


Flora of Gayo Plateau I: A new *Impatiens* (Balsaminaceae) species with flame-coloured flowers from Sumatra, Indonesia

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Abstract

Impatiens bungerrara Mustaqim (Balsaminaceae) is described here as a new endemic species from the northern Gayo Plateau, Sumatra, Indonesia. The new species is similar to *I. vitellina* Grey-Wilson but differs by branched stems, hairs in leaves and peduncles, and several flower morphologies. A detailed description, discussion, and colour photographs are given.

Abstrak

Impatiens bungerrara Mustaqim (Balsaminaceae) dipertelakan di dalam tulisan ini sebagai spesies tumbuhan endemik Dataran Tinggi Gayo bagian utara, Sumatra, Indonesia. Spesies baru ini serupa dengan *I. vitellina* Grey-Wilson, tetapi berbeda karena batang yang bercabang, rambut pada daun dan tangkai perbungaan, dan beberapa morfologi bunga. Sebuah pertelaan rinci, diskusi, dan foto-foto berwarna disajikan.

Introduction

Sumatra is one of the key areas for the centre of diversity for the genus *Impatiens* L. (Grey-Wilson 1989, Utami & Damayanto 2023). Having been excluded from intensive botanical exploration in Dutch eras (Meijer 1981), Sumatra has been recently assigned as a global plant dark spot (Ondo et al. 2024). In the case of *Impatiens*, two new species recently discovered from the northernmost range of the Sumatran Mountains, i.e. Gayo Plateau, Aceh Province (Mustaqim et al. 2024a, 2024b), are proof of the assumption.

This paper is part of a continuous effort to understand the floristic diversity of the Gayo Plateau, an area in the central part of Aceh Province, refers to the mountainous landscapes belonging to three regencies, viz Aceh Tengah, Bener Meriah, and Gayo Lues. This time, a new species of *Impatiens* with bright orange flowers is described based on a specimen collected from Aceh Tengah in the northern Gayo Plateau. The plant is morphologically similar to the Gayo Plateau common species, *I. vitellina* Grey-Wilson (1989). However, it has different floral colour and morphology that warrant its recognition as a new species.

Taxonomic Treatment

Impatiens bungerrara Mustaqim, **sp. nov.**

Diagnosis: *Impatiens bungerrara* is similar to *I. vitellina* Grey-Wilson but differs in having the stem branched (vs simple), peduncle hairy (vs glabrous), flowers with ovate lateral sepals (vs lanceolate) and recurved lower sepal's spur (vs straight or nearly so), upper segment of lateral united petals transversely oblong (vs oblong), and lower segment of lateral united petals obliquely ovate-triangular (vs obliquely oval).

