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Impatiens guiqingensis (Balsaminaceae), a new species from Gansu, China

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Abstract

Impatiens guiqingensis S. X. Yu (Balsaminaceae), a new species from Gansu Province, China, is described and illustrated. The new species is superficially similar to *I. dicentra* in having 1–2 flowered racemose inflorescences, lateral sepals with dentate margin, top of lower and upper petals of lateral united petals with bristle appendages, but differs from the latter by yellow flower, lower sepal without spur and dorsal petal with unapparent crest. Moreover, the occurrence of the new species is also different from the related one.

Key words: *Impatiens*, Balsaminaceae, new species, taxonomy

Introduction

The genus *Impatiens* Linnaeus (1753: 937) belongs to the family Balsaminaceae, which only contains two genera as currently recognized, the monotypic *Hydrocera* Wight & Arnott (1834: 140) and the prolific *Impatiens* containing about 1000 species (Grey-Wilson 1980, Chen 2001). Currently, about 280 species of *Impatiens* are known from China (Chen *et al*. 2007, Yu 2012). However, most species constrict to South-West China, and are endemic to Yunnan, Sichuan and Xizang (Chen 2007, Zeng *et al*. 2015). Comparing to Northwest China, South-West China have pay much more attention in *Impatiens* inventory and filed investigation. So the North-West China have been far underestimated for a long time. However, several provinces, such as Gansu, Ningxia and Qinghai, are also known for their particular floristic because of their unique geographical location of the eastern slope of Qinghai-Tibet Plateau with high heterogeneous habitats (such as, Liupanshan mountain, Helanshan mountain). Many new taxa, including plants and zoos, have been published these years in the slope zone (Xue *et al*. 2015, Zhang & Li 2015, Peng *et al*. 2015, Rosa *et al*. 2015, Wang 2010, 2015, Wang & Li 2014). So there are maybe also some *Impatiens* species by analogy, however, few *Impatiens* species has been inventoried to date only because few field investigation has been carried out in this area.

Recently, more and more filed expeditions have been carried out in North-West China to inventory and phylogenetic studies. The botanic expedition in 2008 performed by Cai-Fai Zhang has collected one unknown *Impatiens* species, which is similar to *I. dicentra* Franch ex Hook. f. (1908: 268) superficially. After scrutiny of specimens, literatures and distribution we found that the unknown species is new to sciences. The species described and illustrated here.

Impatiens guiqingensis S. X. Yu, *sp. nov.* (Figs.1, 2)

The new species is similar to *I. dicentra* superficially in having 1–2 flowered racemose inflorescences, lateral sepals with dentate margin, top of lower and upper petals of lateral united petals with bristle appendages, but differs from the latter by yellow flower, lower sepal without spur and dorsal petal with unapparent crest.

Type: CHINA, Gansu Province, Zhangxian County, Guiqingshan, Shady places in forest, alt. 2440 m above sea level, 34°37’46” N, 104°28’08” E, 11. September 2008, Cai-Fei Zhang 1274 (holotype PE, isotype IBK).

Annual herb, 30–50 cm tall. Stems succulent, glabrous, erect, often branched above. Leaves alternate, aggregated towards the top of the stems; petiolate. Petiole 1–2 cm long. Blades 5–8 (–11) cm long, 3–5 cm wide, lanceolate;

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lateral veins 7–9 pairs; margin crenate-serrate, with simple narrow teeth; apex acute, base crenate. Racemes in upper axils, 1 (–2) flowered with peduncle ca. 1 mm long. Bracts ca. 2 mm long, ovate-lanceolate, inconspicuous. Pedicels 1 cm long, slender, glabrous. Flowers yellow. Lateral sepals 2, the outer pair 1–1.2 cm long, 0.5–1 cm wide, ovate-orbiculate, conchate, 9-veined, dorsal ridge apparent winged, apex mucronate. Lower sepal ca. 1.5–2 cm long, ca. 1 cm deep, infundibuliform, absent spur. Upper petal ca. 0.2–1 cm long, ca. 0.8 cm wide, elliptic or ovate-elliptic, apex mucronate, dorsally with a narrow crest. Lateral united petals 2–2.5 cm long, upper petal of each pair 1–1.5 cm long and ca. 0.5 wide, shortly stalked, lanceolate, with midvein ending in a conspicuous bristle appendage; lower petal of each pair ca. 1.5 cm long, ca. 1 cm wide, obovate-oblong, with midvein ending in a bristle appendage. Stamens 5; filaments 5–6 mm long, flat; anthers obtuse. Ovary glabrous. Capsule glabrous, ca. 2 cm long.

