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BEGONIA MAGUNIANA (BEGONIACEAE, *BEGONIA* SECT. *OLIGANDRAE*), A NEW SPECIES FROM NEW GUINEA

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The new species *Begonia maguniana* H.P.Wilson from New Guinea is described. It is endemic to the Central Range of New Guinea at altitudes of c.1700–2300 m and belongs to the IUCN category Least Concern.

Keywords. *Begonia*, biodiversity, New Guinea, new species, taxonomy.

Introduction

Home to a staggering 15,000 endemic species (Myers *et al.*, 2000), New Guinea has appealed to naturalists for centuries, with extreme diversity emerging as an unsurprisingly common theme to all their studies of the region. Descriptions of New Guinea demand an excessive use of superlative adjectives; it is both the largest and the highest tropical island (with Puncak Jaya reaching 4884 m) and is home to the world's largest and smallest parrots, largest rat, smallest frog, tallest tropical trees and smallest species of *Rhododendron* L. Furthermore, the island boasts an intermingled tapestry of climate zones, topographical heterogeneity and geology. The complex relationships between these varied factors have resulted in a remarkable number of different ecological niches existing on New Guinea in a broad range of ecosystems including alpine meadows, cloud forests, tropical forests, mangroves and savannahs.

Described as a "keystone in Pacific botany" (van Steenis, 1950) due to its position at the critical junction between Asia and Australia, the island's vegetation is heterogeneous, containing both Laurasian and Gondwanan elements as well as numerous neo-endemics. Much of the remarkable botanical diversity of the island today is underpinned by the complex relationships between these biogeographically distinct components (Takeuchi, 2007).

Specimen coverage of Papua New Guinea is reasonable, with 725 Begoniaceae collections. However, their collection localities are concentrated in more accessible regions, so considerable geographical and taxonomic gaps remain. A three-week collecting expedition targeting such a sampling gap in *Begonia* L., in the Telefomin District of Sandaun Province in July 2018, yielded 42 collections comprising at least 14 species, one of which we describe here as a new species.

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Begonia sect. *Oligandrae* M.Hughes & W.N.Takeuchi was described to contain five anomalous species from New Guinea with distinctive horned fruit and a very reduced number of stamens (Hughes & Takeuchi, 2015). Two of these species, *Begonia brassii* Merr. & L.M.Perry and *B. oligandra* Merr. & L.M.Perry, were described in 1943 from West Papua (Indonesia) (Merrill & Perry, 1943). The other three were described very recently following fieldwork in the highlands of Papua New Guinea: *Begonia chambersiae* W.N.Takeuchi (Takeuchi, 2012), *B. pentandra* W.N.Takeuchi (Hughes & Takeuchi, 2015) and *B. sandsiana* W.N.Takeuchi (Takeuchi, 2013). The section is well defined morphologically by species having a reduced stamen number (4–9), symmetrical androecium, free tepals, and unequal wings on the fruit (one being enlarged, verruculose and extended apically towards the tepals, the other two being small and rounded). Images of the specimens cited are available from the Begonia Resource Centre (Hughes *et al.*, 2015).

Key to *Begonia* sect. *Oligandrae*

1a. Lamina divided almost to the midrib ____ 2
1b. Lamina not divided ____ 4

2a. Lamina simple; stamens 4 ____ *B. chambersiae*
2b. Lamina compound, formed of 3- to 6-lobed leaflets; stamens 6–9 ____ 3

3a. Stems repent; leaflet lobes narrow (majority < 3 mm wide), lobe apices rounded ____ *B. oligandra*
3b. Stems suberect; leaflet lobes broad (majority > 5 mm wide), lobe apices acute **B. maguniana**

4a. Lamina lanceolate, margin dentate ____ *B. brassii*
4b. Lamina ovate to orbicular, margin ciliate ____ 5

5a. Plant hairy, bracts ciliate ____ *B. pentandra*
5b. Plant glabrous, bracts glabrous ____ *B. sandsiana*

Begonia maguniana H.P.Wilson **sp. nov.**

Begonia maguniana is closest to *B. oligandra* Merr. & L.M.Perry but differs in its habit, being a larger (15–40 cm tall), more upright plant forming dense clumps of erect to suberect stems, whereas *B. oligandra* is low growing (5–30 cm tall) with suberect to repent stems that root at the nodes. *Begonia maguniana* has striking red stems and some red colouring on abaxial leaf surfaces; occasionally, this is reduced to a red flush on a green stem at the nodes and at the point of attachment between leaf lamina and petiole. The leaves of *Begonia oligandra* are finely divided, with prominent venation giving the appearance of a filmy fern to sterile plants, whereas the leaves of *B. maguniana* are more reminiscent of *Anemone nemorosa* L. – Type: Papua New Guinea, Sandaun Province, Telefomin District, Telefomin, 1775 m, 23 vi 2018, *Wilson, Hughes, & Paul* ELAE7 (holo E [E00914141], iso LAE). **Fig. 1**.

