

# Studies of Sino-Himalayan *Impatiens* (Balsaminaceae) I. A New Species Similar to *Impatiens cyathiflora* Hook. f. and Allies from Yunnan, China

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**Abstract** A new species of *Impatiens*, *I. biluoxueshanensis* S. Akiyama et S. K. Wu (Balsaminaceae), is described from Sino-Himalaya region of China (Ziben Shan, Yunnan) and illustrated. *Impatiens biluoxueshanensis* falls within the *I. cyathiflora* group and differs from the other species of this group in having basal lobes of the lateral united petals oblong-obovate with truncate apex. A table of the comparison and a revised key to species of the all species of the *I. cyathiflora* group are given.

**Key words:** China, Himalaya, *Impatiens*, new species, Sino-Himalaya.

The genus *Impatiens* is greatly diversified in the Sino-Himalayan region, where approximately 200 species have been described. In China there are about 230 species recorded (Chen *et al.*, 2007). During our field surveys in the Sino-Himalayan region we collected numerous specimens that represent species new to science or provide noteworthy new evidence on previously described taxa. The aim of this series of papers is to describe new species and to mention remarkable features and variation for poorly known species towards a monograph of *Impatiens* in the Sino-Himalayan region.

A new species similar to *Impatiens cyathiflora* Hook. f. and allies was found during recent field research in Yunnan. The new species, here named *Impatiens biluoxueshanensis*, was collected at Ziben Shan (in the southernmost part of Biluo Xueshan), Yunnan, China.

In the Flora of China (Chen *et al.*, 2007) *Impatiens cyathiflora* and the similar species, under 189b in the key, are characterized by having racemose inflorescences, medium-sized yellow flowers, dorsal petals without a crest-like appendage,

and funnel-shaped or bucciniform lower sepals. The new species shares these features and a stem with dense yellowish brown glandular hairs distally with the closest allies, *I. cyathiflora*, but differs from them in having the basal lobes of the lateral united petals oblong-obovate with truncate apex. The terminology of the flower follows Akiyama *et al.* (1991).

***Impatiens biluoxueshanensis*, sp. nov.**

[Figs. 1–4]

*Impatiens cyathiflorae* Hook. f. similis, sed lobis basalibus petalorum unitorum lateralium oblongi-ovatis, et foliis 5–7×2.5–3 (nec 10–13×3.5–4.5) cm differt.

Type: China. Yunnan. Yunlong Xian, Ziben Shan (Biluo Xueshan), 25°46'N 99°05'E, 2540 m (S. Wu, S. Akiyama, Y. Hu, X. Cheng and F. Miyamoto 103588, 10 Sept. 1999, KUN–holo, TNS–iso, TI–iso).

Plants 60–70 cm tall; stem branched, basally glabrous, distally densely yellowish brown glandular hairy. Leaves alternate, petiolate or sessile distally; petiole to 3 cm long, with or without



Fig. 1. *Impatiens biluoxueshanensis* S. Akiyama et S. K. Wu in Ziben Shan (Biluo Xueshan) (on 10 September 1999). Upper: Habit. Lower left: Flower (front view). Lower right: Flower (lateral view).

glands at base; leaf blade ovate, 5–7×2.5–3 cm, base attenuate, margin crenate-serrate, apex acuminate, both surfaces glabrous, upper surface green, lower surface slightly glaucous. Inflorescences in axils of distal leaves, racemose, ascending, to 9 cm long, 6–12-flowered; peduncle to 6 cm long, glabrous; pedicels ca. 1.2 cm long, glabrous, with a bract at base; bracts persistent, ovate, ca. 3 mm long, apex glandular, long

acuminate.

Flowers pale yellow, red striate and spotted, ca. 3 cm deep. Lateral sepals 2, broadly ovate, ca. 3 mm long (excluding apex), apex glandular, long acuminate. Lower sepal pale yellow with reddish veins, bucciniform, ca. 1.5 cm deep, abruptly narrowed into an incurved long spur; spur ca. 1.4 cm long in overall length. Dorsal petal pale yellow, with shaded red (on outside)



Fig. 2. Isotype of *Impatiens biluoxueshanensis* S. Akiyama et S. K. Wu (S. Wu, S. Akiyama, Y. Hu, X. Cheng and F. Miyamoto 103588, 10 Sept. 1999, TNS).

