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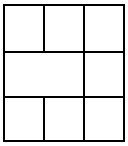

Cover images: *Begonia tjiasmantoi* Ardi & D.C.Thomas. A. Habit. B. Stipule. C. Male. D. Male inflorescence and female flower. E. Male flower. F. Female flower. G. Infructescence. H. Ovary cross-section, axile placentation and bilamellate placentae. A–H from *WI 562*. Photos: W.H. Ardi.

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BEGONIA TJIASMANTOI, A NEW SPECIES FROM WEST SULAWESI

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ABSTRACT
ARDI, W. H. & THOMAS, D. C. 2020. *Begonia tjiasmantoi*, a new species from West Sulawesi. *Reinwardtia* 19(1): 61–65. — A new species, *Begonia tjiasmantoi* Ardi & D.C.Thomas is described from Mamasa, West Sulawesi, Indonesia. The species is endemic to West Sulawesi and belongs to *Begonia* section *Petermannia.* A provisional conservation assessment indicates a Critically Endangered status.

Keywords: Endemic, Mamasa, *Petermannia*, West Sulawesi.

ABSTRAK
ARDI, W. H. & THOMAS, D. C. 2020. *Begonia tjiasmantoi,* jenis baru dari Sulawesi Barat. *Reinwardtia* 19(1): 61–65. — Satu jenis baru, *Begonia tjiasmantoi* Ardi & D.C.Thomas dipertelakan dari Mamasa, Sulawesi Tengah bagian barat, Indonesia. Jenis ini adalah jenis endemik Mamasa, dan termasuk ke dalam seksi *Petermannia*. Evaluasi status konservasi untuk *B. tjiasmantoi* adalah terancam punah.

Kata kunci: Endemik, Mamasa, *Petermannia*, Sulawesi Barat.

INTRODUCTION

Fifty-seven species of *Begonia* (Begoniaceae) are known from the Indonesian island of Sulawesi (see checklist in the Sulawesi *Begonia* Data Portal (Thomas *et al.*, 2013)), a majority of which have been described in the framework of efforts towards a revision of the Sulawesi *Begonia* flora in the last two decades (Hughes, 2006; Thomas & Hughes, 2008; Girmansyah *et al.*, 2009; Thomas *et al*., 2009a, b, 2011, 2018; Wiriadinata, 2013; Ardi *et al.*, 2014, 2018, 2019; Lin *et al.*, 2017; Ardi & Thomas, 2019; Thomas & Ardi, 2019, 2020; Dayanti *et al.*, 2020). The vast majority of Sulawesi *Begonia* species are restricted to the island and many are narrowly endemic to certain areas (Thomas *et al.*, 2013; Ardi & Thomas, 2019; Thomas & Ardi, 2020).

West Sulawesi province still harbors large areas of good quality upland to montane forests, including extensive old-growth forest in the Quarles Mountains, while most of the lowland forests have been completely converted (Cannon *et al.*, 2005, 2007). The province is botanically poorly explored and collection numbers and densities are very low in comparison to other Sulawesi provinces (Cannon *et al.*, 2007).

Here we report the discovery of a new species, *Begonia tjiasmantoi*, from material collected on an expedition in Mamasa regency in West Sulawesi. It is classified in *Begonia* sect. *Petermannia* as it shows typical characters of the section: protogynous inflorescences, two-tepaled male flowers, anthers with unilaterally positioned slits, five-tepaled female flowers, two-flowered female inflorescences or solitary female flowers, three-locular ovaries with axile placentation and bilamellate placentae, and fruits with equal or subequal wings (Doorenbos *et al*., 1998). *Begonia tjiasmantoi* is a very distinctive species on account of its rhizomatous growth habit and its flower coloration. The new species has yellow-tepalled flowers, which is rare in the large section *Petermannia*.

Begonia tjiasmantoi Ardi & D.C.Thomas *spec. nov.* § *Petermannia.* — TYPE: INDONESIA. Sulawesi, West Sulawesi: Mamasa Regency, Messawa, Seppang, 958 m, S 3.0635556, E 119.3131724, 27 November 2019, *W.H. Ardi, M. Ardiyani, W.A. Mustaqim* & *Slamet WI 614* (Holotype BO, Isotype KRB, SING). Figs. 1 & 2.

