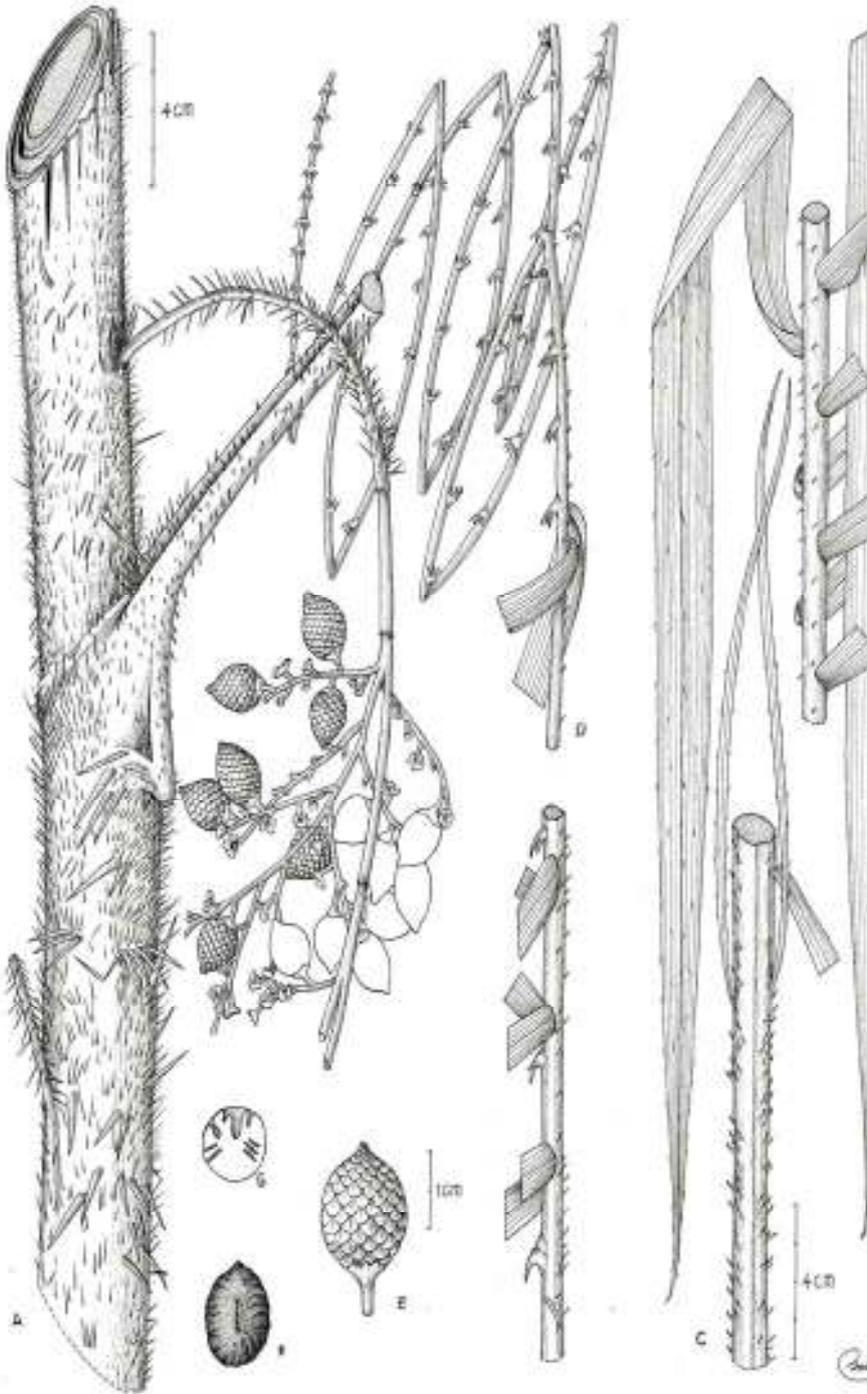




LIPI

A JOURNAL ON TAXONOMIC BOTANY,
PLANT SOCIOLOGY AND ECOLOGY



REINWARDTIA

13 (1)