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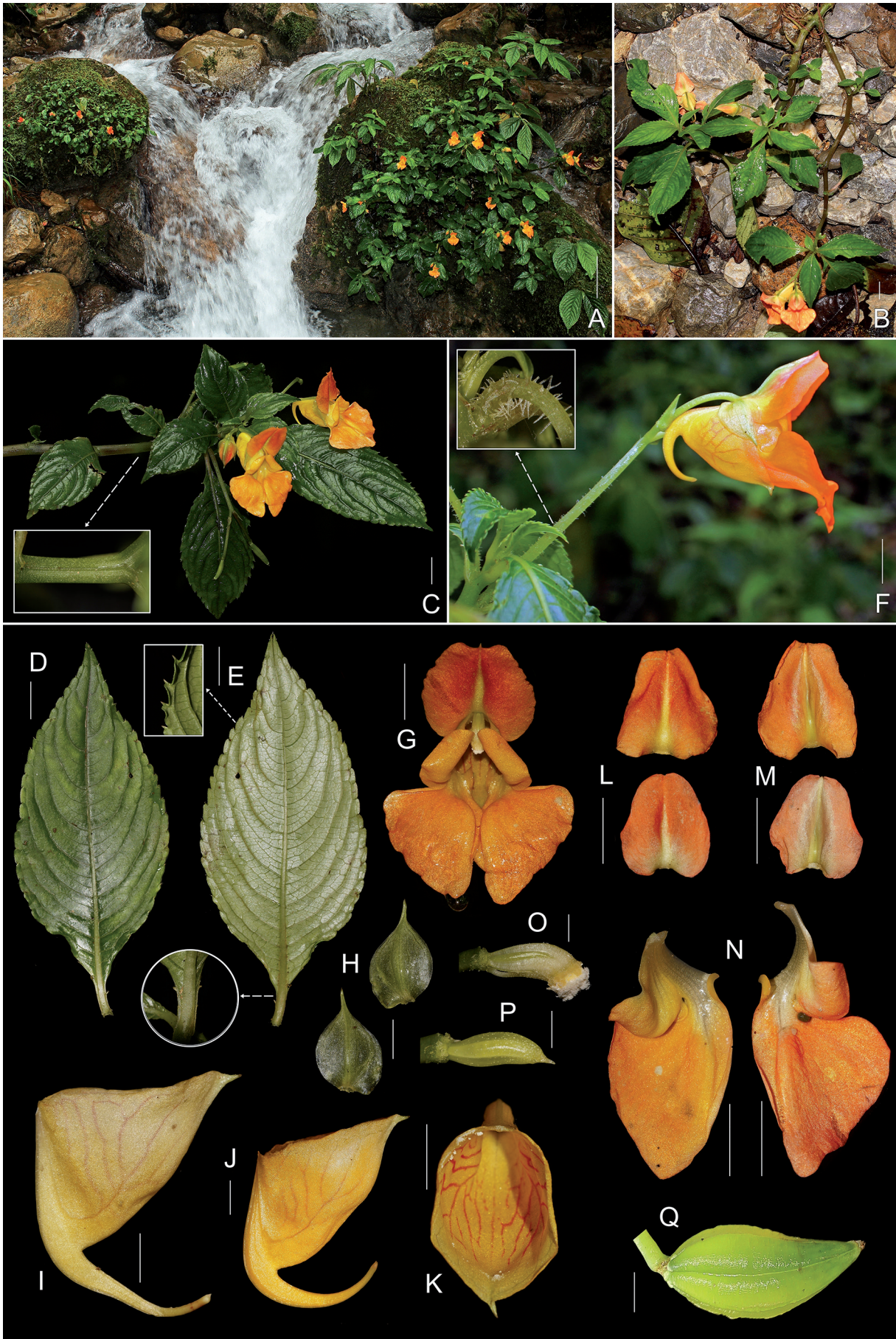


Figure 1. Morphology of *Impatiens bungerara* Mustaqim, sp. nov. A–B. living plants; C. individual plant showing ribbed stem; D. leaf, adaxial; E. leaf, abaxial with margin close-up (above) and petiole close-up (below); F. inflorescence with peduncle hairs (inset); G. flower, front-view; H. lateral sepals; I–J. lower sepals, lateral view; K. lower sepals, adaxial; L. dorsal petals, abaxial; M. dorsal petals, adaxial; N. lateral united petals; O. stamens; P. ovary; Q. fruit. Scale bar: A: 5 cm; B, C: 2 cm; D, E, F, G, L, M, N: 1 cm; H, I, J, K, Q: 5 mm; O, P: 2 mm. Photographs by Wendy A. Mustaqim.

Type: INDONESIA: ACEH PROVINCE: Aceh Tengah Regency, Jagong Jeget Subdistrict, Paya Dedep Village, 4°21'50.3"N 96°43'59.9"E, 1850 m, 27 Jan 2025, *Mustaqim 3876* (holotype: UIDEP, isotype: LGS).

Perennial *herbs*, forming clumps, stem decumbent, c. 40 cm or sometimes creeping. *Stem* subterete, with longitudinal ribs as a continuation of decurrent petiole base, glabrous. *Leaves* spirally arranged; lamina elliptic to ovate, 2.2–10.8 × 1.2–4.8 cm, green above, pale beneath, base attenuate into the petiole, apex acuminate, margin serrate, each segment with sharp tooth, up to c. 0.5 mm long, the basal 1–3 teeth rather with thick, elevated glands, lateral veins 5–10 pairs, inter-primary lateral veins 1–2, laxly hirsutulous above, late glabrescent, lower surface glabrous or sometimes few short hairs present, midrib slightly raised above, distinctly raised beneath, lateral veins slightly raised above, raised beneath, reticulations obscure above, rather distinct beneath on larger leaves; petiole 4–16 mm long, with one pair of elevated glands, sometimes at the very base of the leaf margin, glands up to 0.5 mm long, glabrous, sometimes with short and patent hairs. *Inflorescence* raceme, (1–)2-flowered, on the upper axils; flowers yellow-orange, with lower sepals red-veined. *Peduncle* 1.7–4.5 cm long, laxly patently hairy, especially at the basal part, sometimes glabrous on most of its part; bracts lanceolate, 3.5–5.5 × 2–3 mm, apex acuminate, glabrous, persistent; pedicels 16–21 mm long, glabrous. *Lateral sepals* 2, ovate, asymmetric, concave, 9–15 × 4–9 mm, light green, slightly transparent, acuminate into a sharp point, 8-veined, glabrous. *Lower sepal* deeply navicular, 17–22 mm long, 10–13 mm wide, 12–17 mm deep, abruptly constricted into the recurved spur, spur 15–21 mm long, spur tapering and usually diverging at the upper half, glabrous. *Dorsal petals* ovate, slightly triangulate, 19–22 × 17–21 mm, base rounded, apex shallowly retuse, with shallow to keel-shaped crest up to 2 mm high, glabrous. *Lateral united petals* 35–39 mm long; upper petal of each pair transversely oblong, 9–10 × 13–16 mm, recurved, rounded, glabrous; lower petal of each pair obliquely ovate-triangular, 21–26 × 16–20 mm, auriculate at the base, inner margin slightly notched, glabrous. *Stamens* 5, filaments c. 6.5 mm long, staminal head c. 1 mm long, yellow, glabrous. *Ovary* slightly sigmoid, c. 5.5 × 2 mm, with few hairs and white cystoliths. *Fruit* ovoid, tapering upward, 2.5–3.2 × c. 1.2 cm, light green. (Fig. 1).

