanical expeditions to some remote valleys of Kullu District in Himachal Pradesh,

the first author came across an interesting *Impatiens* species which, after detailed studies, turned out to be *Impatiens scullyi* Hook.f. A screening of the literature revealed that this species was first collected by J. Scully from Nepal and was mentioned by Sir J.D. Hooker from central Nepal (Hooker 1904–1906). It was described in detail later by Akiyama et al. (1991) from central and eastern Nepal. The species was regarded as confined to the country in the list of endemic plants of Nepal (Rajbhandari et al. 2016). Yu (2012), however, reported it from southern Tibet (Xizang).

After further critical analysis, the authors came across an old specimen preserved at the herbarium of the Royal Botanic Garden Edinburgh, collected from Sungri in Shimla in September 1888. This was identified as *Impatiens micranthum* Edgew. probably by the collector, Sir George Watt himself (Image 3A). The collection, however, was finally identified as *Impatiens* aff. *scullyi* in 2015 by Dr. Shinobu Akiyama, who was working on the revision of the Nepalese *Impatiens*.

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This specimen forms the only herbarium record for this species (or its allies) from India, but its identification was not confirmed. There is no information on *I. scullyi* in botanical literature from the western Himalaya (Chowdhery & Wadhwa 1984; Aswal & Mehrotra 1994; Dhaliwal & Sharma 1999; Singh & Rawat 2000; Basu & Uniyal 2002; Kaur & Sharma 2004; Klimeš & Dickore 2005; Singh & Sharma 2006; Chawla et al. 2008, 2012; Dad & Khan 2010; Verma & Sharma 2012; Dar et al. 2014; Pal et al. 2014; Subramani et al. 2014; Singh et al. 2015; Kumar et al. 2016; Das et al. 2018; Pusalkar & Srivastava 2018). As there is no record of this species from India, the authors hereby report the newly collected specimen as the first authentic distribution record of *I. scullyi* Hook.f. from India.

#### Taxonomic treatment

*Impatiens scullyi* Hook.f. in Rec. Bot. Surv. India 4: 15. (1905); H. Hara in H. Hara & L.H.J. Williams, Enum. Fl. Pl. Nepal 2: 80 (1979); S. Akiyama et al. in Bull. Univ. Tokyo No. 34: 78 & Image 4C (1991).

Annual herbs, 30–90 cm tall, stem succulent, swollen at nodes, often rooting from lower nodes. Leaves alternate, aggregated at the apical part of stem; petiole 10–20 mm long; lamina broadly lanceolate to oblong-ovate, 8–14 cm x 4–6 cm, glabrous with crenate margins. Inflorescence racemose, 6–13 cm long, axillary, with 6–10 flowers, flowers congested on top of peduncle. Pedicel 1.5–2 cm long, slender, glabrous, with a bract at base. Bracts 3–4 mm long, narrowly ovate, acute at apex. Flowers 1.4–2.0 cm x 1.2–2.8 cm. Lateral sepals two, ovate, 3–4 mm long; lower sepal pale green to white, 5–7 mm x 12–20 mm, tubular; spur inconspicuous. Dorsal petal white, 4–6 mm x 6 mm, cucullate, with thickened greenish midrib, ending in a short horn or appendage; lateral united petals generally white to pale rose-coloured (only observed in a few individuals) with a yellow spot at the base of the lower lobe, 11–14 mm long; the upper lobe ovate, c. 3mm x 2mm; the lower lobe with two rounded lobes, 9–11 mm x 5–6 mm, with a very characteristic long appendage (10–13 mm long) elongating into the tubular lower sepal. Stamens five; anthers without appendage. Capsules unevenly linear, 2–3 cm long, green with pale yellowish stripes, enclosing 2–5 seeds. Seeds c. 4mm long (Images 1 & 2).

**Phenology:** Flowering was observed starting from the end of June, commencing along with fruiting until September. Seeds ripen in September–October.

#### Ecology and Distribution

*Impatiens scullyi* is primarily a terrestrial species growing along ravines in dense colonies and often beneath wet, dripping rocks in association with *I. leggei*, *I. devendrae*, *Urtica ardens*, *Lecanthus peduncularis*, *Pilea scripta*, and *Elatostema sessile*.

*Impatiens scullyi* is distributed between 1,600–2,400 m along ravines in Kullu and Mandi districts of Himachal Pradesh. It is most likely also distributed in some neighbouring districts, especially in Shimla, as can be concluded from an old, initially misidentified collection. A few images of this species, again misidentified as *I. micranthemum*, can be seen on efloraofindia portal (Efloraofindia 2007 onwards), wherein one record exists from the Great Himalayan National Park of Kullu District and two others from Shimla District. Both these localities correspond to the same districts as observed here, thus further confirming the present distribution evidence.