Begonia watuwilensis Girmansyah



Begonia mekonggensis Girmansyah & Wiriadinata

TWO NEW SPECIES AND ONE NEW SUBSPECIES OF BEGONIA (BEGONIACEAE) FROM SOUTHEAST SULAWESI, SULAWESI, INDONESIA

Received June 8, 2009; accepted June 16, 2009

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ABSTRACT

GIRMANSYAH, D., WIRIADINATA, H., THOMAS, D.C. & HOOVER, W. S. 2009. Two new species and one new subspecies of *Begonia* (*Begoniaceae*) from Southeast Sulawesi, Sulawesi, Indonesia. *Reinwardtia* 13(1): 69–74. — Two new species and one new subspecies, of *Begonia* are described from the Mekongga Mountains in Southeast Sulawesi: *Begonia mekonggensis* Girmansyah & Wiriadinata, *Begonia watuwilensis* Girmansyah, and *Begonia aptera* Blume subsp. *hirtissima* Girmansyah & D.C.Thomas. *Begonia mekonggensis* and *Begonia watuwilensis* belong to *Begonia* section *Petermannia*. Both species have characters which are very unusual amongst species in this section. *Begonia mekonggensis* is dioecious, and *Begonia watuwilensis* exhibits protandrous inflorescences with basal male flowers and several distal female flowers. *Begonia aptera* Blume subsp. *hirtissima* belongs to *Begonia* section *Sphenanthera*.

Keywords: Southeast Sulawesi, *Begonia*, *Begoniaceae*

ABSTRAK

GIRMANSYAH, D., WIRIADINATA, H., THOMAS, D.C. & HOOVER, W. S. 2009. Dua jenis baru dan satu subspecies baru *Begonia* (*Begoniaceae*) dari Sulawesi Tenggara, Sulawesi, Indonesia. *Reinwardtia* 13(1): 69–74. — Dua jenis baru dan satu subspecies, *Begonia mekonggensis* Girmansyah & Wiriadinata, *Begonia watuwilensis* Girmansyah, dan *Begonia aptera* Blume subsp. *hirtissima* Girmansyah & D.C.Thomas, telah dideskripsikan dari Gunung Mekongga dan Watuwila, Sulawesi Tenggara. *Begonia mekonggensis* dan *Begonia watuwilensis* termasuk kedalam seksi *Petermannia*. Kedua jenis ini memiliki karakter yang tidak umum dimiliki oleh seksi ini: *Begonia mekonggensis* berumah dua dan *Begonia watuwilensis* memiliki perbungaan yang tidak biasa yaitu bunga jantan mekar duluan yang keluar di bagian basal sedangkan betina di bagian atas perbungaan dengan banyak bunga. *Begonia aptera* Blume subsp. *hirtissima* termasuk kedalam seksi *Sphenanthera*.

Kata kunci: Sulawesi Tenggara, *Begonia*, *Begoniaceae*

INTRODUCTION

Thirty–six indigenous species of *Begonia* L. have been reported from the Indonesian island of Sulawesi (Hughes, 2008; Thomas *et al.*, 2009a, 2009b). The majority of these species belong to *Begonia* section *Petermannia* (32 species), and four species have been classified in *Begonia* section

Sphenanthera. Close examination of all available *Begonia* specimens from Sulawesi from A, B, BM, BO, CEB, E, K, L and SING indicates that there are still numerous endemic species awaiting description. This is not surprising given that the megadiverse genus *Begonia* has a centre of diversity in Southeast Asia, and Sulawesi *Begonia* has never been revised. The number of species will continue

to rise with further exploration, as fewer botanical collections have been made on Sulawesi than on any other major island in Indonesia, and from several large regions of Sulawesi only a very small number of specimens has been collected (Kessler *et al.*, 2002; Cannon *et al.*, 2007).