Begonia tjiasmantoi has a rhizomatous stem, male and female flowers with yellow tepals and male flowers with relatively few stamens (22–24). This character combination differentiates it from other Sulawesi *Begonia* species. The rhizomatous growth habit of *Begonia tjiasmantoi* is similar to the growth habit of the orange-tepalled *B. ignita* C.W.Lin & C.I.Peng, but *B. tjiasmantoi* can be

Fig. 1. Distribution of *Begonia tjiasmantoi* in West Sulawesi, Indonesia. Red dot: collection location. Broken line: borders of West Sulawesi province. Grey lines: 1° graticules.

differentiated by its strongly asymmetric, ovate to elliptic leaves (8–11 × 3.5–5.5 cm); cymose-paniculate male inflorescence with subumbellate partial inflorescences with up to 6 flowers; yellow male flower tepals that are relatively small (6–8 × 7.5–8.5 mm) and have few stamens (22–24); female flowers with shorter pedicels (3–4 mm), 5 (–6) yellow tepals, and a cylindrical seed-bearing part of the fruit. *Begonia ignita* has symmetric or subsymmetric cordiform leaves that are larger (7–12 × 6.5–11 cm); racemose-cymose male inflorescence with monochasial partial inflorescences with up to 3 flowers; orange male flower tepals that are larger in size (10–15 × 9–11 mm), more stamens (35–45); female flowers with longer pedicels (6–13 mm), 4 (or rarely 2, 3 or 5) orange tepals, and an ellipsoid seed-bearing part of the fruit.

Perennial, monoecious herb, up to *ca*. 15 cm tall. *Stem* rhizomatous, few-branched, internodes 0.5–2.5 cm long, reddish, glabrous except for microscopic glandular hairs. *Leaves* alternate; *stipules* persistent, elliptic, 6–12 × 3–8 mm, reddish, glabrous, midrib prominent, margin entire, translucent, apex narrowed into bristle up to 1 mm long; *petioles* 4–10 mm long, reddish-brownish, terete, shallowly channeled, glabrescent; *lamina* basifixed, ovate to elliptic, 8–11 × 3.5–5.5 cm, very asymmetric, base cordate, lobes sometimes slightly overlapping, apex acuminate, margin dentate, adaxially dark brown-reddish with irregular variegation of greenish blotches, glabrous, abaxial surface crimson red with greenish blotches, hairy on the veins only; venation palmate-pinnate, with 5–6 primary veins, actinodromous, secondary veins craspedodromous, primary and secondary veins slightly prominent on the adaxial surface. *Inflorescences* protogynous; solitary female flower or 2-flowered female partial inflorescence one node basal to male inflorescence part, peduncle 8−15 mm long, reddish, glabrous, bracts stipule-like, elliptic, *ca.* 8 × 3 mm, margin entire, apex bristle up to 1 mm long, reddish, translucent, glabrous, persistent; male inflorescence part paniculate-cymose, composed of up

