

Scientific Article

## IMPATIENS (BALSAMINACEAE) DIVERSITY AND CONSERVATION STATUS IN MOUNT SINGGALANG, WEST SUMATRA

*Keanekaragaman dan status konservasi Impatiens (Balsaminaceae) di Gunung Singgalang, Sumatra Barat*

Nanda Utami\*, Eka Fatmawati Tihurua

Pusat Riset Biologi – Badan Riset dan Inovasi Nasional

Cibinong Science Center, Jl. Raya Jakarta-Bogor, Km 46, Cibinong, Jawa Barat, Indonesia 16003

### Informasi Artikel

Diterima/Received : 23 Agustus 2021

Disetujui/Accepted : 28 November 2021

Diterbitkan/Published : 30 Desember 2021

\*Koresponden E-mail :  
utami\_16002@yahoo.com

DOI: <https://doi.org/10.14203/bkr.v24i3.744>

### Cara mengutip

Utami N, Tihurua EF. 2021. *Impatiens* (Balsaminaceae) diversity and conservation status in Mount Singgalang, West Sumatra. *Buletin Kebun Raya* 24(3): 136–140.

DOI: <https://doi.org/10.14203/bkr.v24i3.744>

### Kontributor

#### Kontributor Utama/Main author:

Nanda Utami

Eka Fatmawati Tihurua

#### Kontributor Anggota/Author member:

-

**Kata Kunci:** Balsaminaceae, endemik, Gunung Singgalang, *Impatiens*

**Keywords:** Balsaminaceae, endemic, *Impatiens*, Mount Singgalang

## INTRODUCTION

Sumatra has high floristic diversity. Unfortunately, forest damage in the island is among the highest in the world (Laurance 1999). Currently, forest destruction in Sumatra does not only occur in lowland forests, but also in mountain forests. Every year more than 1,000 km<sup>2</sup> of montane forest has been destroyed (World Wildlife Fund 2008). One of the mountains in Sumatra, Mt. Singgalang is also experiencing accelerated forest destruction. The bottom and middle of this mountain have been widely cleared for cultivation (Holmes & Rombang 2001). Besides, Mt. Singgalang has a high richness of flora and fauna and is home to many endemic species to Sumatra (World Wildlife Fund 2008). One of these endemic species is *Impatiens singgalangensis* Grey-Wilson.

### Abstrak

Empat jenis *Impatiens* telah dikoleksi dari Gunung Singgalang, Sumatra Barat, Indonesia, yaitu *I. singgalangensis* Grey-Wilson, *I. buennemeijeri* Grey-Wilson, *I. delectans* Ridl., dan *I. diepenhorstii* Miq. Tiga jenis di antaranya, yaitu *I. buennemeijeri*, *I. delectans*, dan *I. diepenhorstii* pertama kali dikoleksi dari lokasi ini. *I. buennemeijeri* yang sebelumnya dilaporkan endemik di Gunung Malintang; *I. delectans* dan *I. diepenhorstii* yang diinformasikan endemik di Gunung Kerinci berhasil dikoleksi di hutan Gunung Singgalang. Dalam artikel ini disajikan deskripsi, gambar, dan status konservasi awal jenis-jenis tersebut.

### Abstract

Four species of *Impatiens* were collected from Mt. Singgalang, West Sumatra, Indonesia, namely *I. singgalangensis* Grey-Wilson, *I. buennemeijeri* Grey-Wilson, *I. delectans* Rild., and *I. diepenhorstii* Miq., of which the last three were collected in this mountain for the first time. *I. buennemeijeri* where previously reported to be endemic to Mt. Malintang, Likewise, *I. delectans* and *I. diepenhorstii* were reported as Mt. Kerinci endemics but are successfully collected here in the forests of Mt. Singgalang. Here descriptions, illustrations, and preliminary conservation status of those species are provided.