During a floristic study of Southeast Sulawesi in May 2008, supported by IBETP in collaboration between the NETC and the Herbarium Bogoriense, several specimens of *Begonia* were collected from Mt. Watuwila and Mt. Mekongga. These specimens include two new species and one new subspecies, which are described below.

Begonia watuwilensis Girmansyah *spec. nov.* — Fig. 1.

Ab omnibus speciebus *Begoniae* sectionis *Petermanniae* inflorescentia protandra, floribus masculis basalibus, floribus femineis distalibus differt. — Type: Indonesia, Sulawesi, Southeast Sulawesi, Kabupaten Kolaka Utara, Kecamatan Uluiwoi, Desa Sanggona. Mt. Watuwila, 14 Mei 2008, Deden Girmansyah, Deden 914 (Holotype BO!, Isotype US, L, K, E).

Stems erect, terete, rooting at base, dark red to violet, glabrous to pubescent, swollen at the nodes, branching, 0.5–0.8 cm in diameter, internodes 3–12 cm long, 50–100 cm tall. Stipules 1–2 x 0.8–1.2 cm, broadly triangular, margin entire, apex acuminate, caducous. Leaves petiole red to dark red, glabrous to pubescent, terete, 1–5.5 cm long; lamina glabrous to pubescent on both sides, broadly ovate, strongly asymmetric, base oblique, lobes not overlapping, margin biserrate, apex acuminate, 9–17 x 4.5–11 cm, broad side 3–7 cm wide, narrow side 1.5–4 cm long wide, basal lobe 2–6 cm long; venation palmate-pinnate, 1–2 pairs at the base, 5 pairs along the midrib, 2–3 in the basal lobe, branching towards the margin, veins impressed above, prominent beneath. Inflorescences bisexual, terminal, cymose, an up to 6-times branched dichasium, somewhat pendant, glabrous to pubescent, protandrous, male and female flower inflorescences with basal male and female flowers distal, *ca.* 30–32 male flowers and *ca.* 32 female flowers every peduncle, peduncles reddish green. Bracts glabrous, reddish, broadly ovate, rather translucent. Male flowers pedicels white, 0.3–1 cm long; tepals 4, white or pink, margin entire, apex rounded, outer tepals broadly ovate, 10–14 x 7–13 mm, the inner two oblong, 8–9 x 2–3 mm; stamens yellow, *ca.* 80–95, forming a narrow fan, filaments pale yellow, 1.5–2 mm long, anthers yellow, oblong to narrowly obovate, 2.5–3 mm long, apex notched, opening by slits along the sides,

almost as long as the anthers. Female flowers pedicels white, 6–7 mm long; ovary pink, with 3 white equal wings, 3 locular; placentae axillary, bifid; tepals 5, white, glabrous, the larger ones up to 15 x 7–9 mm, broadly elliptic, the smallest one narrowly elliptic, 15 x 4 mm; styles 3, golden yellow, forked once, 4 mm long. Fruits dehiscent capsules, reddish green, on a 10–15 mm long pedicel, with 3 equal wings, broadly triangular, acuminate at the base, widest at the apex, 10–15 x 5–7 mm (without wings); stigmas caducous. Seeds barrel-shaped, *ca.* 0.3–0.5 mm long, collar cells more than half the seed length.

Distribution: Indonesia, Sulawesi, Southeast Sulawesi, Mekongga Mountains, the ridge of Mt. Watuwila, between Watumolae and Komapodahu

Habitat: Primary upland forest between c. 1000–1200 m asl.

Notes: The epithet ‘watuwilensis’ is composed of Watuwila, a reference to Gunung Watuwila where the type material was collected, and ‘-ensis’ (Latin: originating from). The protandrous inflorescences with basal male flowers and several distal female flowers of *Begonia watuwilensis* are very unusual in *Begonia* sect. *Petermannia*. Most species in this section show two-flowered or single-flowered female inflorescences or partial inflorescences, which are either basal to male partial inflorescences in a mixed protogynous inflorescence, or separate from the male inflorescences. However, there are several variations of this typical inflorescence morphology (see Irmscher, 1914; Doorenbos *et al.*, 1998). Despite the very unusual inflorescences, *Begonia watuwilensis* can be placed in *Begonia* section *Petermannia*, based on the presence of 3-locular ovaries with axillary, bilamellate placentae, five-tepaled female flowers and four-tepaled male flowers, and the lack of specialized underground organs like tubers or rhizomes. The sectional placement is also supported by chloroplast DNA sequences (unpublished data).

