Ann. Bot. Fennici 50: 165–168 ISSN 0003-3847 (print) ISSN 1797-2442 (online)
Helsinki 14 May 2013

Impatiens unguiculata (Balsaminaceae), a new species from Xizang, China

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Received 24 Sep. 2012, final version received 12 Feb. 2013, accepted 13 Feb. 2013

Cong, Y. Y., Cai, X. Z. & Liu, K. M. 2013: *Impatiens unguiculata* (Balsaminaceae), a new species from Xizang, China. — *Ann. Bot. Fennici* 50: 165–168.

Impatiens unguiculata K.M. Liu & Y.Y. Cong, *sp. nov*a (Balsaminaceae), is described and illustrated. It was found in moist places along rivers in the Yaluzangbu Grand Valley Nature Reserve in Xizang, China. Diagnostic morphological characteristics that distinguish *I. unguiculata* from the morphologically similar *I. drepanophora* are discussed.

Impatiens is the largest genus of Balsaminaceae, with more than 900 species worldwide (Chen *et al*. 2007), and is distributed from temperate to tropical areas, being especially speciose in mountainous areas of eastern Asia. Most of the species have very restricted distributions (Grey-Wilson 1980, Chen *et al*. 2007). About 250 species are known from China (Huang 2006, Chen *et al*. 2007, Yu *et al*. 2007, Cai *et al*. 2008, Cong *et al*. 2008, Hou *et al*. 2011), of which 32 species are reported from Xizang, or Tibet (Chen *et al*. 2007).

During field expeditions to search for *Impatiens* in the Yaluzangbu Grand Valley Nature Reserve in 2008, we collected an unusual species of *Impatiens* that we were unable to identify based on the *Flora of China* (Chen *et al*. 2007). Several herbarium specimens were prepared and material was fixed in a formalin-acetic-alcohol (FAA) solution for further study. Following morphological studies, literature consultation (Huang 2006, Chen *et al*. 2007), and an examination of material in PE and KUN, we concluded that our collection represented an undescribed species, which is described below.

Mature pollen grains and seeds were collected from fresh capsules and flowers of the holotype. For scanning electron microscopy, dried pollen grains and seeds were mounted on stubs, using double-sided adhesive tape, and coated with a layer of gold using a JFC-1600 sputter coater. Coated pollen grains and seeds were then examined and photographed with a JEOL JSM-5600LV scanning electron microscope. Polar length and equatorial diameter of 30 pollen grains and 30 seeds randomly chosen were measured using light microscopy. The micromorphological characters are described according to Walker and Doyle (1975) and Wang and Wang (1983) for pollen grains and Liu *et al*. (2004) for seeds.

Impatiens unguiculata K.M. Liu & Y.Y. Cong, *sp. nova* (Figs. 1 and 2)

Type: China. Xizang (Tibet): Motuo County, Yaluzangbu Grand Valley Nature Reserve, alt. 1054 m, 95°10.674′E, 29°19.739′N, in moist semi-shaded places along rivers, 8 August 2008 *Ke-Ming Liu & Yi-Yan Cong 791424* (holotype HNNU; isotypes HNNU, KUN).