In 1989, Grey-Wilson has described 20 new species and three new varieties from Sumatra. In the following years, several new species were discovered, such as *I. batangadisensis* Utami, *I. marroninus* Utami, *I. rubricaulis* Utami, *I. tribuana* Utami & Nurainas, and *I. tujuhensis* Utami & T.Shimizu (Shimizu & Utami 1997; Utami 2005, 2009, 2011, 2012, 2013, 2020). Currently, ca. 30 species of *Impatiens* are found in Sumatra and mostly occurred in the montane forests (Grey-Wilson 1989; Utami 2020).

The species number of *Impatiens* is likely to grow further in line with discovery of new species in Sumatra. Therefore, the aim of this study was to add existing collections of the Herbarium Bogoriense and to complete the data of some *Impatiens* distributions, such as new distributions.

## MATERIAL AND METHOD

Specimens from Herbarium Bogoriense (BO) were examined as well as its distributions based upon specimen localities were recorded. Inventory of *Impatiens* species in Mt. Singgalang, West Sumatra was carried in 2004 and 2021. In addition to field research, inspections of the collections and herbariums were also carried out in Herbarium Bogoriense (BO). The data collection method followed Rugayah *et al.* (2004).

Herbarium specimens are made by taking samples of *Impatiens* plants that are in flower or bear fruit, then are placed in a fold of old newsprint. Temporarily it preserved in 70% alcohol solution. Flowers and fruit are preserved separately in plastic bottles, while documentation is made for publication.

Conservation status followed IUCN Red List (2019) which is based on several aspects, such as population size, area of existence, and level of threat. Conservation status of examined species in this paper based on herbarium specimens and data collected in the field.

## RESULT AND DISCUSSION

In 2004, the fieldwork was undertaken in Mt. Singgalang, West Sumatra, successfully collected *I. singgalangensis*. Subsequently, in 2021, the fieldwork was conducted by a student of Andalas University, Padang, found and collected several *Impatiens* from this mountain. These included *I. buennemeijeri* Grey-Wilson, *I. diepenhorstii* Miq., and *I. delectans* Ridl. which were collected for the first time. *I. buennemeijeri* was previously reported endemic to Mt. Malintang while the others were endemic to Mt. Kerinci (Grey-Wilson 1989).

### Species description

**1. *Impatiens buennemeijeri* Grey-Wilson.** (Fig. 1) Kew Bull. 44: 92 (1989). Type: Sumatra, G. Malintang, 1,250 m, July 1918, *Bünnemeijer* 3739 (holotype L; isotype BO).

Glabrous perennial herbs, up to 60 cm tall. *Stems* erect, simple. *Leaves* spirally arranged, petiole ca. 3 cm long; lamina ovate to elliptic, 7–10 x 2 cm, apex acuminate, base acute, margin crenate, lateral veins 5–10 pairs, pubescent between the lateral veins and glabrous beneath. *Inflorescences* 2–3 flowered racemes, peduncles ca. 2 cm long, bracts linear, ca. 1.5 cm long. *Flower* white yellow with flushed/redness around the edges of the two upper petals. Sepals lateral, two ovate ca. 1 x 0.4 cm, pale green, with some maroon stripes on the underside of the lateral sepals; lower sepal shallowly navicular, ca. 1 x 0.8 cm, white with a maroon stripe abruptly constricted into a short, filiform spur, ca. 1 cm long, incurved toward the tip. Petals lateral petals united, ca. 1.7 x 0.5 cm, upper petals white yellow/pale yellow with redness around the edges, dorsal petal cucullate ca. 1 x 0.5 cm, when flattened, with a shallow keel-like crest above, pale green with maroon stripes inside, lower petal, ca. 0.5 x 0.2 cm, upper petal of each pair oblong to suborbicular, ca. 0.8 x 0.3 cm, white yellow with redness around the edges; lower petal of each pair oblong to sub oblong, ca. 0.5 x 0.3 cm, white with a maroon stripe and red. *Ovary* glabrous. *Fruit* unknown.

