

## *Impatiens tatoensis* (Balsaminaceae): a new species from Arunachal Pradesh, Northeast India and notes on lectotypification of the name *I. spirifera* Hook.f. & Thomson

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### Abstract

*Impatiens tatoensis* Gogoi & W.Adamowski, a new species from Northeast India with affinities to *I. spirifera* Hook.f. & Thomson is described and illustrated. We provide a lectotypification for the name *I. spirifera* Hook.f. & Thomson as well as a description and illustrations of the species.

### Introduction

Northeast India harbours a great wealth of flora that is still poorly known. One of the most striking examples of this species richness is demonstrated by *Impatiens* L. Recent expeditions of remote areas of Arunachal Pradesh and neighboring states have collected material of *Impatiens*, which has resulted in several new species descriptions (Gogoi and Borah 2013a, 2014, 2015a–e; Hareesh *et al.* 2016), rediscoveries, and extensions of known distribution (Gogoi and Borah 2013b; Gogoi *et al.* 2013, 2015; Borah *et al.* 2015; Odyuo *et al.* 2015; Verma *et al.* 2016).

During a September 2012 expedition to the remote Lower Dibang valley district, Arunachal Pradesh, *I. spirifera* Hook.f. & Thomson was collected. The first records of *I. spirifera* appeared from a collection by J.D. Hooker from Sikkim in the year 1849 during his expeditions to Sikkim and Khasia Hills (present day Meghalaya) with T. Thomson. A description of *I. spirifera* (as '*spirifer*') was made by J.D. Hooker and T. Thomson in 1860 from a specimen now found at K (Fig. 1). However, the description was based on two syntypes (barcode K000694931 and K000694933) and hence a lectotypification is necessary.

An *Impatiens* similar to *I. spirifera* was retrieved on a collecting expedition to the West Sian district of Arunachal Pradesh during July 2013. This unknown species and *I. spirifera* share axillary inflorescences, a coiled spur, two lateral sepals and a subfusiform capsule. However, after a critical examination of the literature and specimens from Northeast India and adjacent areas (Hooker 1875, 1905, 1908, 1910; Toppin 1920; Grey-Wilson 1989, 1991; Vivekananthan *et al.* 1997; Huang 2003; Huang *et al.* 2006; Chen *et al.* 2008; Yu 2012; Akiyama 2015a,b), we find that the unknown taxon can be readily distinguished from *I. spirifera* (Hooker & Thomson 1860) by its perennial habit, two-flowered inflorescences, violet flowers and lateral sepals with dentate margins. In this paper, we describe this taxon as *Impatiens tatoensis* and supply a lectotypification and abridged description of *I. spirifera*.



Fig. 1. Lectotype of *Impatiens spirifera* Hook.f. & Thomson (K000694933! <http://specimens.kew.org/herbarium/K000694933>) © The Board of Trustees of the Royal Botanic Gardens, Kew. Reproduced with the consent of the Royal Botanic Gardens, Kew.

**Impatiens tatoensis** Gogoi & W.Adamowski sp. nov.

**Holotype:** India. Arunachal Pradesh: West Siang, between Tato and Menchukha, 30 Jul 2013, R. Gogoi 30536 (CAL); isotypes: ASSAM.

Perennial non succulent herb, sparsely branched, up to 60 cm tall, stem terete, glabrous, nodes slightly swollen, stem slightly winged. *Leaves* distributed evenly along the stem, alternate, petiole 1–4.5 cm long, green, lamina green above, pale beneath, elliptic to ovate-lanceolate, 3.5–12 × 1.5–6 cm, glabrous, veins much reticulated, base cuneate to attenuate, apex acuminate, margin serrate, setose in the tip of the teeth, stipule absent, veins 7–11 pairs, subopposite. *Inflorescence* axillary, fascicle of one or two flowers, peduncle absent. *Flower* violet, bud greenish-violet. *Pedice*l green, glabrous, to 2.5 cm, bract at the base, bract subulate, to 6 × 2 mm, purplish, persistent, margin white, entire, apex acuminate, mid-vein prominent. *Sepals* lateral 2, obliquely ovate, to 9 × 6 mm, greenish purple, margin dentate, apex acuminate; lower sepal bucciniform, constricted into a spur, purple-violet with dull orange and white blotches, to 2.5 cm deep, mouth beaked, to 1.5 mm, curved upward, ventral side of the mouth with an elongated keel, spur coiled, to 1 cm long, white or light violet, tip unid. *Dorsal petal* purple-violet, orbicular, to 1.5 × 1.7 cm, apex emarginate, dorsal side with an appendage appearing like a flat horn with a widened base. *Lateral united petals* bilobed, subequal, purple-violet with dull orange and white blotches, to 3 cm long (whole), basal lobe orbicular, to 1.3 cm long, apex emarginate, clawed, distal lobe unevenly dolabriform, apex emarginate, to 1.8 × 1 cm, auricle yellow, triangular, 3 × 3 mm. *Stamens* to 7 mm long, anther lobes obtuse. *Capsule* subfusiform, green, slightly ribbed, 2.5 cm long, 2 mm wide, glabrous. *Seeds* many, black, 2 mm wide, papillate. **Fig. 2.**