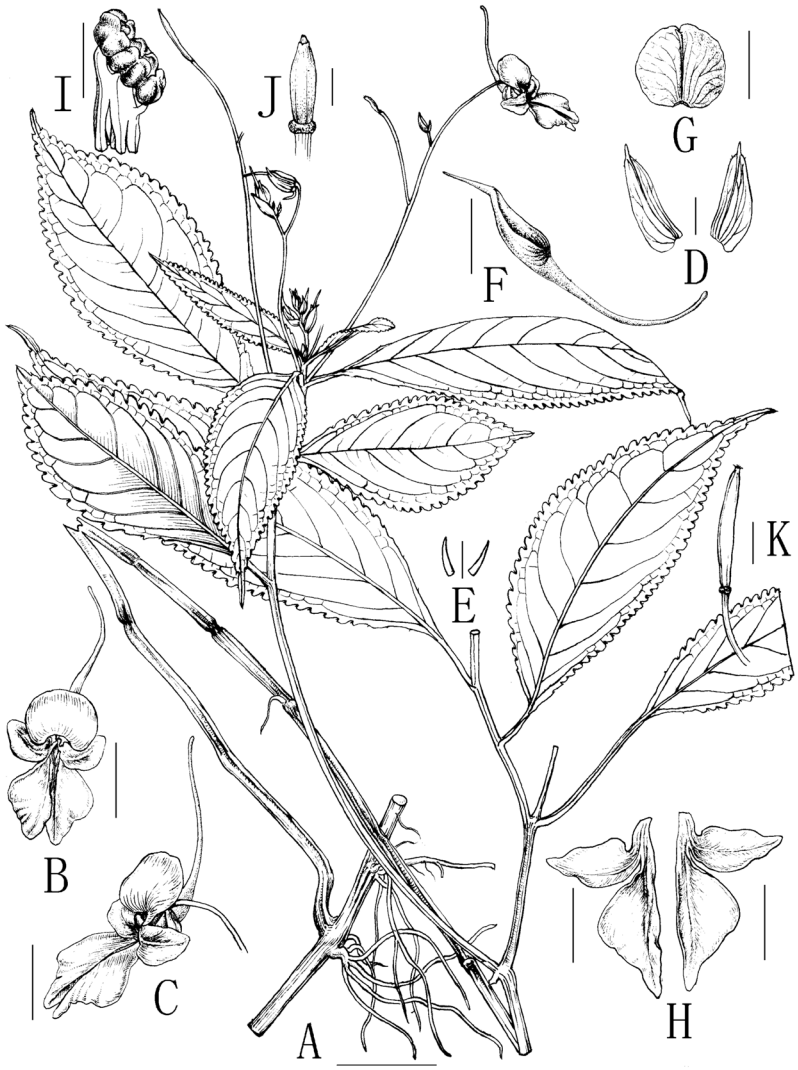

Fig. 1. *Impatiens unguiculata* (from the holotype, drawn by Ling Wang). — **A**: Habit. — **B**: Flower, anterior view. — **C**: Flower, lateral view. — **D**: Outer two lateral sepals. — **E**: Inner two lateral sepals. — **F**: Lower sepal. — **G**: Dorsal petal. — **H**: Lateral united petals. — **I**: Androecium. — **J**: Gynoecium. — **K**: Fruit. Scale bars: **A** = 2 cm; **B**, **C**, **F**, **G**, **H**, **K** = 1 cm; **D**, **I** = 2.5 mm; **E** = 1.5 mm; **J** = 1 mm.

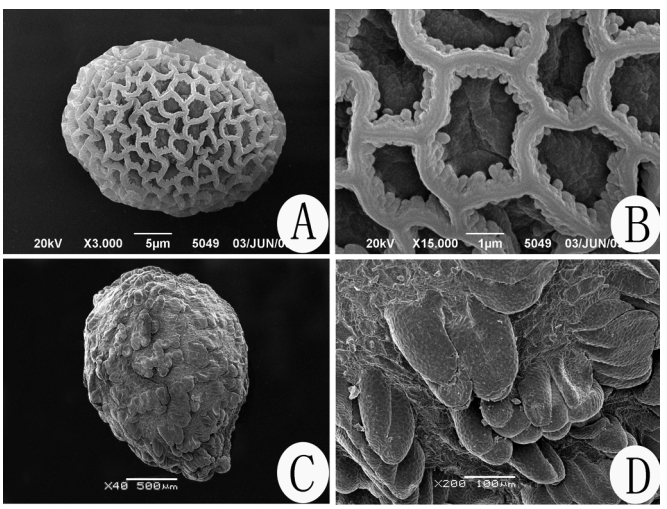

Fig. 2. SEM micrographs of *Impatiens unguiculata*. — **A** and **B**: Pollen grain. — **C** and **D**: Seed.

Table 1. Morphological comparison of *Impatiens unguiculata* and *I. drepanophora*.