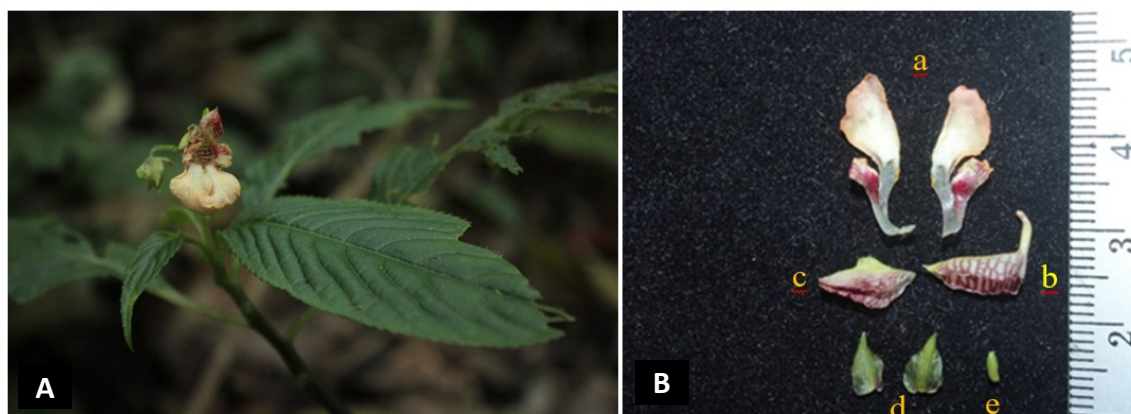
**Distribution:** *I. buennemeijeri* is actually endemic to Sumatra and previously was found in Mt. Malintang and Mt. Sago (Grey-Wilson 1989). However, it was recently discovered on Mt. Singgalang. This mountain is located approximately 116 km from Mt. Malintang. According to Nurainas *et al.* (2020), this species is also found in Jambi.

**Habitat/Ecology.** In Mt. Singgalang, this plant was collected in montane forest, moist places, at ca. 1,406 m asl.

**Conservation status.** The preliminary conservation status is DD (Data Deficient).

**Flowering time:** March to June.

**Specimens examined.** Sumatra. West. G. Malintang, *Bünnemeijer* 3739 (BO); G. Sago, July 1918, *Bünnemeijer* 369 (BO); NU 0254, Feb. 2021.



**Figure 1.** *Impatiens buennemeijeri*. (A) front view, (B) part of flower. a). A pair of lateral united petals, b). Lower sepal and spur, c). dorsal petal, d). a pair of lateral sepal, e). Gynoecium. (Photo by Firham)

**2. *Impatiens delectans* Ridl.** (Fig. 2)

Fed. Mal. States Mus. 8.4:24 (1917). Type: Sumatra, G. Kerinci, 2,190 m, 25 April 1914, *Robinson & Kloss* s.n. (holotype BM; isotype K).

Decumbent perennial herb up to 30 cm. *Stems* glabrous, thin, weakly. *Leaves* spirally arranged, lamina ovate to elliptic 1–6 x 0.3–2.4 cm, apex acuminate, margin crenate, each tooth terminated by a distinct, filiform appendage, lateral veins 2–6 pairs, pubescent between the lateral veins above, and glabrous beneath, petiole 1–2 cm, stipitate, glands on each side. *Inflorescence*: 1-flowered. *Flowers* yellow; peduncle 6–14 mm, long, often bearing superfluous bracts. *Bracts* linear, 3–4.5 mm long. *Pedicels* slender, 8–12 mm long. *Petal* lower sepal narrowly navicular, 10–14 x 3–5 mm, abruptly constricted into a straight spur 8–12 mm long. Dorsal petal cucullate 6–14 x 8–12 mm, when flattened, with a “keel like” crest

above. Lateral united petals 15–28 mm; upper petal of each pair oblong 4–9 x 2–4 mm; lower petal of each pair obliquely ovate, 13–17 x 10–12 mm, asymmetrical, obtuse. *Ovary* glabrous. *Fruit* unknown.

