

## *IMPATIENS MONTICOLA* (BALSAMINACEAE), A NEWLY RECORDED SPECIES FOR THE FLORA OF VIETNAM

© 2021 г. Cuong Huu Nguyen<sup>1,2,\*</sup>, L. V. Averyanov<sup>3,\*\*</sup>,  
A. A. Egorov<sup>4,\*\*\*</sup>, and Ly Van Nguyen<sup>2,\*\*\*\*</sup>

<sup>1</sup> St.-Petersburg State Forest Technical University  
Institute Str., 5, St.-Petersburg, 194021, Russia

<sup>2</sup> Vietnam National University of Forestry  
Hanoi, Vietnam

<sup>3</sup> Komarov Botanical Institute RAS  
Prof. Popov Str., 2, St.-Petersburg, 197376, Russia

<sup>4</sup> St.-Petersburg State University  
Universitetskaya Emb., 7/9, St.-Petersburg, 199034, Russia

\*e-mail: [nguyenhuucuong.tvr@gmail.com](mailto:nguyenhuucuong.tvr@gmail.com)

\*\* e-mail: [av\\_leonid@mail.ru](mailto:av_leonid@mail.ru)

\*\*\*e-mail: [a.a.egorov@spbu.ru](mailto:a.a.egorov@spbu.ru)

\*\*\*\*e-mail: [lynguyenvnuf@gmail.com](mailto:lynguyenvnuf@gmail.com)

Received October 22, 2020; Revised July 24, 2021; Accepted July 27, 2021

*Impatiens monticola* Hook.f., previously known from China and India only, is found at first in Vietnam: Ta Xua Nature Reserve, Son La Province. The voucher herbarium specimens of this species collected in Vietnam are housed in the Herbarium of Vietnam National University of Forestry (VNF) and the Komarov Botanical Institute (LE). Amended morphological description of this species accompanied with color photos, new data on ecology and phenology are additionally provided.

**Keywords:** Balsaminaceae, *Impatiens*, *I. monticola*, new record, Vietnam

**DOI:** 10.31857/S0006813621100082

*Impatiens* L. (Balsaminaceae) includes about 900 species (Chen et al., 2007a) distributed in the northern hemisphere with the highest diversity in the tropical zone of Africa and Asia (Song et al., 2003; Yuan et al., 2004). Forty one species have been recorded in Vietnam up to now (Hooker, 1909a, b; 1911; Tardieu, 1944; Pham, 2003; Nguyen, 2003; Chen et al., 2007b; Shui et al., 2011; Vu et al., 2015; Hoang et al., 2015; Hoang et al., 2016; Nguyen et al., 2018; Pham et al., 2019).

During our field survey of plant diversity in the Ta Xua Nature Reserve (Son La Province, northern Vietnam) in 2020, we collected unusual specimens of *Impatiens*. After examination of available collections in herbaria (HN, HNU, NHNP, LE, VNM), as well as analysis of relevant regional literature, we identified this plant as *Impatiens monticola* Hook. f., which was previously reported only from China (Chen et al., 2007a) and India (Panday et al., 2014). This is the first record of this species in the flora of Vietnam, data for which are presented below.

*Impatiens monticola* Hook.f., 1908, Nouv. Arch. Mus. Hist. Nat., ser. 4, 10: 257; Chen et al., 2007, in Z.-Y. Wu, P.H. Raven et D.Y. Hong (eds.), Fl. China 12: 92; Panday, Sinha et Karmakar, 2014, NeBio 5, 6: 31.

Described from central China, Sichuan ("Szechuan; monte Omei, alt. 4000 ped. Père E. Faber (ex Herb. Aug. Henry, n. 863), E.-H. Wilson n. 4735, in Herb. Paris et Kew"). **Syntypes:** Ernst Faber 863 (K000199718 – photo! <http://apps.kew.org/herbcat/detailsQuery.do?barcode=K000199719>), E.-H. Wilson 4735 (K000199719 – photo! <http://apps.kew.org/herbcat/detailsQuery.do?barcode=K000199718>), E.-H. Wilson 4735 (P-P00492344 – photo! <https://plants.jstor.org/stable/10.5555/al.ap.specimen>).