FIG. 1. *Begonia maguniana* H.P.Wilson, sp. nov. A, Habit; B, female flower; C, female flower and ovary; D, male flower; E, ripe fruit; F, leaf lamina (upper surface). A, B and F, *Wilson, Hughes, & Paul* ELAE7; C, *Wilson, Hughes, & Paul* ELAE106; D, *Wilson, Hughes, & Paul* ELAE101; E, *Wilson, Hughes, & Paul* ELAE30. (Photographs: A, B and E, Mark Hughes; C, D and F, Hannah Wilson.)

Erect tuberous caulescent herb 15–40 cm tall, forming clumps with up to c.50 stems. *Stems* red, succulent, c.5 mm wide, flattened on one side (above petiole attachment), internodes (1.5–)3–7 cm long, glabrous to villose, hairs simple, 1–2 mm long. *Stipules* caducous, ovate lanceolate, keeled, glabrous, 6 × 4 mm, tip shortly cuspidate. *Leaves*: petioles red, succulent, (0.5–)1.5–3 cm, subglabrous to villose, hairs simple, 1–2 mm long; lamina compound, leaflets 5, occasionally fewer, total size 2.5 × 2 cm to 6 × 4.5 cm, apical leaflet with pinnate venation, leaflets lobed, dark green above with occasional hairs just inside the margin, red or pale green below with hairs on the main veins; margin irregularly serrate with hairs at the tips of the serrations. *Inflorescences* bisexual drepanium, 2–5 cm long, protandrous, with 2 or 3 male flowers and a single terminal female flower; primary peduncle glabrous, c.2–4 cm long; bracts conspicuous, white, ovate, glabrous, 10 × 8 mm. *Male flowers*: pedicel white, glabrous, 6–12 mm long; tepals 4, white with pale green at the base, outer two broadly ovate, 12 × 10 mm, inner two elliptic, 10 × 5 mm; androecium on a raised red torus, stamens 9 in three whorls of 3, filaments white, 2 mm long, anthers 1.5 mm in diameter, ovate orbicular, white, dehiscing all around the perimeter, pollen white. *Female flowers*: pedicel white, 2–5 mm long, glabrous; ovary 3-locular, placentation axile, 2 placental lamellae per locule, ovary green, glabrous, with one horn-like wing, slightly verruculose, and two rounded succulent wings, all wings clustered to upper side of the ovary such that wing ridges all point upwards during flowering; tepals 3, white, forming a bell with a slightly flared entrance, outer two ovate, 12 × 9 mm, inner tepal elliptic, 8 × 4 mm; styles 3, free, pale green, deeply forked, linear, 4 mm long, stigmatic surface slightly spiral along the linear forks. *Fruit* remains green when ripe, held with the larger wing downwards, dehiscing through membranous valves inside the two round fleshy wings.

Additional specimens examined. Papua new guinea. **Sandaun Province**: Telefomin District. Folongonom, 2100 m, 24 iv 1975, *Barker* LAE67484 (LAE); Star Mts, 2000 m, 8 iv 1975, *Croft & Leiean* 65767 and 65787 (LAE); Telefomin, 1750 m, 13 iv 2017, *Magun & Poulsen* LAE90444 (E, LAE); Star Mts, 2250 m, 11 v 1975, *Veldkamp* 6689 (LAE); Feranmin, 1699 m, 25 vi 2018, *Wilson, Hughes, & Paul* ELAE30 (E, LAE); Busilmin, 1707 m, 8 vii 2018, *Wilson, Hughes, & Paul*, ELAE101 (E, LAE); Busilmin, 1834 m, 9 vii 2018, *Wilson, Hughes, & Paul* ELAE106 (E, LAE).

Indonesia. **Papua Province**: Kabupaten Lanny Jaya, Nobaga, 2547 m, 10 i 2004, *Danet* 4285 (LYJB); Tenmasigin, Orion Mts, 1800 m, 22 v 1959, *Kalkman* 4016 (A).

Distribution and ecology. Endemic to the Central Range of New Guinea (Fig. 2). Locally common along streams, lithophytic on mossy limestone boulders or growing among small rocks in dry stream beds, occasionally terrestrial. Grows sympatrically with *Begonia oligandra* and *B. vinkii* Sands in some places, with no evidence of hybridisation seen in the field (although see notes regarding *Danet* 4285).

Etymology. Begonia maguniana is named after Thomas Magun (LAE Herbarium, Papua New Guinea), who, with Axel Poulsen, collected this species in Telefomin in April 2017.