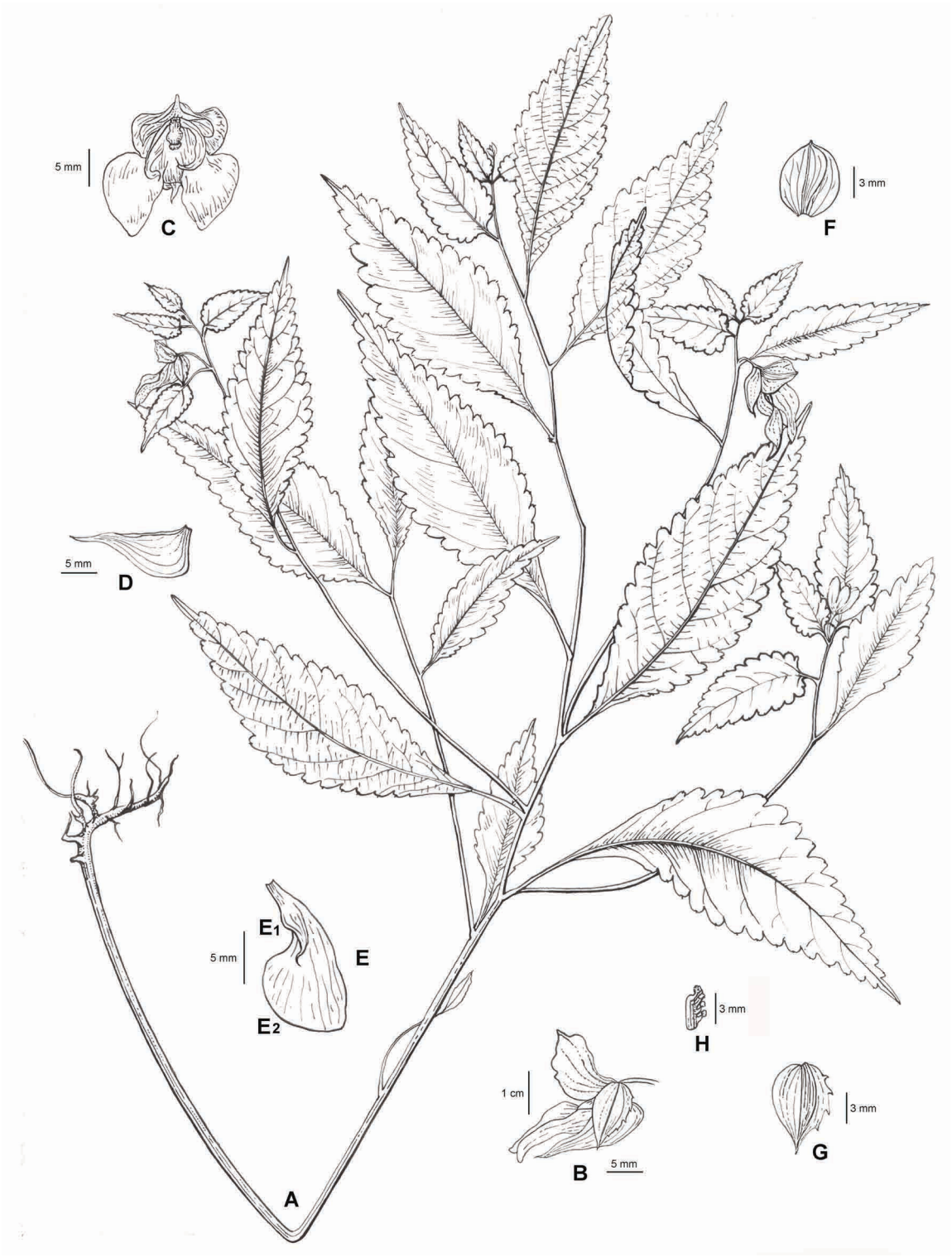

FIGURE 1. ***Impatiens guiqingensis***; A. habit; B. flower (lateral view); C. flower (front view); D. lower sepal; E. lateral united petals; E1. upper petal; E2. lower petal; F. dorsal petal; G. outer lateral sepal; H. androecium. (Drawn by P. Liu from C. F. Zhang 1274).