Begonia mekonggensis Girmansyah & Wiriadinata *spec. nov.* — Fig. 2.

Inflorescentia subumbellata *Begoniae* guttapilae et *Begoniae* ozototrichi affinis, sed praeclare habitu dioico distinguitur. — Type: Indonesia, Sulawesi, Southeast Sulawesi, Kabupaten Kolaka, Kecamatan Ranteangin, Desa Tinukari. Gunung Mekongga, 18 Maret 2006, Deden Girmansyah, Deden 579 (Holotype BO!, Isotype US, L, K, E)

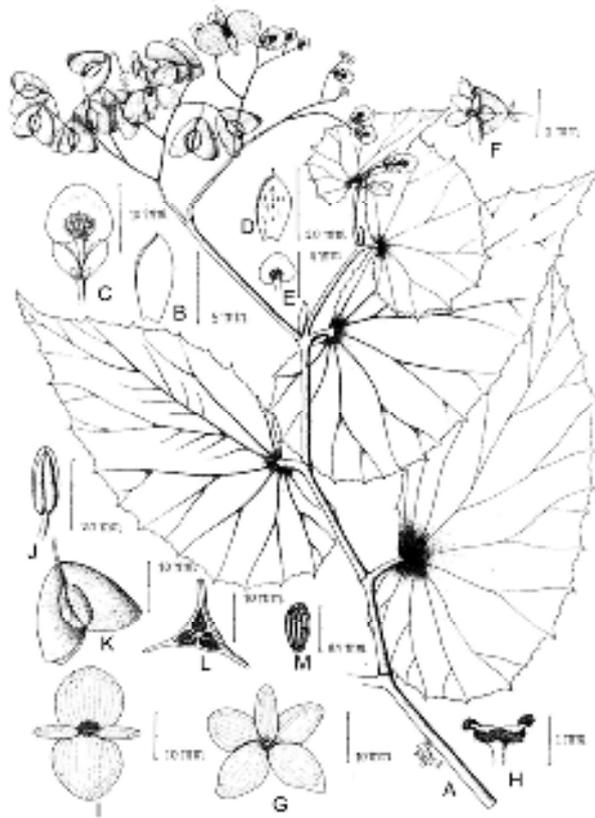


Fig.1. *Begonia watuwilensis* Girmansyah (A. Habit, B. Bract, C. Male inflorescence, D. Bracteole, E. Male flower, F. Female flower with ovary, G. Female flower tepals, H. Stigma, I. Male flower tepals, J. Stamen, K. Fruit, L. Fruit in cross section, M. Seed. Drawn from Deden 914).

