Impatiens alboarenicola, a new species of Balsaminaceae from north-western Madagascar

YUTARO FUJIMOTO1,7*, SHUICHIRO TAGANE2,8, HARISON RABARISON3,9, ROVA N. ANDRIAMAHASETRA4,10, NATSUKI KOMADA5,6,11 & KAORU KITAJIMA1,12

1Graduate School of Agriculture, Kyoto University, Kitashirakawa-Oiwake-cho, Sakyo-ku, Kyoto 606-8502, Japan
2Kagoshima University Museum, Kagoshima University, 1-21-30, Korimoto, Kagoshima 890-0065, Japan
3Department of Plant Biology and Ecology, Faculty of Science, University of Antananarivo, BP 566, Ambohitaina, Antananarivo 101, Madagascar
4Faculty of Science, Technology and Environment, University of Mahajanga, BP 652, Inmeuble Kakal, 5 Rue Georges V, Mahajanga 401, Madagascar
5Graduate School of Global Environmental Studies, Kyoto University, Yoshida-Nihommatsu-cho, Sakyo-ku, Kyoto 606-8501, Japan
6Graduate School of Advanced Science and Engineering, Hiroshima University, 1-5-1, Kagamiyama, Higashihiroshima 739-8529, Japan
7fujimoto.yutaro.24w@kyoto-u.jp; https://orcid.org/0000-0001-5050-8310
8stagane29@gmail.com; https://orcid.org/0000-0002-1974-7329
9rabarisohr@yahoo.fr; https://orcid.org/0009-0003-0684-1484
10navalonaandriamahasetra@gmail.com; https://orcid.org/0009-0004-2991-7469
11nkomada@hiroshima-u.ac.jp; https://orcid.org/0000-0002-6149-0475
12kitajima.kaoru.4s@kyoto-u.ac.jp; https://orcid.org/0000-0001-6822-8536

*Author for correspondence

Abstract

A new species of Impatiens, I. alboarenicola (Balsaminaceae), is described and illustrated from Ankarafantsika National Park, north-western Madagascar. This species is similar to I. barthlottii and I. tsingycola in leaf and flower shape, but clearly distinguished from the former by its shorter stature, absence of a tuber at the stem base, solitary (rarely 2) flowers in the axils of leaves, and smaller flowers, and from the latter by its smaller leaf blades with fewer pairs of teeth on the dentate leaf margin, solitary (rarely 2) flowers in the axils of leaves, and saccate spur-like projection located at ca. 5 mm below the apex of the lower petal lobe of the lateral united petals (vs. at the apex of the lower petal lobe).

Key words: African flora, Ericales, plant taxonomy, seasonally dry tropical forest

Introduction

Impatiens Linnaeus (1753: 937) (Balsaminaceae) is a large genus comprising more than 1,100 species distributed in the Old World and North and Central America (POWO 2023). It has been known to have five hotspots in species richness, namely Southeast Asia and southwestern China, eastern to central Himalaya, southern India, tropical Africa, and Madagascar (Grey-Wilson 1980, 1989, Chen et al. 2007, Ruchisansakun et al. 2018).

In Madagascar, 186 species of Impatiens are accepted to date (POWO 2023). Among them, as many as 78 species have been discovered by recent intensive fieldwork and subsequent taxonomic studies since 2000 (Fischer & Rahelivololona 2002, Fischer et al. 2003, Fischer & Rahelivololona 2004, 2007a, b, Abrahamczyk & Fischer 2015, Fischer & Rahelivololona 2015a, b, c, 2016, Fischer 2016, Fischer et al. 2017, 2020), suggesting that the inventories are not enough and more species remain to be discovered in the region.

Ankarafantsika National Park, with an area of 136,513 ha, established in 1927, is one of the oldest national parks in Madagascar. It is located in Boeny Region, north-western Madagascar (Fig. 1), and the area is known as one of the largest remnants of the severely reduced dry forest (IUCN/UNEP/WWF 1987, Pons & Wendenburg 2005). Annual precipitation in the recent five years (2018–2022) is 1,154–1,957 mm, and the dry season (monthly precipitation < 10 mm) typically occurs from May to October (rainfall data provided by the Durrel Wildlife Conservation Trust in...
A NEW SPECIES OF IMPATIENS ALBOARENICOLA

During our botanical inventories in the above area in 2023, an unknown species of Impatiens was collected. After careful examination with reference to herbarium specimens at Herbs. DEBEV, KAG, and TAN (herbarium codes follow Thiers 2024), digital specimen images available online (e.g., JSTOR Global Plants, https://plants.jstor.org), and relevant literature (Perrier de la Bâthie 1934, 1948, Fischer & Rahelivololona 2002, Fischer et al. 2003, Fischer & Rahelivololona 2004, 2007a, b, Abrahamczyk & Fischer 2015, Fischer & Rahelivololona 2015a, b, c, 2016, Fischer 2016, Fischer et al. 2017, 2020), it was clear that the species was as yet undescribed. It is formally described below.