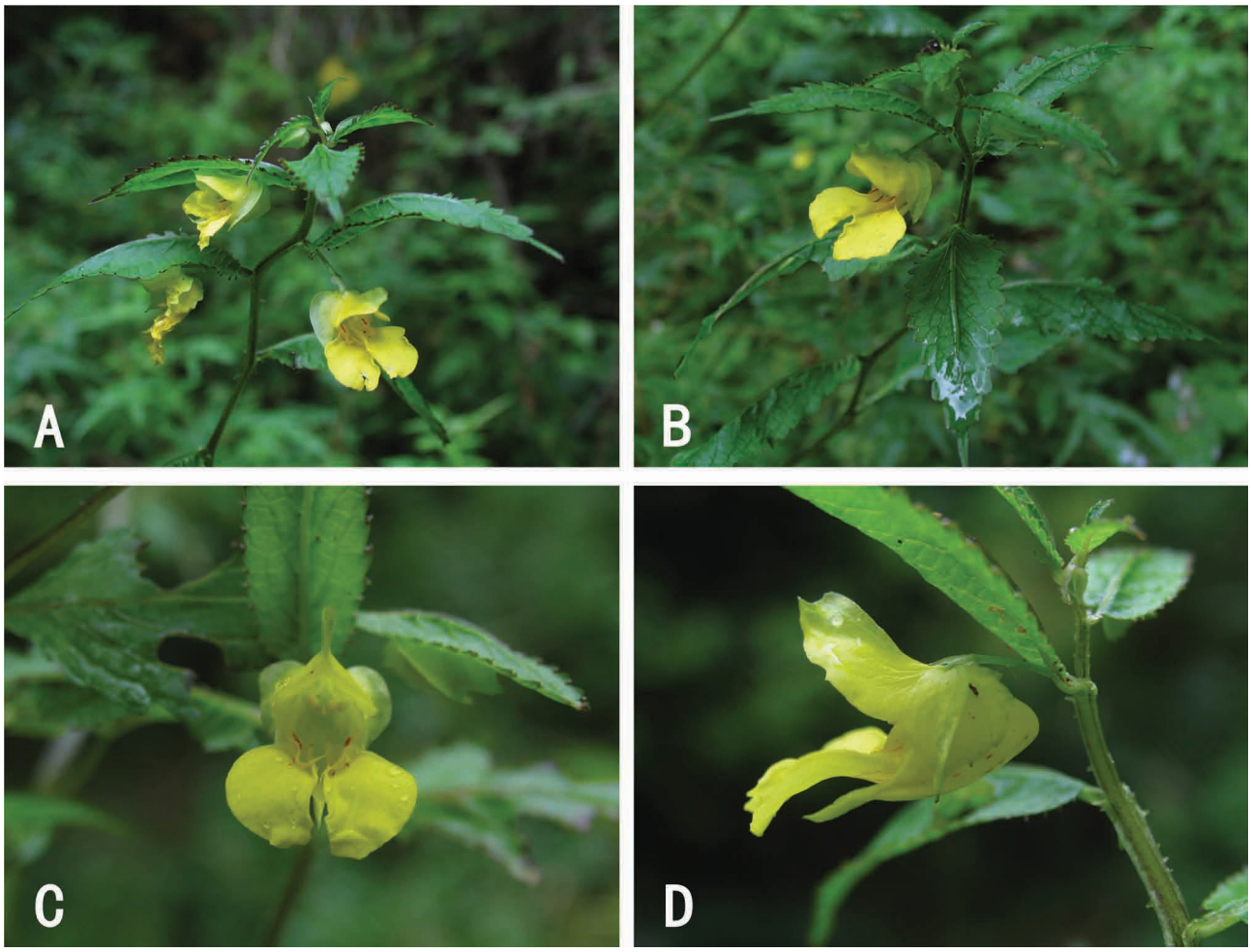

FIGURE 2. ***Impatiens guiqingensis*** . A–B. flower branches. C. flower in front view. D. flower in lateral view (photographed by C. F. Zhang).

Phenology:—The new species is flowering in August and fruiting in September.

Distribution and habitat:—*Impatiens guiqingensis* grows sparsely in small populations, and is only found in the Guiqingshan mountain, Zhangxian County, Gansu province, at ca. 2440 m., while *I. dicentra* is confined to Central China, such as western Hubei, eastern Chongqing (Fig. 3).

Etymology:—The specific epithet 'guiqingensis' refers to the locality of the type specimen, Guiqingshan mountain, Zhangxian County, Gansu, China.

Conservation status:—*Impatiens guiqingensis* is known for about 150 individuals covering less than 5 km^2. This species is confined in a national park, so it is not received any special conservation and the outside of its distribution are also disturbed by some tourist. It should be treated as Critically Endangered (CR) based on the International Union for Conservation of Nature Red List Categories and Criteria B2a.