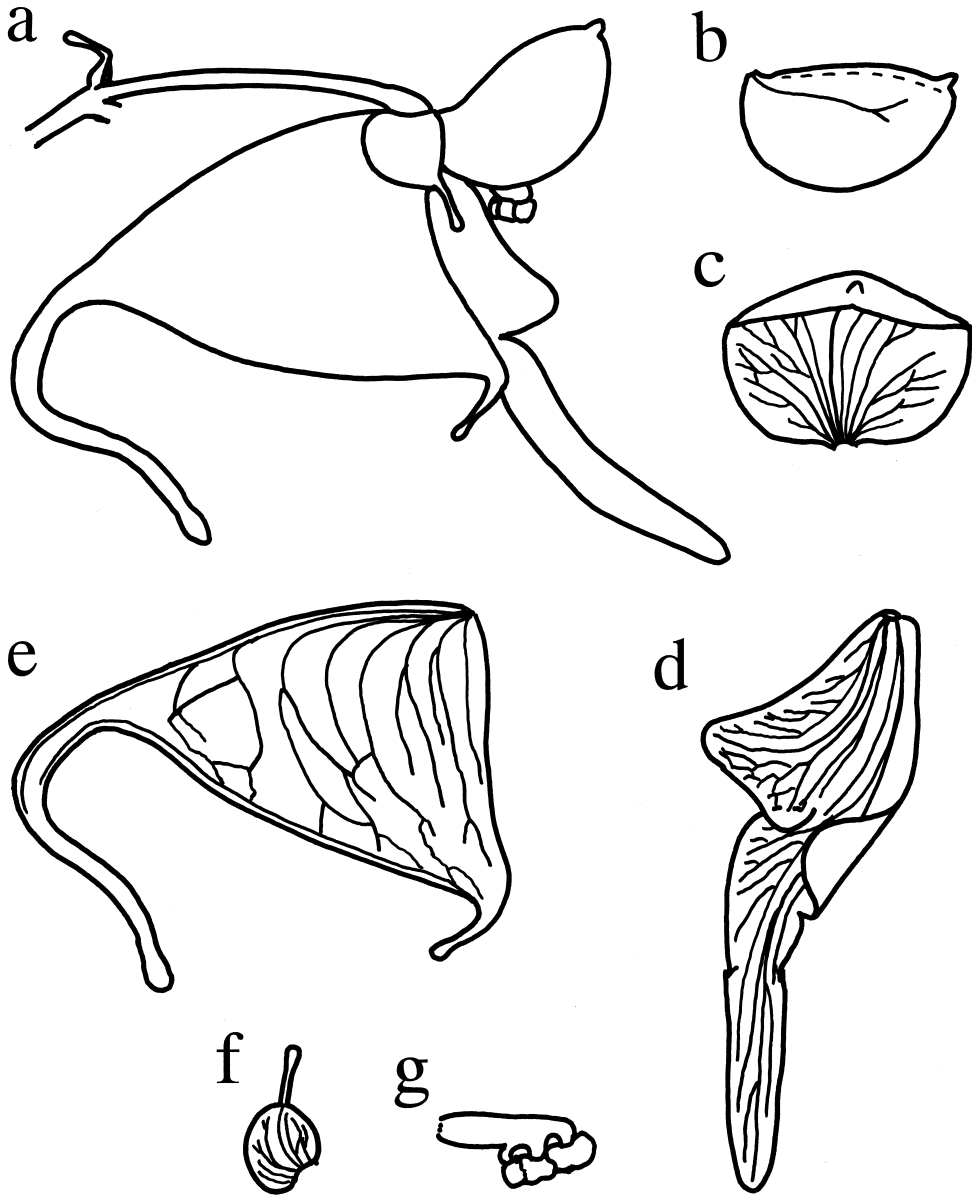


Fig. 3. *Impatiens biluoxueshanensis* S. Akiyama et S. K. Wu. a: Flower (lateral view). b: Dorsal petal (folded). c: Dorsal petal. d: lateral united petals. e: Lower sepal. f: Lateral sepal. g: Anthers. All $\times$ 3.

midvein, nearly orbicular, ca.  $9 \times 11$  mm, somewhat cucullate, apex obtuse, midvein slightly thickened and mucronate near apex. Lateral united petals pale yellow, with reddish veins and spots, ca. 2.6 cm long; basal lobe oblong-obovate, ca.  $10 \times 6$  mm, apex truncate; distal lobe narrowly ovate, ca.  $17 \times 4.5$  mm, apex obtuse; appendage large, inflexed. Filaments linear, hooked

at apex; anthers ovoid, connective glabrous. Ovary linear. Flowers in September.

Distribution: China. Yunnan. Yunlong Xian, Ziben Shan (Biluo Xueshan) (known only the type).

Chen *et al.* (2007) included seven species under *189b* in the key to the species of *Impatiens* in the *Flora of China* treatment. They include

Table 1. Comparison of *Impatiens biluoxueshanensis* and resembling species.