**Description** (Fig. 1). Herb, terrestrial, perennial, to 0.6 m tall, glabrous (except leaves). Stem slender, erect, usually solitary, sometime branched from the base. Leaves alternate, crowded on upper part of stem, petiolate, with stipular glands; petiole to 5 cm long, shorter in upper leaves; leaf blade pale gray-green abaxially, green adaxially, ovate-elliptic or obovate, 11–

**Table 1.** Comparison of morphological characters of *Impatiens monticola* and *I. mengtszeana*

| Character                              | <i>I. monticola</i>                       | <i>I. mengtszeana</i>                                 |
|----------------------------------------|-------------------------------------------|-------------------------------------------------------|
| Stem length                            | to 60 cm                                  | 20–40 cm                                              |
| Petiole length                         | to 5 cm                                   | 2.5–3 cm                                              |
| Number of lateral veins on leaf blade  | 5–7 pairs                                 | 6–8 pairs                                             |
| Pedicle length                         | 1.5–2 cm                                  | 0.5–2.5 cm                                            |
| Flower color                           | pale yellowish with reddish streaks       | yellow                                                |
| Bract character                        | persistent                                | caducous                                              |
| Number of veins in lateral sepal       | 6–8 veins                                 | 3–5 veins                                             |
| Lower sepal shape and length           | broadly funnel-shaped, spur 3–3.5 cm long | funnel-shaped or subsaccate, spur ca. 2.5 cm long     |
| Dorsal petal size                      | 2.0–2.2 × 1.4–1.6 cm                      | 1.5–1.8 × 2 cm                                        |
| Lateral united petals shape and length | not clawed, 2.6–2.8 cm long               | clawed, 3–4 cm long                                   |
| Upper petal shape and size             | suborbicular, 16–18 × 10–12 mm            | orbicular to broadly triangular-obovate, 1.2 × 1.2 cm |
| Lower petal shape and size             | obdeltoid, 14–16 × 16–18 mm               | broadly dolabriform to suborbicular, 1.8 × 1.4 cm     |
| Filament length                        | 4–5 mm                                    | 6–7 mm                                                |
| Ovary shape                            | straight, terete                          | curved, fusiform                                      |
| Capsule shape                          | erect, narrowly fusiform                  | narrowly ovoid                                        |

16 × 4.5–6 cm, base cuneate, attenuate into petiole, margin crenulate, apex acuminate or shortly caudate, strigose between teeth with hairs to 1 mm long; venation distinctly reticulate, prominent on both surfaces, lateral veins 5–7 pairs. Inflorescences axillary, racemose, located near stem apex, each with 2 flowers; peduncles longer than petioles, 5.5–6 cm long, elongate at fruiting. Flowers pale yellowish with reddish streaks, about 3.5 cm in diameter; pedicels 1.5–2 cm long, glabrous, green; bracts persistent, green, lanceolate or narrowly ovate, 4–6 mm long, herbaceous; lateral sepals 2, ovate to broadly elliptic, 11–13 × 6–8 mm, pale green with reddish spots at the base, membranous, inconspicuous, with 5–7 veins, apex acuminate, the base broadly cuneate to almost rounded. Lower sepal 4–5 cm long, broadly funnel-shaped, bright yellow with reddish streaks inside, constricted into a spur; mouth 2.0–2.2 cm wide, with conspicuous beak, to 2–3 mm long, curved; spur 2.5–3 cm long, twisted, yellow green to yellow with reddish spots. Dorsal petal 2–2.2 × 1.4–1.6 cm, ovate, apex cuspidate, median vein distinct, with obtuse crest, base obtuse. Lateral united petals not clawed, 2.6–2.8 cm long, 2-lobed; upper petals 1.6–1.8 × 1–1.2 cm, sub-orbicular, apex short acute or obtuse, pale yellowish; lower petals 1.4–1.6 × 1.6–1.8 cm, obdeltoid, pale yellowish, apex rounded or truncate. Stamens 5, filaments fibrous, 4–5 mm

long; anthers ovoid, apex obtuse. Capsule erect, narrowly fusiform, 2–2.5 cm long. Seeds many, brownish-yellow, ellipsoid, 3 mm long.