**Taxonomy**

*Impatiens alboarenicola* Y.Fujimoto, Rabarison & Tagane, *sp. nov.* (Figs 2 & 3)

**TYPE:**—MADAGASCAR. Boeny Region: Marovoay District, Ankarafantsika National Park, 16.31722°S, 46.81053°E, 152 m elev., 20 February 2023, S. Tagane & H. Rabarison A261 (holotype DEBEV!; isotypes KAG [KAG184161!], TAN!).
Annual herb, 5.3–18.5 cm tall, glabrous except adaxial surface of lamina. Stems erect, succulent, pale brown to reddish-brown in vivo, often dark blue to dark purple in sicco, not branched or rarely branched, without tuber at base. Leaves alternate, petiolate; petiole pale brown to reddish-brown, (7.5–)12–20–(46) mm long, with extrafloral nectaries; lamina ovate-triangular, ovate, elliptic-ovate, (7–)16–41–(64) × (4–)10–27–(43) mm, adaxial surface covered with short white hairs, abaxial surface glabrous, apex acute, base cuneate to acute, slightly decurrent, margin dentate, teeth (1–)7–9(–11) on each side, with gland-tipped appendages, secondary veins (3–)4–6(–8) pairs, tertiary veins indistinct on both surfaces. Flowers light yellow to pale yellow with yellow spots on lateral united petals and with spur, 1.3–1.8 cm long. Pedicels 18–25 mm long. Bracts narrowly triangular, 0.9 × 0.5 mm, apex acute. Lateral sepals 2, lanceolate, 2.5–3.0 × 0.5–1.0 mm, apiculate, shallowly cucullate. Lower sepals navicular, 8 × 3 mm, apex acuminate, spur obtuse, 4.0–4.5 mm long, strongly curved. Dorsal petal cucullate, 5.0–6.5 × 2.5–4.5 mm, apex rounded to emarginate, often with apicule 0.5 mm long. Lateral united petals 10–13 mm long, upper petal lobe rounded, 4.5–6.5 × 2.0–3.5 mm, lower petal lobe suborbicular, 10–13 × 3.5–5.0 mm, with yellow, 1 mm long, saccate spur-like projection at ca. 5 mm below the apex of the lower petal lobe of the lateral united petals (vs. at the apex of the lower petal lobe).

Other specimens examined:—MADAGASCAR. Boeny Region: Marovoay District, Ankarafantsika National Park. However, forest fires have often occurred, which might gradually reduce the habitat of I. alboarenicola around Ankarafantsika has disappeared (Schüßler et al. 2016). However, recent molecular phylogenetic analyses based on nuclear and plastid markers demonstrated that the species of Malagasy I. subgen. Impatiens was not a monophyletic group (Rahelivololona et al. 2018). Further analysis including I. alboarenicola is necessary to clarify its phylogenetic and taxonomic position.

Note:—Impatiens alboarenicola is morphologically classified into the Impatiens subgen. Impatiens sensu Fischer and Rahelivololona (2002) because of the lower sepal with a spur and the petiole with extrafloral nectaries (Fischer & Rahelivololona 2007a, b). Within the I. subgen. Impatiens, I. alboarenicola belongs to the section Uniflorae Hooker & Thomson (1859: 113), based on its short-fusiform capsules, conspicuously turgid at the middle, and fascicled inflorescence with 1 to 2 flowers (Yu et al. 2016). However, recent molecular phylogenetic analyses based on nuclear and plastid markers demonstrated that the species of Malagasy I. subgen. Impatiens was not a monophyletic group (Rahelivololona et al. 2018). Further analysis including I. alboarenicola is necessary to clarify its phylogenetic and taxonomic position.
FIGURE 3. Isotype of *Impatiens alboarenicola* Y. Fujimoto, Rabarison & Tagane (KAG184161).
Acknowledgements

The authors thank Madagascar National Parks and the manager and staff of Ankarafantsika National Park for permitting our botanical inventories in the protected area, and the Botanical and Zoological Garden of Tsimbazaza (TAN) and the herbarium of the Faculty of Science, University of Antananarivo (DBEV) for allowing us to access their collections. We also thank Zo Lalaina Razafiarison, Tojotanjona Patrick Razanaparany, and Hiroki Sato for their support of our field survey, and Wataru Noyori for assistance in the field and sample preparation. This study was supported by JSPS KAKENHI (JP22H00424) and JST SPRING (JPMJSP2110).

References

https://doi.org/10.11646/phytotaxa.226.1.8


https://doi.org/10.35535/pfsyst-2020-0008


https://doi.org/10.11646/phytotaxa.244.2.7