*Impatiens scullyi* was reported from Nepal growing between 1,800m and 2,630m (Akiyama et al. 1991) and from southern Tibet between 700m and 2,400m (Yu 2012).

#### Conservation status

*Impatiens scullyi* Hook.f. was earlier known only from Nepal and southern Tibet in the central and eastern Himalaya. We hereby present its first distribution record from the western Himalaya. We assess this species as Vulnerable in India as per the IUCN Red List regional criteria due to its restricted and fragmented distribution range, as it is distributed only in a few localities and that too with a low population of some 100 mature individuals. In both the surveyed locations, the species is generally distributed along ravines. Flash floods in monsoon may pose some minor threat to the plant population distributed along the ravines. Based on field surveys conducted in the last two years, we are of the view that this taxon is restricted in its distribution for reasons yet unknown. Along with flash floods, the competition faced from other fiercely growing plants of the same habitat can also be one of the reasons for its low population.

#### Remarks

Edgeworth (1846) described many new species from northwestern India on the basis of his own herbarium collection. For most species, he had not only herbarium specimens but also the notes taken from living plants at the moment of collection. One of these species is *Impatiens micranthemum* Edgew.

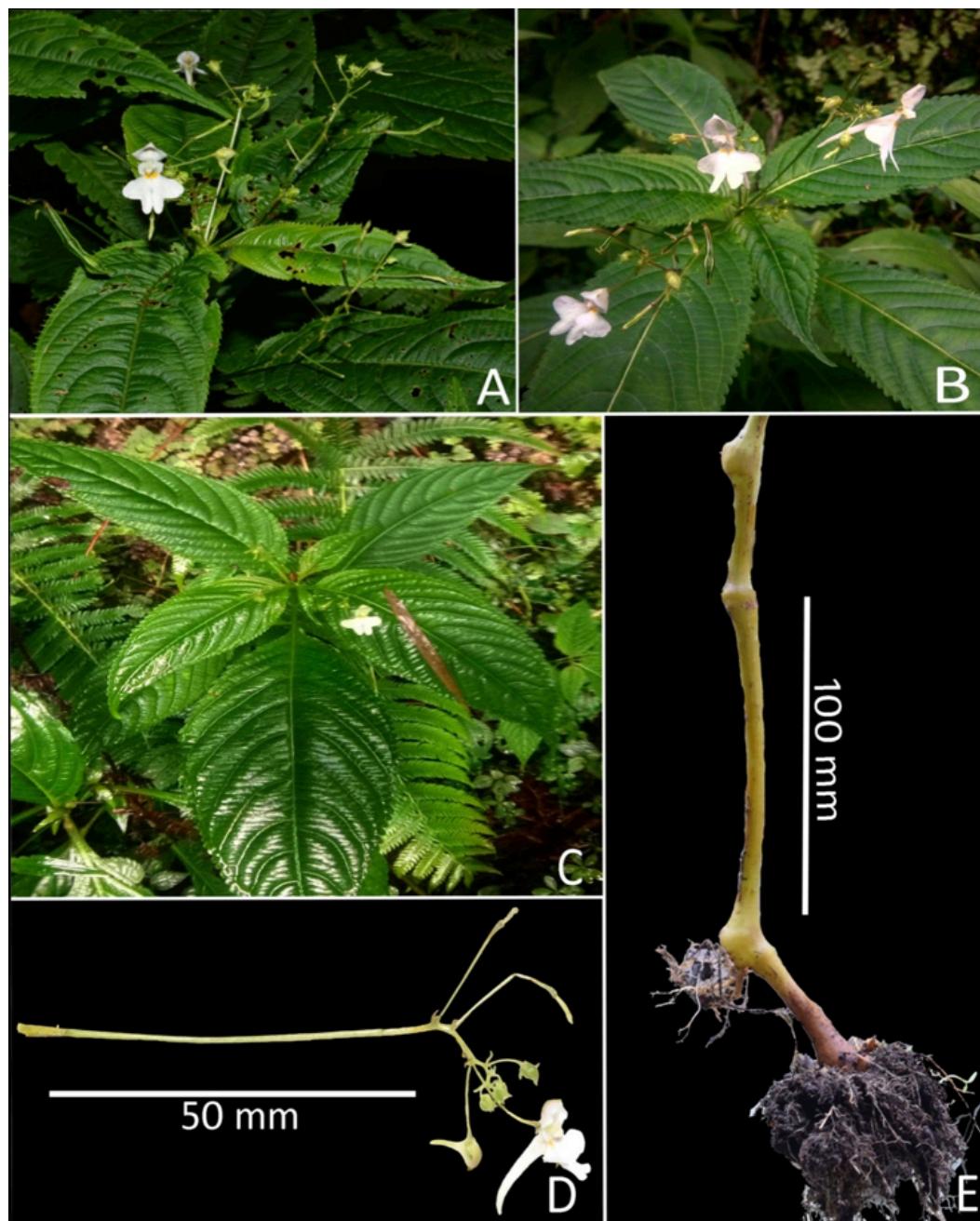


Image 1. *Impatiens scullyi* Hook.f.: A–B - Plant flowering in its natural habitat | C - Habit | D - Inflorescence | E - Swollen nodes with adventitious roots appearing on the lower node. © Ashutosh Sharma.

(Edgeworth 1846: 40). In most sources, it is treated as a synonym of *I. laxiflora* Edgew. (Edgeworth 1846: 40; Grey-Wilson 1991; The Plant List 2013). It was described as having predominantly white or whitish flowers, but inflorescences with 3–4 flowers, stems with sparse black glands and round lower lobe of lateral united petals. These features clearly differentiate it from *I. scullyi*, as described by Hooker (1904–1906) and Akiyama et al. (1991). There is, however, nothing in Edgeworth's

description of *I. micranthemum* about a long appendage on lateral united petals, characteristic of *I. scullyi* (see Akiyama et al. 1991 and Image 2) and very rare in other species of the *Impatiens* genus.

The material of *I. scullyi* from Nepal (Akiyama et al. 1991) and southern Tibet (Yu 2012) look very similar to the material from Himachal Pradesh. There are slight differences in the colour of the different flower parts and the shape of lateral united petals, without taxonomic