**Phenology:** Flowering and Fruiting occurs in July.

**Habitat and Ecology:** *Impatiens tatoensis* is endemic to West Siang district of Arunachal Pradesh. It grows at an altitude of c. 1800 m above sea level, in the margin of moist evergreen subtropical forest along with *Polygonum chinense* L., *Pilea* sp., and *Elatostema* sp.

**Etymology:** The species epithet denotes the type locality of Tato of West Siang, Arunachal Pradesh.

**Conservation status:** Several roadside colonies of the new species were encountered consisting of c. 25 individuals. At present there is no known threat to the existence of the species. A future survey is required to determine the extent of the known population and if there are other populations.

**Notes:** *Impatiens tatoensis* is similar to *I. spirifera* Hook.f. & Thomson in having an axillary inflorescence, a lower sepal gradually constricted into a coiled spur, two lateral sepals present, and a subfusiform capsule (Figs 2, 3). *Impatiens tatoensis* differs from *I. spirifera* in having a perennial habit (annual in *I. spirifera*), glabrous leaves (puberulent in *I. spirifera*), inflorescence 2-flowered fascicle (single flowered in *I. spirifera*), flowers violet (pink in *I. spirifera*), floral parts glabrous (hairy in *I. spirifera*), margin of lateral sepals dentate (entire in *I. spirifera*), dorsal petal with flattened horn-like appendage (appendage thorn-like in *I. spirifera*) and keel on the ventral side of lower sepal (ventral side of lower sepal without keel in *I. spirifera*) (Figs 2, 3).

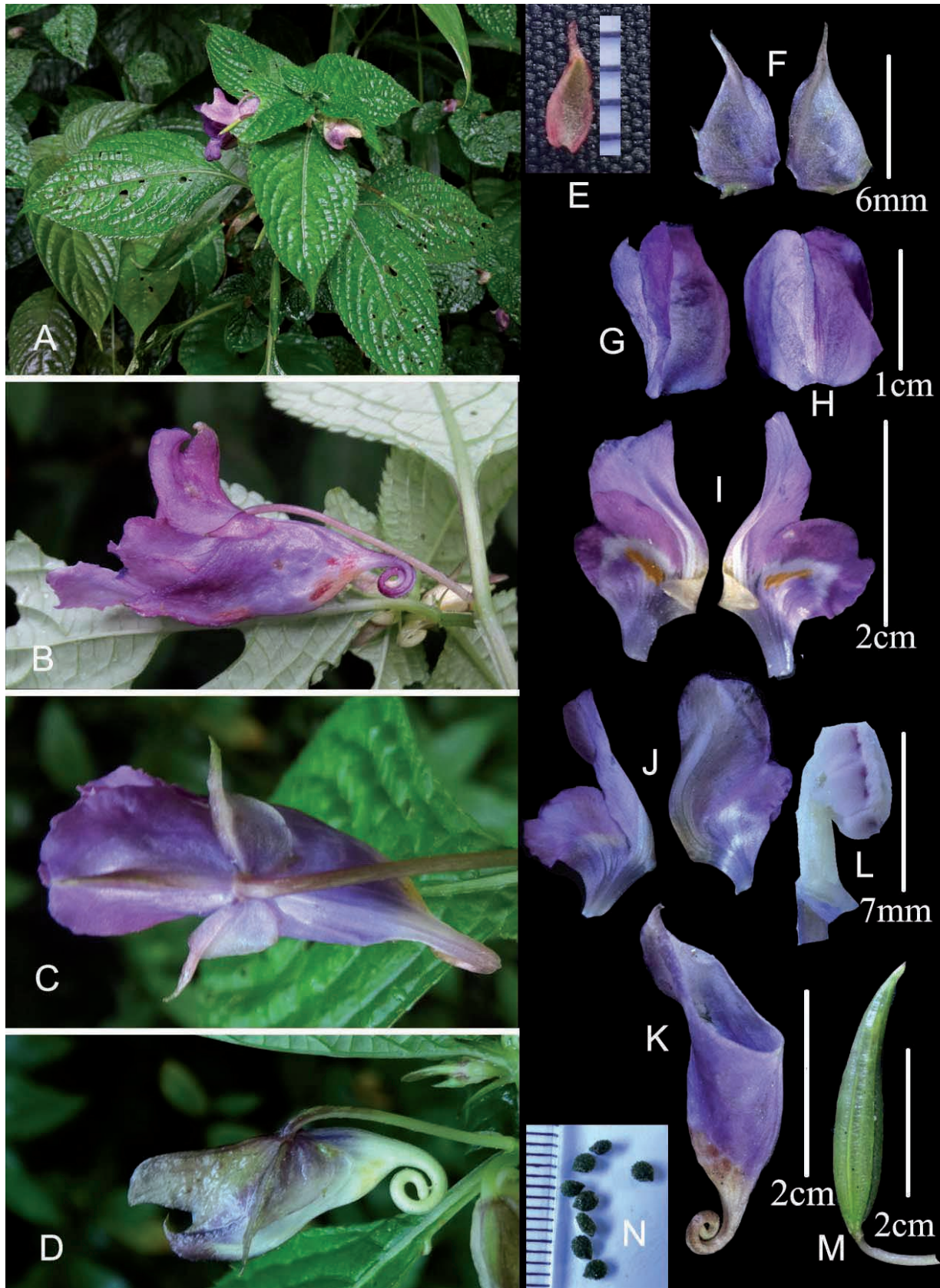
**Impatiens spirifera** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot, 4: 135 1860.