Discussion

After detailed studies, we found that *Impatiens guiqingensis* is close to *I. dicentra* superficially. However, the former can be easily distinguished by: blades lanceolate or elliptic-lanceolate, 1 (–2) flowered racemose inflorescence (vs. 2-flowered racemose inflorescence), dorsal ridge of lateral sepal winged (vs. dorsal ridge of lateral sepal unapparent), lower sepal without spur (vs. lower sepal with bifid spur) and dorsal petal with unapparent crest (vs. dorsal petal with apparent winged crest). The distributions of the two species are also isolated from each other. For the new species, *Impatiens guiqingensis*, is confined to southeastern of Guasu province, whereas the related species is recorded in western Hubei, eastern Chongqing and northern Hunan province. The occurrences of these two species are not overlaped with each other (Fig. 3)

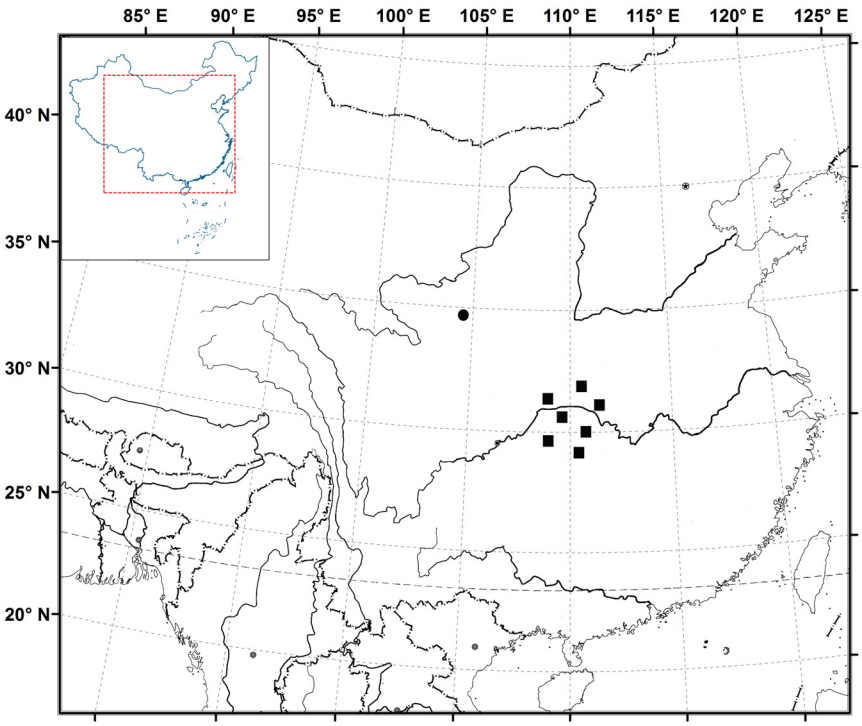

FIGURE 3. Distributions of ***Impatiens guiqingensis*** (●) and ***I. dicentra*** (■).

In order to illustrate the morphology circumscription of the new species, further four species with similar morphological characters, *I. guiqingensis*, *I. dicentra*, *I. davidii* Franch. (1886: 65) and *I. noli-tangera* Linnaeus (1753: 983) are compared with each other, on the basis of their reproductive and vegetative characters in Table 1.

TABLE 1. Morphological character comparison among superficial similar species, *I. guiqingensis*, *I. dicentra*, *I. davidii*, and *I. noli-tangera*.

Characters	*I. guiqingensis*	*I. dicentra*	*I. davidii*	*I. noli-tangera*
Blade	Lanceolate or elliptic-lanceolate	Ovate, ovate-lanceolate	Ovate-oblong or Ovate-lanceolate	Ovate, elliptic-ovate
Blade margin	Dentate	Dentate	Dentate	Undulate
Inflorescence	1 (–2) flowered	2 flowered	2 flowered	3–5 flowered
Lateral sepals	Ovate-elliptic, dorsal ridge winged	Ovate circular, dorsal ridge unapparent	Broad ovate, dorsal ridge unapparent	Broad ovate, dorsal ridge unapparent
Lateral sepal margin	Dentate	Dentate	Entire	Entire
Lower sepal	Infundibuliform, without spur	Infundibuliform, with bifid spur	Infundibuliform, with bifid spur	Infundibuliform, with long spur
Doral sepals	Crest unapparent	Crest apparent winged	Crest unapparent	Crest unapparent
Lateral United petals	Apex of lower and upper petals with birstle appendages	Apex of lower and upper petals with birstle appendages	Apex of lower and upper petals with birstle appendages	Apex of lower and upper petals entire

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