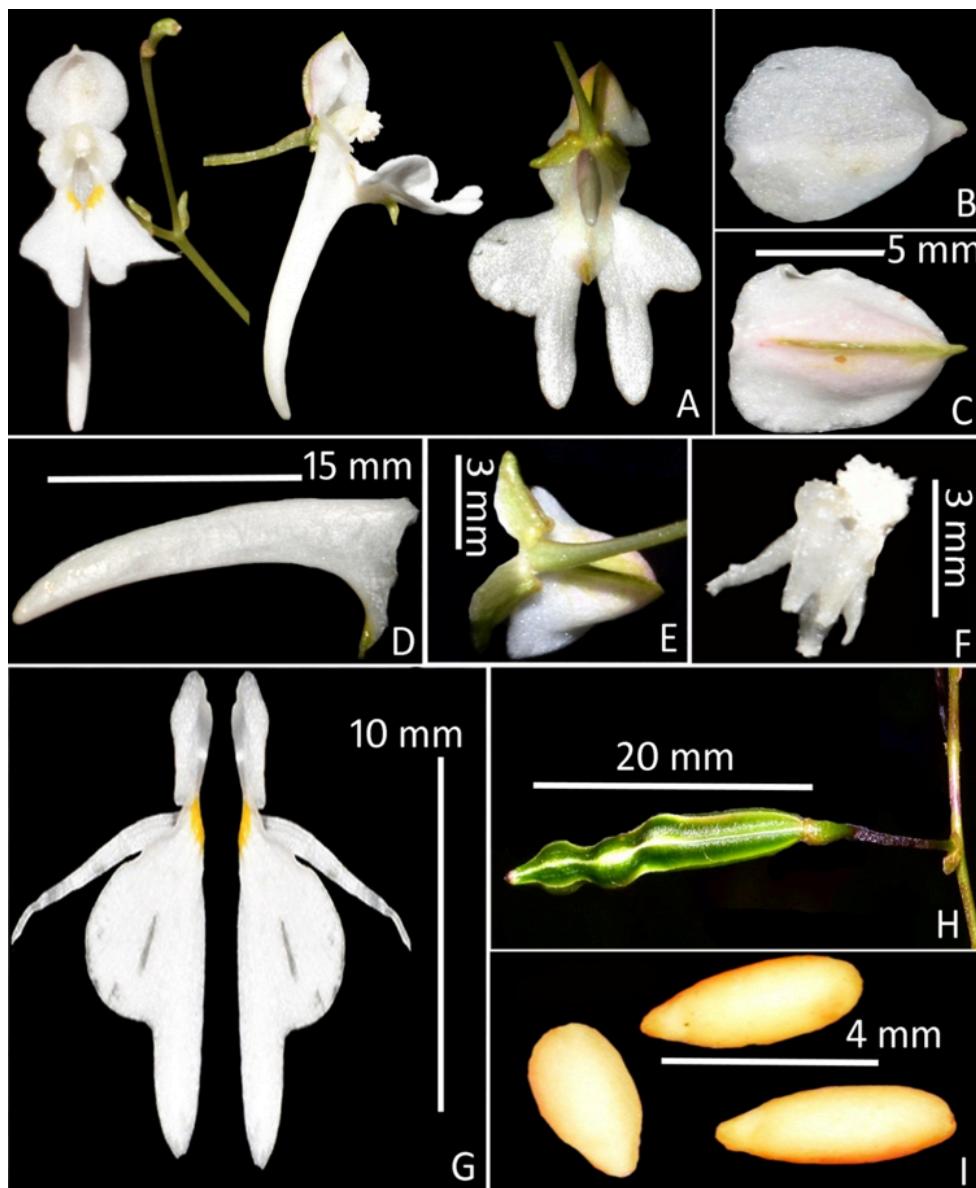


Image 2. A - Flower in front view, lateral view, and back view | B - Dorsal petal in dorsal view | C - Dorsal petal in ventral view | D - Lower sepal | E - Lateral sepals | F - Column | G - Lateral united petals | H - Seed capsule | I - Seeds (unripe). © Ashutosh Sharma.

significance. Akiyama et al. (1991) comment that flower size and shape of lateral united petals are variable in this species.

*Impatiens scullyi* seem to be more widely distributed in Nepal, as confirmed by specimens from E (Royal Botanic Garden Edinburgh Herbarium) and KATH herbaria (National Herbarium and Plant Laboratories, Lalitpur, Nepal), as well as images from Langtang National Park, north of Kathmandu, posted on the iNaturalist portal (iNaturalist) under the name *I. edgeworthii*. *Impatiens edgeworthii* could have white flowers but has lower sepal with distinct spur and the characteristic shape of the upper lateral petal (for images, see (for images, see

Korina 2019).

There are two surprising records of *I. scullyi* from the easternmost Himalaya, west of Namcha Barwa Mountain (southeastern Tibet) on the Global Biodiversity Information Facility portal (GBIF Secretariat). We tracked these records in MSG herbarium (Ludwig-Maximilians-Universität, Munich) in Munich and found that these are misidentifications of another balsam species with small, coarsely crenate leaves and one-flowered inflorescences (see Image 4).