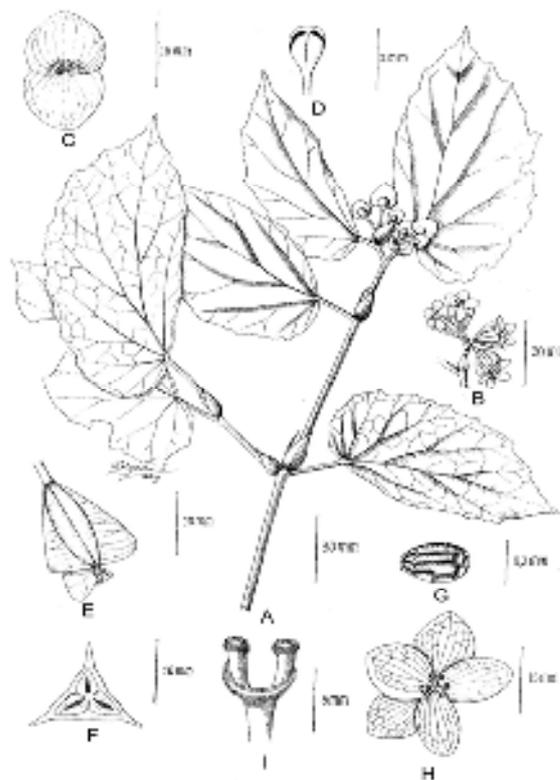


Fig. 2. *Begonia mekonggensis* Girmansyah & Wiriadinata (A. Habit, B. Female inflorescence, C. Male flower, D. Stamen, E. Fruit, F. Fruit in cross section, G. Seed, H. Female flower, I. Stigma. Drawn from Deden 579).

Stems erect, terete, rooting at base, brownish red, glabrous, swollen at the nodes, branching, 0.4–0.5 cm in diameter, internodes 3–6 cm long, up to 50 cm tall. Stipules glabrous, narrowly triangular, margin entire, apex acuminate, persistent, pale yellow, 1.7–2.1 x 0.6–0.8 cm. Leaves petiole dark red, glabrous, terete, 2–5 cm long; lamina glabrous on both sides, oval, asymmetric, base slightly oblique, lobes not overlapping, margin biserrate, apex acuminate 6–14 x 3–7 cm, broad side 2.5–5 cm wide, narrow side 1.5–2.5 cm wide, basal lobe 1–1.5 cm long; venation palmate-pinnate, 1–2 pairs of veins at the base, 2–3 pairs along the midrib, 1–3 in the basal lobe, branching towards the margin, veins impressed above, prominent beneath. Inflorescences unisexual (plants dioecious), axillary, dichasial, somewhat pendant, glabrous, peduncles reddish green. Bracts glabrous, green, boatshaped, rather translucent, persistent, *ca.* 1 x 0.5 cm. Male flowers pedicels reddish–white, 2–2.5 cm long; tepals 2, white or reddish, margin entire, apex rounded, 1.1 x 1.1–1.9 cm; stamens yellow, forming a narrow fan, filaments pale yellow, 1–1.5 mm long, anthers yellow, broadly obovate, 1–1.5 mm long, apex notched, opening by slits along the sides, almost as long as the anthers. Female flowers pedicels white, 3–5 mm long; ovary reddish green, with 3 equal wings, 1.2–1.9 cm long, 3 locular, placentae axillary, bifid; tepals 5, white to reddish, broadly elliptic, glabrous, up to 15–16 x 6–12 mm, styles 3, orange, forked once, 5 mm long. Fruits dehiscent capsules, green, on 3–5 mm long pedicels, with 3 equal wings, broadly triangular, acuminate at the base, widest at the apex, *ca.* 8 x 14 mm; stigmas caducous. Seeds barrel-shaped, *ca.* 0.4–0.45 mm long, collar cells less than half the seed length.

Distribution. Indonesia, Sulawesi, Southeast Sulawesi, Mt. Mekongga.

Habitat. Secondary forest at 700–800 m asl.

Notes. The epithet ‘mekonggensis’ is composed of Mekongga, a reference to Gunung Mekongga where the type material was collected, and ‘-ensis’ (Latin: originating from).

Observations in the field clearly indicate that *Begonia mekonggensis* is dioecious. Dioecy has not been described for species in *Begonia* section *Petermannia* before, but several closely related dioecious species were recently observed and collected in Southwest Sulawesi (Thomas & Ardi 09–94, 09–96, 09–102, 09–104–106, 09–120–122 deposited at BO, E, and L) indicating a radiation of an endemic dioecious group of *Begonia* on Sulawesi. These species will be described in a forthcoming paper on *Bego-*

nia in Southwest Sulawesi.

Begonia mekonggensis grows in two types of habitats: In flat areas with good water supply, where plants are stronger and usually exhibit white tepals, and on steep slopes, which are characterized by drier conditions, where plants are weaker and exhibit pink tepals.

Begonia aptera Blume subsp. *hirtissima* Girmansyah & D.C.Thomas *subsp. nov.* — Fig. 3.