Type citation: Sylvis temperatis subtropicisque Himalayae orientalis Sikkim, alt. 4000-7000 ped.! J.D.H.(Fl. Oct-Dec).

Lectotype (designated here): India. Sikkim, Choongtam, 1849, 4000-5000ft., J.D. Hooker s.n. K000694933 Image ! (K).

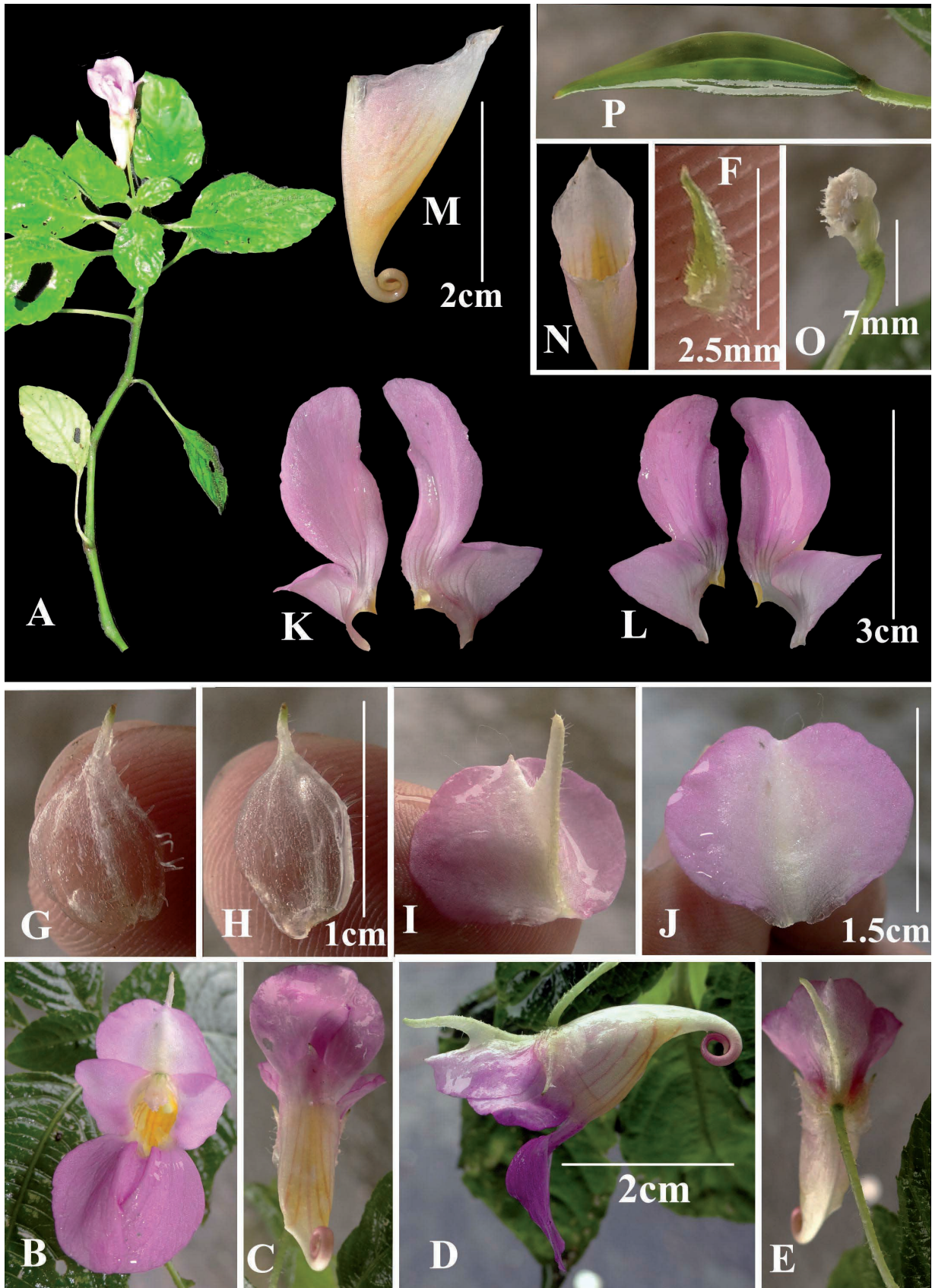
Annual non-succulent herb, unbranched or rarely branched, up to 45 cm tall, stem terete, without swollen nodes, upper stem portion puberulent. *Leaves* distributed evenly along the stem, alternate, petiole 0.6–4.5 cm, green, stipule absent, lamina elliptic to ovate-lanceolate, sometimes oblique, 3–9 × 1.5–5 cm, puberulent on both sides, mainly upper surface, base cuneate to attenuate or oblique, apex acuminate, margin crenate, setose between teeth, veins 6–9 pairs, subopposite. *Inflorescence* axillary, single flowered, without peduncle. *Flower* pink, pedicel up to 4.5 cm, puberulent, bract at the base, lanceolate, 2.5–1.5 mm, persistent, apex acuminate, puberulent. *Sepals* lateral 2, suborbicular to orbicular, transparent, 0.7–1 × 0.6–0.9 cm, apex acuminate, margin with ciliate hairs. Lower sepal bucciniform, gradually constricted into a spur, pink or pinkish white with yellowish hue and some darker venation, to 2.2 cm deep, mouth minutely beaked, spur coiled, pink, up to 1.2 cm, tip unid. *Petals* dorsal petal orbicular, 1.5–1.8 × 1.5–2 cm, apex emarginate, dorsal side with whitish, pointed, thorn-like, pilose appendage, to 7 mm long, pointing forward. *Lateral united petals* pink, bilobed, subequal, to 3.6 cm (whole), to 1.6 cm wide, basal lobe orbicular or suborbicular, apex obtuse, not clawed, auricle to 3.5 mm long, 2 mm tall, yellowish; distal lobe oblong dolabriform, to 2.5 cm long, 1.4 cm wide, apex rounded; stamens upright, to 3 mm long, anther lobe obtuse. *Capsule* a subfusiform, green, ribbed capsule to 2.5 × 0.3 cm, seeds brown, 2.5 mm across. **Figs 1, 3.**