Phenology: Flowering and fruiting recorded in January.

Etymology: The specific epithet is derived from the Gayo language, 'bunge' means flower and 'rara' means fire, reflecting the flower's colour resembling fire flame.

Distribution: Endemic to Sumatra, only known from the northern Gayo Plateau.

Habitat and ecology: The species grows among rocks in small streams in montane forests at an elevation range from 1750 to 1850 m above sea level. The habitat of this species is restricted to rocky small streams in sandstone rocks.

Additional specimen examined: INDONESIA. Aceh Tengah, Jagong Jeget, Paya Dedep, 4°22'00.1"N 96°43'20.7"E, 1750 m, 10 Jan 2023, *Mustaqim 2566* (LGS, UIDEP).

Preliminary conservation status assessment: The two known populations are threatened by natural disasters, i.e. flash floods, which routinely happen in the area. Because its habitat is restricted to rocks among streams and margins, the population is often threatened by flooding because of rain, especially during flash floods. This situation led to an extreme fluctuation in the number of mature individuals. Besides that, the surrounding habitats are also threatened by ongoing forest conversions for agriculture and associated activities. Compared to the IUCN Red List Categories and Criteria (IUCN 2012) following the guidelines from the IUCN Standards and Petitions Committee (2024), the species is best assigned as Critically Endangered [CR B2a+b(iii)+c(iv)].

Notes: *Impatiens bungeara* is unique among the Sumatran species in having spirally arranged leaves, inflorescence raceme with yellow-orange flowers, deep (> 7 mm) navicular lower sepals, non-toothed lateral sepals 9–15 mm long, dorsal petals without or with only shallow crest, and the recurved filiform, 15–21 mm long, spur. With this set of characteristics, the species is close not only to *I. vitellina* but also other four species, namely *I. junghuhnii* Miq., *I. tapanuliensis* Grey-Wilson, and *I. pyrrotricha* Miq. (Grey-Wilson 1989) as well as the recently described *I. bungeusing* Mustaqim & Ruchis. (Mustaqim et al. 2024b). From the first three species, *I. bungeara* differs in having totally glabrous floral parts and with the fourth species, it is distinct by the much longer (15–21 mm vs 8–8.5 mm) and non-U shaped lower sepal's spur (vs U-shaped) (see Table 1).

Table 1. Key morphological characters of *Impatiens bungeara* and some similar species

Morphology	<i>I. bungeara</i>	<i>I. vitellina</i>	<i>I. junghuhnii</i>	<i>I. pyrrotricha</i>	<i>I. tapanuliensis</i>	<i>I. bungeusing</i>
Leaves						
Widest point	below up to the middle	at the middle or above	above the middle	above the middle	below the middle	above the middle
Lateral veins (pairs)	5–10	(4-)5–10	4–9	5–9	8–13	8–10
Leaf margin	predominantly crenate	very shallowly crenate	shallowly serrate or serrate-crenate	coarsely crenate	very shallowly crenate	crenate
Inflorescence						
Number of flowers	1–2	1–5	1–3	1–3	2–6	4–6
Peduncle hairs	present	absent	absent or present	present	absent to present	absent