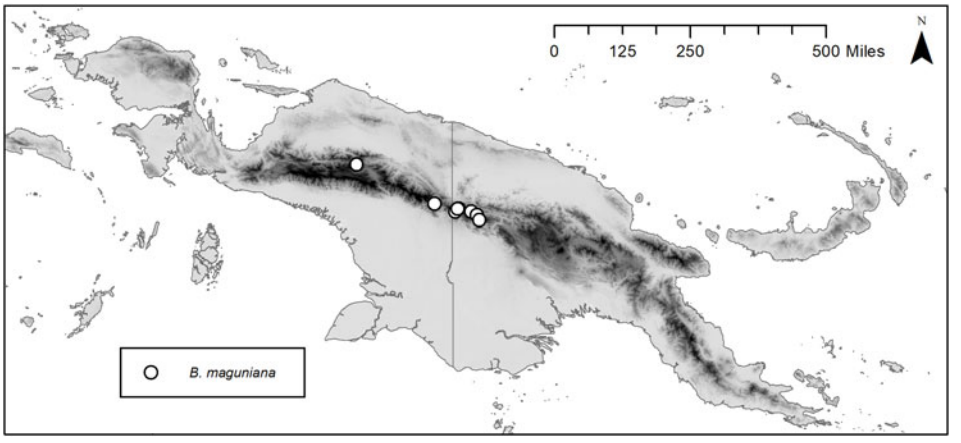

FIG. 2. Distribution of *Begonia maguniana* H.P.Wilson, based on collection localities of herbarium specimens.

In the field, at first sight the plant is reminiscent of the European wood anemone, *Anemone nemorosa*. As the capsule matures, the larger ovary wing develops and the pedicel elongates and curves, resulting in the capsule being held upside down at maturity (Fig. 3), such that the two carpels with smaller wings are now uppermost. The tissue at the top of these carpels then disintegrates, leaving behind a papery flap that lifts to allow the seed to be dispersed. The capsules are not persistent, and seed is dispersed while the capsule is still green. The anthers in *Begonia maguniana* are unusual in forming a continuous band, giving the stamen a lollipop-like appearance. The collection from the far west of the range (*Danet* 4285) has dimorphic leaves, with the lower leaves not as lobed, and appearing more similar to those of *Begonia brassii*, whereas the upper leaves are typical of *B. maguniana*. Further work is needed to assess whether this is due to hybridisation or part of the normal morphological variation of this species.

Proposed IUCN status. Without the isolated westernmost specimen (*Danet* 4285), the extent of occurrence (EOO) is 1255 km^2 and the area of occupancy (AOO) is 28 km^2; with this specimen, the EOO is 4879 km^2 and the AOO is 32 km^2. Either way, these figures suggest that *Begonia maguniana* should be regarded as Endangered (EN). There is no way to adapt EOO and AOO to take into account species with a naturally small distribution, as is common in *Begonia*. This species is thriving; it is present in numerous locations, with reasonably large populations where it occurs, and grows along trail sides (an indication that it can tolerate some disturbance). Furthermore, the montane forests of New Guinea are not under threat from logging, owing to their inaccessibility, so we consider an IUCN category of Least Concern to be appropriate (IUCN Standards and Petitions Subcommittee, 2017).

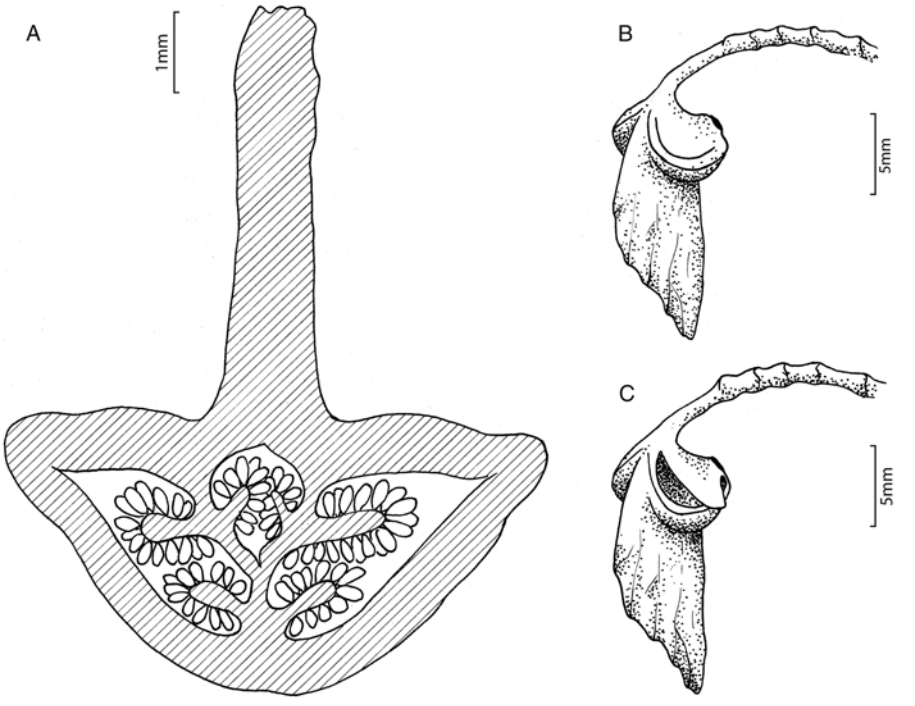

FIG. 3. *Begonia maguniana* H.P.Wilson. A, Transverse section through ovary, showing the three locules, each with two placentae; B, almost mature capsule showing line of dehiscence; C, mature capsule with dehisced ovary. (Drawings by Hannah P. Wilson.)

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