**Specimens examined:** DD172573, 04.viii.2018, India, Himachal Pradesh, Mandi District, Dhaved (near



Image 3. A - Specimen of *Impatiens* aff. *scullyi* from the Herbarium of the Royal Botanic Garden Edinburgh (E00848289) | B - Specimen of *Impatiens scullyi* from the Herbarium of FRI, Dehradun (DD 172574; own collection).

Khanni), 31.653°N & 77.283°E, 1,600–1,900 m, coll. Ashutosh Sharma; DD172574, 15.viii.2018, India, Himachal Pradesh, Kullu District, Jhuni, 31.870°N & 77.324°E, 1,800–2,100 m, coll. Ashutosh Sharma (Image 3B); No. 9420261, 12.viii.1994, Nepal, Rasuwa District, Lingju Tibling, 28°12'N & 85°07'E, 2,040–2,130 m, coll. F. Miyamoto, K.R. Rajbhandari, S. Akiyama, M. Amano, H. Ikeda & Y. Tsukaya (KATH005907; seen as a picture); No. 8427, 16.ix.1954, Nepal, Mardi Khola, 2,280m, coll. Stainton, Sykes & Williams (KATH030467; seen as a picture); No. 4367, 12.ix.1954, Nepal, Gurjakhani, 2,590m, coll. Stainton, Sykes & Williams (E00848293; seen as a picture); No. 9043, 15.x.1954, Nepal, Bhujihola, 2,440m, coll. Stainton, Sykes & Williams (E00848290; seen as a picture). One individual was collected from each location listed.

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**Image 4.** Specimen of *Impatiens* from Tsango Gorge in southeastern Tibet stored in the Ludwig-Maximilians-Universität, Munich (MSG) Herbarium, misidentified as *I. scullyi*. Notice the small leaves, coarsely crenate leaf margins, and one-flowered inflorescences

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