**Distribution:** Endemic to Mt. Kerinci, W. Sumatra (Grey-Wilson 1989). Recently, this species is also found in Mt. Singgalang for the first time, at 1,406 m asl. Mt Kerinci is located about 178 km to Mt. Singgalang, at an altitude of 3,805 m asl.

**Habitat:** 1,400–2,500 m asl., on the forest floor

**Flowering time:** March to June.

**Conservation status:** Preliminary conservation status DD (Data Deficient).

**Specimens examined:** West Sumatra, Mt. Kerinci. April 1920, *Bünnemeijer* 9845 (BO) & May 1920; *Bünnemeijer* 9998 (BO); *NU* 0255, Feb. 2021.

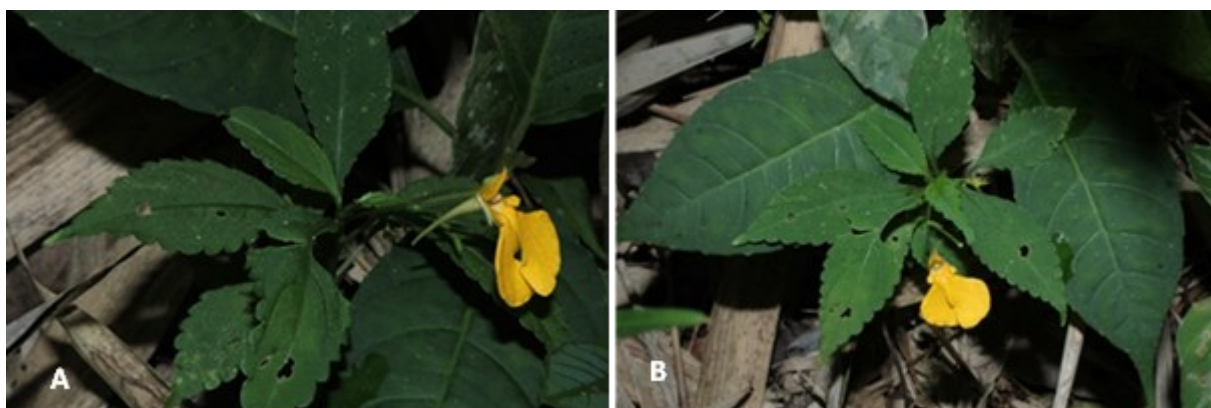


Figure 2. *I. delectans*. (A) side view, (B) front view. Photo by Firham

**3. *Impatiens singgalangensis* Grey-Wilson.** (Fig. 3A)

Kew Bull. 44: 79 1989. Type: Sumatra, G. Singgalang. May 1918. *Bünnemeijer* 2618 (holotype BO, isotype L).

Stoloniferous, perennial herb 12–35 cm, tall. *Stems* branched, glabrous. *Leaves* spirally arranged, congested towards the stem apices, lamina narrowly lanceolate-elliptic, 4.5–15 x 2–3 cm, apex acute to acuminate, margin serrate; lateral veins 9–11 pairs, pubescent between the lateral veins above, pubescent along the midrib and lateral veins beneath; petiole 1.5–4 cm long. *Inflorescence* 2 yellow. Peduncle 3 flowered, sub umbellate raceme. *Flowers* yellow. *Peduncle* 3–5 cm long, glabrous. *Bracts* linear-lanceolate, 3.5–8 mm long, caducous. *Pedicels* slender, 12–22 mm long. Lateral sepal ovate, 6–8 mm long, acuminate, glabrous. Lower sepal shallowly navicular, 8–11 x 3 mm, abruptly constricted into a filiform spur, 15–28 mm long. Dorsal petal cucullate, ca. 12 mm long, 12 mm wide, when flattened with a shallow crest above, glabrous. Lateral united petals 20–26 mm

long, upper petal of each pair oblong, 8–14 x 5–9 mm; lower petal of each pair asymmetrical, oval-oblongate 14–22 x 8–10 mm. *Ovary* glabrous. *Fruit* unknown.