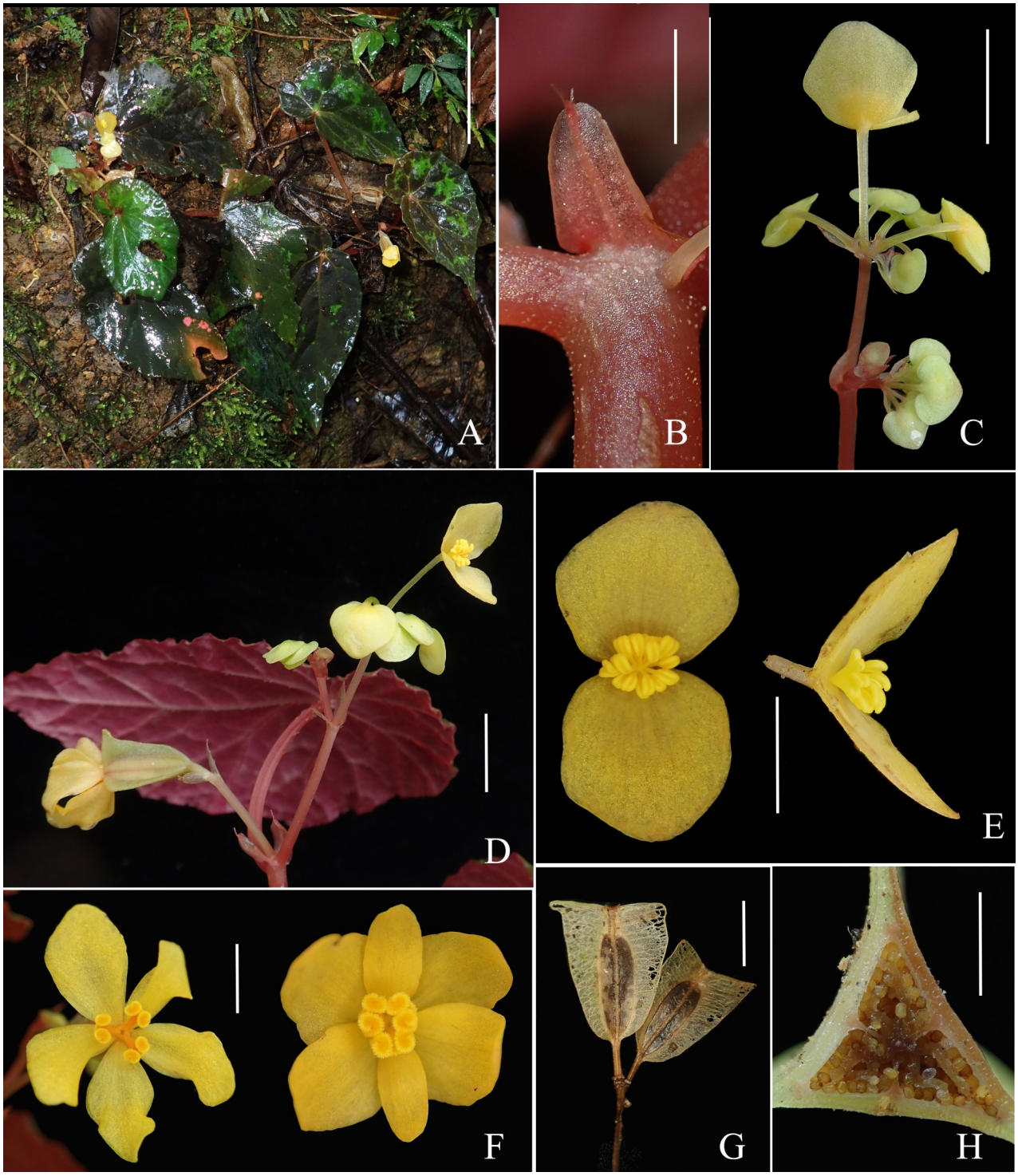

Fig. 2. *Begonia tjiasmantoi* Ardi & D.C.Thomas. A. Habit; scale bar: 5 cm. B. Stipule; scale bar: 5 mm. C. Male inflorescence; scale bar: 10 mm. D. Male inflorescence and female flower; scale bar: 10 cm. E. Male flower, front and side view; scale bar: 5 mm. F. Female flower, front view; scale bar: 5 mm. G. Infructescence; scale bar: 10 mm. H. Ovary cross-section, axile placentation and bilamellate placentae; scale bar: 2 mm. A–H from *WI 562*. Photos: W.H. Ardi.

to 3 sub-umbellate partial inflorescences, each with up to 6 flowers, peduncle of partial inflorescence up to 11.5 mm long, glabrous; *bracts* stipule-like, persistent, ovate, *ca.* 6.5 × 3.5 mm, translucent, midrib slightly prominent, reddish, glabrous, apex acuminate and narrowed into bristle *ca.* 1 mm long. *Male flowers*: *pedicels* 10–15 mm long, yellowish-greenish, hairy; *tepals* 2, yellow, broadly ovate to suborbicular, 6–8 × 7.5 –8.5 mm, abaxial surface glabrous, margin entire, apex rounded; *androecium* yellow, stamens 22–24, free filaments up to *ca.*1.3 mm long, fused at the base, anthers 0.5–0.8 mm long, dehiscing through unilaterally positioned slits *ca.* ½ as long as the anthers. *Female flowers*: *pedicel* 3–4 mm long, yellowish, glabrous; *tepals* 5(–6), yellow, subequal to unequal, ovate to elliptic, 6–12 × 2–8 mm, abaxially glabrous, margin entire, apex rounded; *ovary* cylindrical, 6–12 × 2–4 mm (excluding the wings), yellowish-green, glabrous, locules 3, placentae bilamellate, wings 3, equal to subequal, base rounded to cuneate, apex truncate or subtruncate, widest point up to 6 mm (apically); *style* up to 3 mm long, basally fused, 3-branched, each stylodium bifurcate in the stigmatic region, stigmatic surface a spirally twisted papillose band, orange. *Fruits*: *peduncles* up to 20 mm long; *pedicels* 4–5 mm long, not recurved; seed-bearing part cylindrical, 8–14.5 × 3.5–4.5 mm (excluding the wings), wing shape as for ovary, widest point up to *ca.* 7 mm. *Seeds* barrel-shaped, 0.2–0.3 mm long.

Distribution. Endemic to Mamasa, West Sulawesi, Sulawesi, Indonesia.