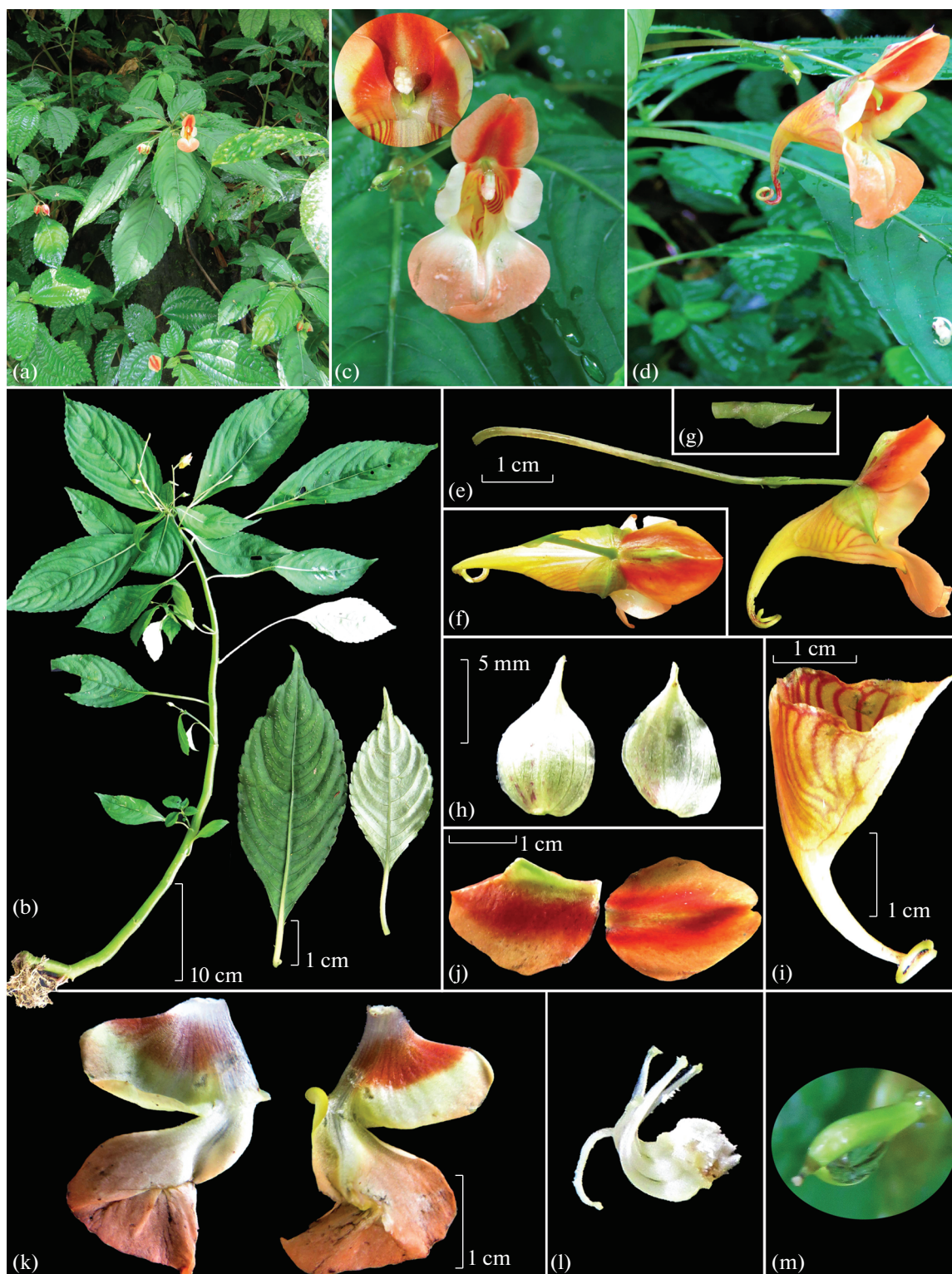
**Flowering and fruiting:** September – November.

**Distribution.** Vietnam (Son La Province, Ta Xua Nature Reserve), China (Chongqing, Sichuan), India (Mizoram, Lawngtlai District, Phawngpui National Park).