**Distribution:** This species was locally endemic to Mt. Singgalang (Grey-Wilson 1989). According to Nurainas *et al.* (2020), this species is also found in Lubuksulasih, Solok.

**Habitat:** Montane Forest, 1,460–2,200 m asl.

**Flowering time:** April to June

**Conservation status:** The preliminary conservation status is DD (Data Deficient).

**Specimens examined:** Sumatra. West. G. Singgalang, May 1918, *Bünnemeijer* 2618 (BO); *Tokuoka T., Murakami, Y., Kanaya, T., Utami, N. and Girmansyah, D.* (T-0568); *Tokuoka T., Murakami, Y., Kanaya, T., Utami, N. and Girmansyah, D.* (T-0574); *Tokuoka T., Murakami, Y., Kanaya, T., Utami, N. and Girmansyah, D.* (T-0576)





Figure 3. (A) *I. singgalangensis* Grey-Wilson and (B) *I. diepenhorstii* Miq. Photo by Firham

**4. *Impatiens diepenhorstii* Miq. (Fig. 3B)**

Fl. Ind. Bat. Supp. 297 (1860) & in Illstr. Fl. Ind. Archip. 101 (1871). Type: W. Sumatra, Padang, Bukit Silit (holotype U). *I. korthalsii* Miq. Illustr. Fl. Ind. Archip. 100 (1871). Type: West Sumatra. G. Malintang & Pulo Besi., *Korthals* s.n. (holotype L).

Perennial stoloniferous herb, 5–35 cm tall. *Stems* decumbent to erect, slender, rooting at the lower nodes, glabrous. *Leaves* spirally arranged; lamina lanceolate-elliptic-oblongate, 4–14 x 1.5–4.6 cm, apex acuminate, margin crenate, lateral veins 3–7 pairs, usually sparsely pubescent between the lateral veins above, petiole 0.5–2.7 cm long. *Inflorescence* 2–3 flowered raceme, frequently reduced to a single flower. *Flowers* yellow, often with reddish markings on the upper petals. *Peduncle* slender 16–38 mm long, glabrous. *Bracts* inconspicuous, linear, 2–5 mm long. Lateral sepals narrowly ovate to lanceolate, 3–5 mm long, somewhat asymmetrical. Lower sepals shallowly navicular, 6–9 x 2.5–5 mm, abruptly constricted into a slightly curved filiform spur 5–23 mm long. Dorsal petal sub cucullate, 3–9 x 5–7 mm, when flattened with a shallow crest above. Lateral united petals, 15–27 mm long; upper petal of each pair oblong to reniform, 3–5 x 1.5–2 mm; lower petal of each pair obliquely oval to ovate 13–19 x 9–13 mm, slightly emarginate distally along the inner margin. *Ovary* glabrous. *Fruit* capsule fusiform, 9–15 x 3–5.5 mm, glabrous.

**Distribution.** Endemic to West Sumatra. Grey-Wilson (1989) recorded this species was found in several mountains in West Sumatra including Mt. Kerinci, Mt. Malintang, and Mt. Singgalang.

**Habitat:** Montane Forest, 1,406 m asl.

**Flowering time:** March to August

**Conservation status:** The preliminary conservation status is DD (Data Deficient).

**Specimens examined:** April 1918, *Leafmans* 26 (BO), May 1918, *Bünnemeijer* 2657 (BO), June 1918, *Bünnemeijer* 2864 (BO, L), 1927, *Yates* 2453 (BO); NU 0256, Feb, 2021.