Habitat. Strongly disturbed secondary forest, growing terrestrially on steep slopes of an irrigation water channel in a coffee plantation, in dense shade, at 900–1,100 m asl.

Etymology. The species epithet refers to Wewin Tjiasmanto, the Chairmain of the Tjiasmanto Conservation Fund, who has generously supported the Sulawesi *Begonia* Project.

Provisional conservation assessment. Critically Endangered (CR) B1ab(iii), B2ab(iii). *Begonia tjiasmantoi* is known from only a single collection and a few additional observed individuals at the type locality. The location is not legally protected and on land that is part of a coffee plantation. Anthropogenic threats through agriculture including herbicide use, and associated habitat deterioration and loss were observed. Previous exploration in the Quarles Mountains has not resulted in any other collections of this species, so we must assume, at least until additional collection efforts reveal otherwise, that it has a very restricted distribution. Because of the single known location and associated very small extent of occurrence (EOO) and area of occupancy (AOO), the limited number of observed mature individuals, and the observed anthropogenic threats, we assess this species as Critically Endangered.

Notes. *Begonia tjiasmantoi* is a very distinct species on account of its rhizomatous stem and yellow-tepalled flowers. Sulawesi *Begonia* species in section *Petermannia* have mainly usually white, pinkish or sometimes greenish tepals, but there are exceptions including species that have orange (*Begonia ignita*) and coral-pink (*B. stevei*) tepal coloration.

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REFERENCES

ARDI, W. H. & THOMAS, D. C. 2019. A new species of *Begonia* (Begoniaceae) from South Sulawesi, Indonesia, and an augmented description of *Begonia bonthainensis*. *Reinwardtia* 18(1): 19–26. DOI: 10.14203reinwardtia.v18i1.3691.

ARDI, W. H., ARDAKA, I. M., HARTUTI-NINGSIH, LUGRAYASA, I. N. & THOMAS, D. C. 2014. Two new species of *Begonia* (Begoniaceae) from Sulawesi, Indonesia. *Edinburgh Journal of Botany* 71: 259–268. DOI: 10.1017S0960428614 000092.

ARDI, W. H., CHIKMAWATI, T., WITONO, J. R. & THOMAS, D. C. 2018. A synopsis of *Begonia* (Begoniaceae) of Southeastern Sulawesi including four new species. *Phytotaxa* 381(1): 27–50. DOI: 10.11646/ phytotaxa.381.1.7.

ARDI, W. H., ZUBAIR, M. S., PITOPANG, R. & THOMAS, D. C. 2019. *Begonia medicinalis* (Begoniaceae), a new species from Sulawesi, Indonesia. *Phytotaxa* 423(1): 41–45. DOI: 10.11646/phytotaxa.423.1.5.

CANNON, C. H., HARTING, J. R., SALIM, A. & SUMMERS, M. 2005. *The Vegetation of Sulawesi. I. Coarse Filter Analysis.* Technical Report. The Nature Conservancy & Texas Tech University.

CANNON, C. H., SUMMERS, M., HARTING, J. R. & KESSLER, P. J. A. 2007. Developing conservation priorities based on forest type, condition, and threats in a poorly known ecoregion: Sulawesi, Indonesia. *Biotropica* 39: 747–759.

DAYANTI, E. P., PITOPANG, R., ARDI, W. H. & THOMAS, D. C. 2020. Two new species of *Begonia* (Begoniaceae, Section *Petermannia*) from Mount Sidole, Central Sulawesi, Indonesia. *Phytotaxa* 439(2): 136–142. DOI: 10.11646/phytotaxa.439.2.4

DOORENBOS, J. M., SOSEF, S. M. & DE WILDE, J. J. F. E. 1998. The Sections of *Begonia* including Descriptions, Keys and Species Lists. Studies in Begoniaceae VI. Wageningen Agricultural University Papers 98 (2). Wageningen: Wageningen Agricultural University.

GIRMANSYAH, D., WIRIADINATA, H., THOMAS, D. C. & HOOVER, W. S. 2009. Two new species and one new subspecies of *Begonia* (Begoniaceae) from Southeast Sulawesi, Indonesia. *Reinwardtia* 13: 69–74.

HUGHES, M. 2006. Four new species of *Begonia* (Begoniaceae) from Sulawesi. *Edinburgh Journal of Botany* 63: 191–199. DOI: 10.1017/S0960428606000588.