**Habitat and ecology in Vietnam.** Primary and secondary evergreen broad-leaved mountain forests, usually along watershed at elevations 1200–1300 m a.s.l. in association with *Begonia longifolia*, *Dichroa hirsuta*, *Leea bracteata*, *Dendrocnide stimulans*, *Costus tonkinensis*, *Diplazium esculentum*, *Selaginella argentea*, *Angiopteris evecta*, and *Oplismenus compositus*.

**Specimens examined** (Fig. 2): Vietnam, Son La Province, Ta Xua Nature Reserve, elev. 1254 m, 21°20'40.0"N 104°35'28.4"E, 03 Oct. 2020, N. V. Ly 20201003004 "(VNF; LE01077047 <http://en.herbarium-le.ru/?t=occ&id=91551>, LE01087903 <http://en.herbarium-le.ru/?t=occ&id=46178>, LE01087904 <http://en.herbarium-le.ru/?t=occ&id=46182>, LE01087905 <http://en.herbariumle.ru/?t=occ&id=46179>, LE01087906 <http://en.herbariumle.ru/?t=occ&id=46180>).

**Notes:** *Impatiens monticola* is very similar morphologically to *I. mengtszeana* Hook.f., which was also re-



**Fig. 1.** *Impatiens monticola* Hook. f. (a) – habitat; (b) – flowering plant in natural habitat; (c) – flower (frontal view); (d), (e) – flower (side view); (f) – flower (dorsal view); (g) – bract; (h) – lateral sepal; (i) – lower sepal; (j) – dorsal petal; (k) – lateral united petals; (l) – stamens; (m) – fruit. All photos by Ly Van Nguyen, design by Cuong Huu Nguyen.



Fig. 2. *Impatiens monticola* Hook. f. Herbarium voucher specimen N.V. Ly, NVL 20201003004 housed at VNF.

ported previously as an endemic to China. Comparison of distinguishing characters of *I. monticola* and *I. mengtzeana*, which may be found in Vietnam as well are presented in the Table 1.

#### ACKNOWLEDGEMENTS

The studies were supported by the institutional research project of the Komarov Botanical Institute of the Russian Academy of Sciences "The Vascular Plants of Eurasia: the systematics, flora and plant resources" (AAAA-A19-119031290052-1). Authors would like to thank the authorities of the Ta Xua Nature Reserve (Son La province, Vietnam) for their support during fieldworks.

#### REFERENCES

- Chen Y., Akiyama S., Ohba H. 2007a. *Impatiens* L. — In: Flora of China. Vol. 12. Science Press, Beijing, and Missouri Botanical Garden Press. P. 43–113.
- Chen Y.L., Akiyama S., Ohba H. 2007b. *Balsaminaceae*. — Flora of China. Vol. 12. Science Press, Beijing, and Missouri Botanical Garden Press. P. 43–114.
- Hoang T.S., Trinh N.B., Nguyen Q.H., Pham V.V., Nguyen T.V.A. 2015. *Impatiens parvisepala* (Balsaminaceae): a newly recorded from Vietnam. — Vietnam J. Forest Sci. 4: 4018–4020.
- Hoang T.S., Trinh N.B., Nguyen Q.H., Pham V.V., Cao V.L. 2016. *Impatiens morsei* (Balsaminaceae): a newly recorded from Vietnam. — Sci. Res. Rep. 6: 1–3.
- Hooker J.D. 1909a. *Impatiens* d'Indo-Chine. — In: Notulae systematicae, Laboratoire de Phanérogamie. Vol. 1. Muséum National d'Histoire Naturelle. P. 10–14.
- Hooker J.D. 1909b. On some species of *Impatiens* from Indo-China and the Malayan peninsula. — In: Bulletin of Miscellaneous Information. Vol. 1. Royal Gardens. P. 1–12.
- Hooker J.D. 1911. Balsaminaceae. — In: Flore Generale de l'Indo-Chine. Vol. 1. P. 611–629.
- Nguyen S.K., Tong Y.H., Xia N.H. 2018. *Impatiens napoensis* (Balsaminaceae): a newly recorded species for the