	<i>I. biluoxueshanensis</i>	<i>I. cyathiflora</i>	<i>I. scutispala</i>	<i>I. clavicuspis</i>	<i>I. loulanensis</i>	<i>I. urticifolia</i>	<i>I. nyimana</i>	<i>I. furcillata</i>
Plant (in distal part)	with dense glandular hairs	with dense yellow-brown glandular hairs	glabrous	glabrous with few glands	with sparse glandular hairs or glabrous	glabrous	with dense or sparse yellow brown long hairs	with sparse glandular hairs
Leaf blade	ovate 5-7×2.5-3 cm	ovate-oblong or ovate-lanceolate 10-13×3.5-4.5 cm	ovate-lanceolate, rarely ovate-elliptic (8-10-16×3.5-7 cm)	ovate-lanceolate or lanceolate 7-12×2-3.5 cm	ovate-oblong or ovate-lanceolate 7-18×2.5-5 cm	elliptic-ovate, elliptic or oblong-lanceolate 8-20×2.5-5.5(-6) cm	ovate or ovate-lanceolate 4-10×2.5-4 cm	rhombic-ovate or rhombic-lanceolate 5-13×2.5-5 cm
Inflorescence	axillary in upper leaf axils	axillary in upper leaf axils	axillary in upper leaf axils	axillary in upper leaf axils	axillary in upper leaf axils	axillary	axillary	axillary
Flower	6-12	6-10	8-13(-16)	10-12	5-13	3-5	(1 or) 2-5	3-9
Peduncle	ascending, to 6 cm	ascending*, shorter or overtopping leaf	ascending*, overtopping or about as long as leaf	ascending*, longer than petiole, 10-22 cm	ascending*, 6-10 cm	spreading or ± curved, shorter or longer than leaf	spreading?, shorter than leaf	ascending, 3-5 cm
Bract	persistent, glandular, long acuminate	persistent, glandular, long acuminate	caducous, scarcely mucronate or cuspidate	persistent, long glandular aristate or shortly acuminate	persistent, glandular aristate	persistent, ovate-lanceolate	persistent?, acuminate	persistent?, linear
Flower	yellow, red striate and spotted ca. 3 cm	yellow, red spotted 3-3.5 cm	yellow, pink-purple spotted 2-2.5 cm	yellowish, purple tinged at apex 2-2.5 cm	yellow ca. 2 cm	yellow or pale purple, red striate and spotted 2.5-3 cm	yellow or white, red-brown spotted 2.8 cm	pale purple or yellow small (to 2.5 cm)
Lateral sepal	glandular, long acuminate	long glandular	hardly mucronate	glandular aristate or shortly acuminate	glandular aristate	obliquely ovate, often with glands on one side	mucronate	cuspidate
Lower sepal	bucciniform, narrowed into an incurved spur	cup-shaped or funnelliform, narrowed into an incurved spur	bucciniform, gradually narrowed into an incurved spur	bucciniform, gradually narrowed into an incurved spur	funnelliform, narrowed into a curved long spur	obliquely funnelliform, abruptly narrowed into an incurved or hooked short spur	bucciniform-funnelform, abruptly narrowed into a curved short spur	funnelliform, abruptly elongated into an involute, long spur
Dorsal petal	apex not curved cuspidate	apex not curved cuspidate	apex not curved cuspidate	apex not curved cuspidate	apex not curved cuspidate	apex not curved cuspidate	apex curved cuspidate	apex not curved cuspidate
Basal lobe of lateral united petals	oblong-obovate, apex truncate	oblong-orbicular, apex obtuse	orbicular, apex obtuse	suborbicular, apex obtuse	suborbicular, apex obtuse	orbicular, apex obtuse	suborbicular, apex obtuse	subovate, apex acute
Distribution	Yunnan	Yunnan	NW Yunnan	Yunnan? Myanmar	Guizhou, Yunnan	S. Xizang Bhutan, Sikkim, Nepal	E. Xizang	Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol Korea, Russia

\* This is confirmed by figures in the original descriptions or the authentic specimens.

*Impatiens urticifolia* Wall., *I. nyimana* C. Marq. et A. Shaw, *I. furcillata* Hemsl., *I. cyathiflora* Hook. f., *I. scutisepala* Hook. f., *I. claviscuspis* Hook. f. ex W. W. Sm., and *I. loulanensis* Hook. f. (Table 1). However, one of them, *I. furcillata*, greatly differs from the others in having acute apex of the basal lobes of the lateral united petals, pale purple or yellow flowers, and rhom-

bic-ovate or rhombic-lanceolate leaf blades, and should be excluded from the group of *I. cyathiflora* and allies. It resembles *I. textorii* Miq. and is distributed in Hebei, northeastern China, Korea and Far East Russia. *Impatiens urticifolia* and *I. nyimana* also differ from the remaining four species in the fewer flowered (less six flowers) inflorescences. In the key to species, *I. urticifolia* is distinguished from the other six species by flowers with pale purplish spots, but its flowers are red striate and spotted (Akiyama et al., 1991), or red striate, as mentioned in the description (Chen et al., 2007).