LIN, C.-W., THOMAS, D. C., ARDI, W. H. & PENG, C.-I. 2017. *Begonia ignita* (sect. *Petermannia,* Begoniaceae) a new species with orange flower from Sulawesi, Indonesia. *Garden's Bulletin Singapore* 69(1): 89–95. DOI: 10.3850/S2010098116000081.

THOMAS, D. C. & ARDI, W. H. 2019. *Begonia mabberleyana* (Begoniaceae), a new species from Central Sulawesi, Indonesia. *Garden's Bulletin Singapore* 71, Suppl. 2: 219–225. DOI: 10.26492/gbs71(suppl.2).2019-16.

THOMAS, D. C. & ARDI, W. H. 2020. Synopsis of *Begonia* (Begoniaceae) of southwest Sulawesi and the Selayar Islands, Indonesia, including one new species. *Phytotaxa* 437(2): 073–096.

THOMAS, D. C. & HUGHES, M. 2008. *Begonia varipeltata* (Begoniaceae): A new peltate from Sulawesi, Indonesia. *Edinburgh Journal of Botany* 65: 369–374. DOI: 10.1017/S096042860800509X.

THOMAS, D. C., ARDI, W. H. & HUGHES, M. 2009a. Two new species of *Begonia* (Begoniaceae) from Central Sulawesi, Indonesia. *Edinburgh Journal of Botany* 66: 103–114. DOI: 0.1017S09604286090 05320.

THOMAS, D. C., ARDI, W. H., HARTUTI-NINGSIH & HUGHES, M. 2009b. Two new species of *Begonia* (Begoniaceae) from South Sulawesi, Indonesia. *Edinburgh Journal of Botany* 66: 229–238. DOI: 10.1017/S0960428609005484.

THOMAS, D. C., ARDI, W. H. & HUGHES, M. 2011. Nine new species of *Begonia* (Begoniaceae) from South and West Sulawesi, Indonesia. *Edinburgh Journal of Botany* 68: 225–255. DOI: 10.1017S0960428611000072.

THOMAS, D. C., ARDI, W. H., GIRMANSYAH, D. & HUGHES, M. 2013. *Sulawesi Begonia Data Portal*. Available from: http://portal.cybertaxonomy.org/flora-malesiana-prospective/(Accessed 24 March 2020).

THOMAS, D. C., BOUR, A. & ARDI, W. H. 2018. *Begonia* of the Matarombeo karst, Southeast Sulawesi, Indonesia, including two new species. *Garden's Bulletin Singapore* 70 (1): 161–174. DOI: 10.26492/gbs70(1).2018-15.

WIRIADINATA, H. 2013. A new species of *Begonia* (Begoniaceae) from South Sulawesi, Indonesia. *Reinwardtia* 13(5): 445–448.

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Journal : KRAENZLIN, F. 1913. *Cyrtandraceae* novae Philippinenses I. *Philipp. J. Sci.* 8: 163–179.
MAYER, V., MOLLER, M., PERRET, M. & WEBER, A. 2003. Phylogenetic position and generic differentiation of *Epithemateae* (Gesneriaceae) inferred from plastid DNA sequence data. *American J. Bot.* 90: 321–329.

Proceedings : TEMU, S. T. 1995. Peranan tumbuhan dan ternak dalam upacara adat "Djoka Dju" pada suku Lio, Ende, Flores, Nusa Tenggara Timur. In: NASUTION, E. (Ed.). Prosiding Seminar dan Lokakarya Nasional Etnobotani II. LIPI & Perpustakaan Nasional. Pp. 263–268. (In Indonesian).
SIMBOLON, H. & MIRMANTO, E. 2000. Checklist of plant species in the peat swamp forests of Central Kalimantan, Indonesia. In: IWAKUMA, T., INOUE, T., KOHYAMA, T., OSAKI, M., SIMBOLON, H., TACHIBANA, H., TAKAHASHI, H., TANAKA, N., YABE, K. (Eds.). Proceedings of the International Symposium on: Tropical Peatlands. Pp. 179 – 190.

Book : RIDLEY, H. N. 1923. *Flora of the Malay Peninsula 2*. L. Reeve & Co. Ltd, London.

Part of Book : BENTHAM, G. 1876. *Gesneriaceae*. In: BENTHAM, G. & HOOKER, J. D. (Eds.). *Genera Plantarum 2*. Lovell Reeve & Co., London. Pp. 990–1025.

Thesis : BAIRD, L. 2002. *A Grammar of Kéo: An Austronesian Language of East Nusantara*. Australian National University, Canberra. [PhD. Thesis].

Website : http://www.nationaalherbarium.nl/fmcollectors/k/KostermansAJGH.html. (Accessed 15 February 2012).

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