**Fig. 2.** *Impatiens tatoensis*: A, habit; B, flower lateral view; C, flower dorsal view; D, flower bud lateral view; E, bract; F, lateral sepals; G, dorsal petal lateral view; H, dorsal petal dorsal view; I, lateral petals ventral view; J, lateral petals dorsal view; K, lower sepal; L, stamens; M, capsule; N, seeds (scale in mm). Images by R. Gogoi (R. Gogoi 30536).





**Fig. 3.** *Impatiens spirifera* Hook.f. & Thomson: A, habit; B, flower frontal view; C, flower ventral view; D, flower lateral view; E, flower dorsal view; F, bract, G–H, lateral sepal ventral and dorsal view; I, dorsal petal dorsal view; J, dorsal petal ventral view; K & L, lateral united petals dorsal and ventral view; M, lower sepal; N, lower sepal mouth; O, stamens; P, capsule. Images by R. Gogoi (R. Gogoi 21874).

**Phenology:** Flowering and fruiting July to September.

**Additional specimens examined:** Arunachal Pradesh, Lower Dibang valley, between Tiwari gaon and Mayodia, 1200m, 19 Sep 2012, R. Gogoi 21874 (ARUN and ASSAM); Sikkim, Choongtang, 6000-8000 ft., Sep 1903, Dr. Prain's collector 141; Sikkim, Pashok, 26 Aug 1862, T. Anderson 564 (CAL); West Bengal, Darjeeling, 22 Sep 1869, C.B. Clarke 9211 (CAL).

**Notes on lectotypification of *I. spirifera* Hook.f. & Thomson:** The description of *I. spirifera* Hook.f. & Thomson was based on a voucher at K (Fig. 1). The herbarium sheet includes five specimens with three separate barcodes that RBG and K have attached: one barcode represents three specimens (K000694932), and one for each of the remaining specimens (K000694931 and K000694933!). Specimen K000694932 was annotated by J. D. Hooker (in pencil) as *I. decipiens* Hook.f. and delineated from the remaining two specimens. For the type we here designate specimen K000694933, that J. D. Hooker has annotated (with illustrations) as corresponding most closely with the protologue of *I. spirifera* Hook.f. & Thomson (Hooker & Thomson 1860).

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