A *Begonia aptera* Blume subsp. *aptera* caule, foliis, tepalis et ovariis dense pilosis, nervis in facie adaxiali foliorum profunde impressis, foliorum marginibus profunde duplicato-serratis differt.— Type: Indonesia, Sulawesi, Southeast Sulawesi, Kabupaten Kolaka, Kecamatan Rante angin, Desa Tinukari. Gunung Mekongga, 21 Maret 2006, Deden Girmansyah, Deden 654 (Holotype BO!, isotype US, L, K, E)

Stems erect, terete, rooting at base, brownish green, densely hairy, swollen at the nodes, branching, up to *ca.* 1.9 cm in diameter, internodes 3–24 cm long, up to 90 cm tall. Stipules hairy, broadly triangular, margin entire, apex acuminate ending with one hair, caducous, 1.4–2.1 x 0.3–1.2 cm. Leaves petioles reddish–green, hairy, terete, 1.5–9.5 cm long; lamina densely hairy on both sides, oblong, asymmetric, base oblique, lobes not overlapping, margin biserrate, apex acuminate, 8–17 x 4–8.5 cm, broad side 2.5–7 cm wide, narrow side 2–4.5 cm wide, basal lobe 1.5–5 cm long; venation palmate-pinnate, 1–2 pairs of veins at the base, 3–4 pairs along the midrib, 2 in the basal lobe, branching towards the margin, veins impressed above, prominent beneath. Inflorescences bisexual, axillary, cymose, a 2–4-branched dichasium, hairy, male and female flowers developed in mixed inflorescences (monoecy), peduncles pale green, 0.9–1.5 cm, bracteoles absent. Male flowers pedicels pale green, hairy, *ca.* 1.2–1.4 cm long; tepals 4, white, margin entire, tip rounded, the outer two elliptic to suborbicular, abaxial side hairy, 0.6–1.1 x 0.6–0.9 cm, the inner two ovate, obovate or elliptic, 0.6–0.9 x 0.4–0.7 cm; stamens yellow, in a globose cluster, filaments pale yellow, *ca.* 1–2 mm long, anthers yellow, oblong, 1.4–2 mm long, connective projecting *ca.* 0.1–0.2 mm, apex rounded, opening by slits along the sides, almost as long as the anthers. Female flowers pedicels pale green, hairy, 1.5–10 mm long; ovary, pale yellowish–greenish, hairy, with 3 pale green, narrow, rib-like wings, *ca.* 4–6 mm long, 3 locular, placentae axillary, bifid; tepals 5, white, obovate to elliptic, hairy on abaxial side, up to 5–7 x 2–4 mm, styles 3, orange, forked once, *ca.* 4 mm long. Fruits fleshy, indehiscent, pale green,