	Impatiens unguiculata	*Impatiens drepanophora*
Lamina	oblong or ovate-oblong without basal glands	ovate-lanceolate with 2 stipitate basal glands
Inflorescences	2–5-flowered	5–10-flowered
Bracts	ovate, apex cuspidate	ovate-lanceolate, apex mucronulate to cuspidate
Flowers length	30–45 mm	ca. 35 mm
Lateral sepals	4; outer 2, oblong-lanceolate, 6–7 mm long, margin with 1–3 glands; inner 2 minute	2, falcate, ca. 2 mm long, margin denticulate
Lower sepal	navicular, with 5–7 mm long beak at apex and a recurved spur at base	navicular, with 3–4 mm long beak at apex and an involute-incurved spur at base
Lateral united petals	upper lobes ovate; lower lobes considerably clawed, triangular-dolabriform	upper lobes narrowly oblong, lower lobes oblong-dolabriform

Etymology: The specific epithet refers to the distinctly clawed lower lobes of the united lateral petals.

Herbs, perennial, 51–110 cm tall, glabrous. Stem erect, branched, naked basally, nodes swollen. Leaves alternate; petiole 1.1–2.6 mm; lamina oblong or ovate-oblong, rarely oblong-lanceolate, 7.5–17 × 4–7 cm, membranous, lateral veins 6–9 pairs, base cuneate, margin crenate, teeth mucronulate, apex acuminate. Inflorescences in upper leaf axils, 2–5-flowered; peduncle erect, 4–9 cm long. Pedicels bracteate at base; bracts caducous, ovate, ca. 7 × 4 mm, apex cuspidate. Flowers 30–45 mm long. Lateral sepals 4, golden yellow, outer two oblong-lanceolate, 6–7 × 2.7–3.2 mm, apex cuspidate, margin with 1–3 glands; inner two lanceolate, minute, ca. 1.8 × 0.7 mm. Lower sepal navicular, 11–12 mm long, 4–6 mm deep (excluding spur), apically with a beak-shaped tip 5–7 mm long, tapering into recurved spur; spur 25–31 mm long. Dorsal petal golden yellow, reniform or suborbicular, 11–13 mm in diam., abaxial midvein slightly thickened, without crest-like appendage. Lateral united petals ± clawed, 19–26 mm long, 2-lobed; upper lobes ovate, 8–10 × 4–6 mm, apically obtuse; lower lobes considerably clawed, triangular-dolabriform, entire, apically obtuse; auricle inconspicuous. Stamens 5, 3.5–4.5 mm long, filaments linear, free for about 1/2 their length; anthers ovoid, joined into a ring surrounding ovary apex, apex obtuse. Ovary 5-carpellate, narrowly fusiform, 2.5–3 mm long, erect, style 1, apically 7–8-lobed; placentation axile. Capsule linear, 2.5–3.3 cm long, ca. 2.6 mm wide, apex acuminate, 5-valved, fleshy.

Pollen grains subellipsoid, $P \times E$ = 26.42–27.55 × 21.07–22.63 μm, 4-colpate (Fig. 2A); sexine with irregularly reticulate ornamentation, granulate protrusions on the muri surface visible under high magnification (Fig. 2B).

Seeds 2.0–2.5 × 1.3–1.7 mm, ovoid, yellow (Fig. 2C); coat covered with finger-like protrusions with numerous pits (Fig. 2D). Flowering and fruiting from August to October.

Impatiens unguiculata is somewhat similar to *I. drepanophora*, but differs from it by several characters (Table 1).

Acknowledgements

Financial support for this work was provided by the Educational Commission of Hunan Province, China (110540), the Hunan Provincial Natural Science Foundation of China(10jj4019, 12JJ4031) and Science Research Fund for the Doctoral Program of Higher Education of China (20104306120008). The authors are grateful to Prof. Chunlin Long, Dr. Zhi-ling Dao, and Dr. Guang-wan Hu, Kunming Institute of Botany, the Chinese Academy of Sciences, for their help and support during our visit to KUN. We also thank Ling Wang for the illustration.

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