**Key to the species of *Impatiens* on Mt. Singgalang**

- 1a. Flower white yellow with flushed/redness around the edges of the two upper petals, lower sepal shallowly navicular, white with a maroon stripe abruptly constricted into a short, filiform spur, incurved toward the tip ..... *I. buennemeijeri*
- 1b. Flower yellow, lower sepal narrowly navicular, abruptly constricted into a straight spur ..... 2
- 2a. Inflorescence has 1 flower, decumbent perennial herb ..... *I. delectans*
- 2b. Inflorescence with 2–3 flowers, stoloniferous perennial herb ..... 3
- 3a. Inflorescence 2, peduncle 3 flowered, sub umbellate raceme; flowers yellow. Dorsal petal cucullate, glabrous ..... *I. singgalangensis*
- 3b. Inflorescence 2–3 flowered raceme, frequently reduced to a single flower; flowers yellow, often with reddish markings on the upper petals. Dorsal petal subcucullate ..... *I. diepenhorstii*

**CONCLUSION**

Based on of exploration carried out in Mt. Singgalang in 2004 and 2021, four species of *Impatiens* were collected, namely *I. singgalangensis*, *I. buennemeijeri*, *I. delectans* and *I. diepenhorstii* of which three of them, *I. buennemeijeri*, *I. delectans* *I. diepenhorstii* are new distribution records in Sumatra, especially in Mt. Singgalang.

**ACKNOWLEDGEMENT**

We would like to thank Firham, a student of Andalas University, whom did the samples collection and took photographs. Also, our gratitude to Dr. Liam Trethowan of Royal Botanic Garden Kew (RBG Kew) for English correction of the manuscript.

**REFERENCES**

- Grey-Wilson C. 1989. A revision of Sumatran *Impatiens*. Studies on Balsaminaceae VII. Kew Bulletin 44: 67–106.
- Holmes D, Rombang WM. 2001. Daerah penting bagi burung: Sumatera. PKA/ BirdLife Inter-national Indonesia Programme. Bogor.
- IUCN. 2019. IUCN Red List Categories and Criteria: Version 14 (August). IUCN Species Survival Commission, Gland and Cambridge.
- Laurance WF. 1999. Reflections on the tropical deforestation crisis. *Biological Conservation* 91: 109–117.
- Nurainas N, Taufiq A, Handika H, Syamsuardi S. 2020. Flora of Sumatra: Vascular plant collection of selected families deposited at Herbarium of Andalas University (ANDA). Version 1.26. Herbarium of Andalas University. Occurrence dataset <https://doi.org/10.15468/sncpxn>, <https://www.gbif.org/occurrence/2006002438> (Accessed November 27, 2021).
- Rugayah T, Retnowati A, Windadri FI, Hidayat A. 2004. Pengumpulan data taksonomi. *Dalam*: Rugayah, Widjaja EA, Praptiwi. Pedoman Pengumpulan Data Keanekaragaman Hayati, Pusat Penelitian Biologi. Bogor.
- Shimizu T, Utami N. 1997. Three new species of *Impatiens* (Balsaminaceae) added to Flora Malesiana. Kew Bulletin 52: 435–442.
- Utami N. 2005. Two new species of *Impatiens* (Balsaminaceae) from Batang Gadis National Park, North Sumatra, Indonesia. *Blumea* 50: 443–446.
- Utami N. 2009. *Impatiens rubricaulis* (Balsaminaceae), a new species of *Impatiens* (Balsaminaceae) from West Sumatra. *Reinwardtia* 13: 93–94.
- Utami N. 2011. *Impatiens kunyitensis* (Balsaminaceae), a new species from Sumatra, Indonesia. Kew Bulletin 66: 187–190.
- Utami N. 2012. Three new species of *Impatiens* (Balsaminaceae) from Sumatra, Indonesia. Kew Bulletin 67: 731–737.
- Utami N. 2013. *Impatiens kerinciensis* (Balsaminaceae), a new species from Sumatra, Indonesia. Kew Bulletin 68: 687–688.
- Utami N. 2020. *Impatiens marroninus*, a new species of *Impatiens* (Balsaminaceae) from Sumatra, Indonesia. *Blumea* 65(1): 10–11.
- World Wildlife Fund. 2008. Sumatran montane rainforest. *In*: Encyclopedia of Earth. Eds. Cutler J. [First published in the Encyclopedia of Earth August 30, 2007. [http://www.eoearth.org/article/Sumatran\\_montane\\_rain\\_forest](http://www.eoearth.org/article/Sumatran_montane_rain_forest). (Accessed October 10, 2021).