- flora of Vietnam. — Journal of Tropical and Subtropical Botany. 26: 545–548.
- Nguyen T.B. 2003. *Balsaminaceae* — In: Checklist of Plant Species of Vietnam. Vol. 2. Hanoi. P. 1047–1051 (in Vietn.).
- Panday S., Sinha B.K., Karmakar P. 2014. *Impatiens monticola* (Balsaminaceae): a new distributional record for India. — NeBio. 5 (6): 31–33.
- Pham H.H. 2003. An illustrated Flora of Vietnam. Vol. 2. Ho Chi Minh, Vietnam. P. 298–306.
- Pham T.T., Do V.T., Nguyen T.T., Phung T.T., Pham V.T. 2019. *Impatiens sicutifera* (Balsaminaceae): a New Record for the Flora of Vietnam. — Acta Phytotaxonomica et Geobotanica. 70: 63–66.
- Shui Y.M., Janssens S., Huang S.H., Chen W.H., Yang Z.G. 2011. Three new species of *Impatiens* L. from China and Vietnam: preparation of flowers and morphology of pollen and seeds. — Syst. Bot. 36 (2): 428–439. <https://doi.org/10.1600/036364411X569615>
- Song Y., Yuan Y.M., Kupfer P. 2003. Chromosomal evolution in Balsaminaceae, with cytological observations on 45 species from Southeast Asia. — Caryologia 56: 463–481. <https://doi.org/10.1080/00087114.2003.10589359>
- Tardieu B.M. 1944. Les *Impatiens* d'Indochine, repartition, affinités et description d'espèces nouvelles. — Notulae Systematicae. 11: 169–185.
- Vu T.C., Nguyen T.T.H., Bui H.Q., Suksathan P. 2015. A new record of *Impatiens kamtilongensis* Toppin (Balsaminaceae) for Vietnam flora. — J. Biol. (Tap Chi Sinh Hoc). 37 (3): 332–335.
- Yuan Y.M., Song Y., Geuten K., Rahelivololona E., Wohlhauser S., Fischer E., Smets E., Kupper P. 2004. Phylogeny and biogeography of Balsaminaceae inferred from ITS sequence data. — Taxon. 53: 391–403. <https://doi.org/10.2307/4135617>

## **IMPATIENS MONTICOLA (BALSAMINACEAE), НОВЫЙ ВИД ДЛЯ ФЛОРЫ ВЬЕТНАМА**

**Cuong Huu Nguyen<sup>a,b,#</sup>, Л. В. Аверьянов<sup>c,##</sup>,  
А. А. Егоров<sup>d,###</sup>, Ly Van Nguyen<sup>b,####</sup>**

<sup>a</sup> Санкт-Петербургский государственный университет  
Institute Str., 5, St. Petersburg, 194021, Russia

<sup>b</sup> Вьетнамский национальный университет лесоводства,  
Ханой, Вьетнам

<sup>c</sup> Ботанический институт им. В.Л. Комарова РАН  
ул. Проф. Попова, д. 2, г. Санкт-Петербург, 197376, Россия

<sup>d</sup> Санкт-Петербургский государственный университет  
Университетская наб., 7/9, Санкт-Петербург, 199034, Россия

<sup>#</sup>e-mail: [nguyenhuucuong.tvr@gmail.com](mailto:nguyenhuucuong.tvr@gmail.com)

<sup>##</sup>e-mail: [av\\_leonid@mail.ru](mailto:av_leonid@mail.ru)

<sup>###</sup>e-mail: [a.a.egorov@spbu.ru](mailto:a.a.egorov@spbu.ru)

<sup>####</sup>e-mail: [lynguyenvnuf@gmail.com](mailto:lynguyenvnuf@gmail.com)

*Impatiens monticola* Hook.f., вид недотроги, известный ранее только из Китая и Индии, впервые найден в Северном Вьетнаме в заповеднике Та Суа провинции Сон Ла. Эталонные гербарные образцы этого вида, собранные во Вьетнаме, хранятся в гербарии Национального университета лесного хозяйства Вьетнама (VNF) и Ботанического института им. В.Л. Комарова (LE). Приводится полное морфологическое описание вида, сопровождающееся цветными фотографиями и новыми данными по его экологии и фенологии.

**Ключевые слова:** Balsaminaceae, *Impatiens*, *I. monticola*, новая находка, Вьетнам