Except for those three species, four additional species, *I. cyathiflora*, *I. scutisepala*, *I. claviscuspis*, and *I. loulanensis*, are considered to comprise a natural group, tentatively named here the *I. cyathiflora* group. The group is characterized by the ascending many-flowered racemose inflorescences, i.e., type 1a in Akiyama and Ohba (2000), more or less bucciniform lower sepals with incurved spur, i.e., type B(c) in Akiyama and Ohba (2000), and two lateral sepals. The species of the *I. cyathiflora* group are all distributed in Yunnan (only *I. loulanensis* extends to Guizhou). *Impatiens biluoxueshanensis* evidently falls within this group. Except for the diagnostic characters, all the species resemble each other and seem to be differentiated within narrow geo-

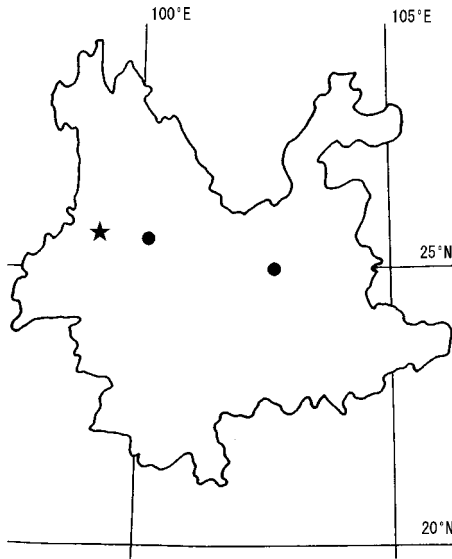


Fig. 4. Distribution of *Impatiens biluoxueshanensis* S. Akiyama et S. K. Wu (★) and *I. cyathiflora* Hook. f. (●).

Table 2. A revised key for the lead 189b in the *Flora of China*

189b. Dorsal petal without cristate midvein	
1. Shape of leaf blade rhombic-ovate or rhombic-lanceolate; apex of basal lobe of lateral united petals acute	..... <i>I. furcillata</i>
1. Shape of leaf blade not rhombic-ovate, nor rhombic-lanceolate; apex of basal lobe of lateral united petals obtuse or truncate	..... 2
2. Inflorescences (1 or) 2–5-flowered	..... 3
3. Plants glabrous in distal part; apex of dorsal petal not curved cuspidate	..... <i>I. urticifolia</i>
3. Plants densely or sparsely yellowish brown long hairy in distal part; apex of dorsal petal curved cuspidate	..... <i>I. nyimana</i>
2. Inflorescences (5 or) 6–13(–16)-flowered	..... 4 [the <i>I. cyathiflora</i> group]
4. Flowers 3–3.5 cm deep; plants with dense yellowish brown glandular hairs in distal part	..... 5
5. Basal lobe of lateral united petals oblong-orbicular, apex obtuse	..... <i>I. cyathiflora</i>
5. Basal lobe of lateral united petals oblong-obovate, apex truncate	..... <i>I. biluoxueshanensis</i> , sp. nov.
4. Flowers 2–2.5 cm deep; plants blabrous or with sparse glandular hairs in distal part	..... 6
6. Bracts caducous, apex scarcely mucronate or cuspidate	..... <i>I. scutisepala</i>
6. Bracts persistent, glandular aristate or acuminate	..... 7
7. Lower sepal bucciniform*; petiole with 2 blobose glands	..... <i>I. claviscuspis</i>
7. Lower sepal funnellform; petiole without basal glands	..... <i>I. loulanensis</i>

\* In *Flora of China* (Chen et al., 2007) “saccate” is used for bucciniform here.

graphic ranges. A revised key for the lead 189b in the *Flora of China*, which includes *Impatiens biluoxueshanensis*, is provided (Table 2).

*Impatiens biluoxueshanensis* was found sporadically along rather exposed path-side clearings on the trail to Ziben Shan, at elevations of 2540 m (Fig. 1). We did not find it in other places. The type locality of *I. cyathiflora* is Yunnan Sen (now, Kunming) and has been recorded from Kunming, Songming (NE of Kunming) and Dali (Chen, 2001). Ziben Shan, the type locality of *I. biluoxueshanensis*, is located approximately 350 km west of Kunming and 100 km west of Dali (Fig. 4).

#### Acknowledgement

We are indebted to Dr. Hideaki Ohba, Professor Emeritus, University of Tokyo for promoting the field surveys and for his valuable comments. We are grateful to Dr. David E. Boufford, the Harvard University Herbaria, for reading the

manuscript.

The field survey was supported by a Grant-in-Aid for Scientific Research (A) from the Japan Society for the Promotion of Science, No. 11691178 in 1999 (to Hideaki Ohba).

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