Morphology	<i>I. bungerara</i>	<i>I. vitellina</i>	<i>I. junghuhni</i>	<i>I. pyrrotricha</i>	<i>I. tapanuliensis</i>	<i>I. bungeusing</i>
Flower						
Color	orange	yellow	yellow	yellow	yellow	yellow
Lower sepal depth (mm)	12–17	11–13	11–13	11–14	11–12	11–13
Spur shape and orientation	recurved	straight or nearly so	recurved	recurved	straight or nearly so	U-shaped
Spur length (mm)	15–21	9–14	11–16	11–15	7–11	8–8.5
Dorsal petal crest	not to slightly pronounced	not pronounced	pronounced	pronounced	pronounced	not pronounced
Source	-	Grey-Wilson (1989), pers. obs.	Grey-Wilson (1989)	Grey-Wilson (1989)	Grey-Wilson (1989)	Mustaqim et al. (2024)

The habitat of the new species is restricted to sandstone rocks (see Muksin et al. 2007 for rock formation) on the stream or its margin. This situation may cause an interpretation that the new species is a rheophyte. However, the species does not display narrow leaf blades as one of the most important characteristics of the plant group (Imaichi & Kato 1997). So far, only one species of *Impatiens* has been assigned as a true rheophyte (Costa et al. 2020), i.e. *I. hukaungensis* J. Murata & Nob. Tanaka from Myanmar (Tanaka et al. 2018), has, however, narrow leaf blades (i.e. oblanceolate), not elliptic or ovate like in *I. bungerara*. Further studies involving ecology and other aspects of this species are needed to draw a better conclusion about the possible evolution of the new species to a true rheophyte.

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References

- Costa LMS, Goetze M, Rodrigues AV, dos Santos Seger GD, Bered F (2020) Global rheophytes data set: angiosperms and gymnosperms. *Ecology* **101**(8): e03056. [DOI](#)
- Grey-Wilson C (1989) A revision of Sumatran *Impatiens*: Studies in Balsaminaceae: VIII. *Kew Bulletin* **44**(1): 67–106. [DOI](#)
- Imaichi R, Kato M (1997) Speciation and morphological evolution in rheophytes. In: Iwatsuki K, Raven PH (eds) *Evolution and diversification of land plants*. Springer, Tokyo. [DOI](#)
- IUCN (2012) *IUCN Red List categories and criteria: Version 3.1*. Second edition. IUCN, Gland and Cambridge, Swiss/UK, 32 pp.
- IUCN Standards and Petitions Committee (2024) Guidelines for using the IUCN Red List Categories and Criteria. Version 16. Prepared by the Standards and Petitions Subcommittee, 122 pp. ([PDF](#)) (accessed 1 Feb 2025)
- Meijer W (1981) Sumatra as seen by a botanist. *Indonesian Circle* **9**(25): 17–28. [DOI](#)
- Muksin U, Arifullah A, Simanjuntak AVH, Asra N, Muzli, Wei S, Gunawan E, Okubo M (2023) Secondary fault system in Northern Sumatra, evidenced by recent seismicity and geomorphic structure. *Journal of Asian Earth Sciences* **245**: 105557. [DOI](#)
- Mustaqim WA, Arico Z, Jayanthi S, Andini WR, Pratiwi D, Ruchisansakun S (2024b) A new species of *Impatiens* (Balsaminaceae) from northern Gayo Plateau, Sumatra. *Taiwania* **69**(4): 554–559. [DOI](#)
- Mustaqim WA, Mahardhika AY, Fauzan YSA, Arico Z, Primananda E, Robiansyah I (2024a) A new species of *Impatiens* (Balsaminaceae) from northern Gayo Plateau, northern Sumatra. *Taiwania* **69**(1): 57–61. [DOI](#)
- Ondo I, Dhanjal-Adams KL, Pironon S, Silvestro D, Colli-Silva M, Deklerck V, Grace OM, Monro AK, Nicolson N, Walker B, Antonelli A (2024) Plant diversity darkspots for global collection priorities. *New Phytologist* **244**: 719–733. [DOI](#)
- Tanaka N, Ohi-Toma T, Ito Y, Aung MM, Murata J (2018) New or noteworthy plant collections from Myanmar (10): *Impatiens hukaungensis* (Balsaminaceae), a new rheophyte from the Northern Region. *The Journal of Japanese Botany* **91**(1): 23–30. [DOI](#)
- Utami N, Damayanto IPGP (2023). Annotated checklist of Indonesian *Impatiens* (Balsaminaceae). *Nordic Journal of Botany* **2023**: e04088. [DOI](#)