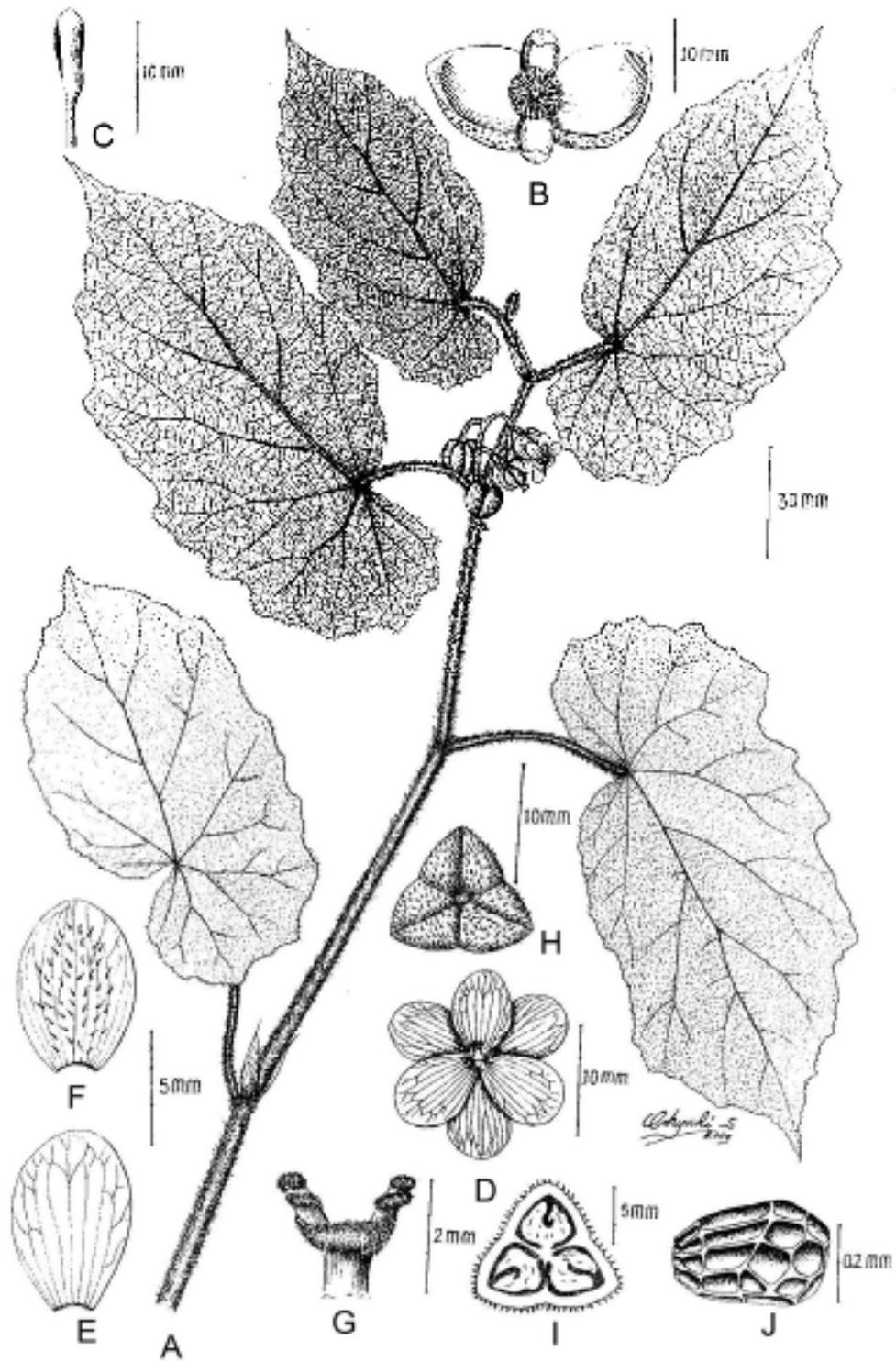


Fig.3. *Begonia aptera* subsp. *hirtissima* Girmansyah & D.C. Thomas. (A. Habit, B. Male flower, C. Stamen, D. Female flower, E. Ventral side of female tepal, F. Dorsal side of female flower, G. Stigma, H. Fruit, I. Fruit in cross section, J. Seed. Drawn from Deden 654)

on 3–10 mm long pedicels, with 3 narrow, riblike wings, *ca.* 4–9 x 5–10 mm; stigmas persistent. Seeds barrel-shaped, 0.3–0.32 mm long, collar cells less than half the seed length.

Habitat. Secondary forest at 700–1700 m asl.

Distribution. Indonesia, Sulawesi, Southeast Sulawesi, Mt. Mekongga.

Notes. Specimens of *Begonia aptera* from A, B, BM, BO, CEB, E, K, L, SING, and *Begonia aptera* observed at several locations in the field, show a considerable morphological variation with regards to the growth habit, leaf morphology, indumentum characters, and fruit morphology, which might indicate ongoing morphological differentiation of some isolated populations. *Begonia aptera* is usually robust and erect, but sometimes weakly stemmed and arching over; the leaf shape ranges from ovate or elliptic to oblong; the aboveground vegetative parts are usually glabrous, but in some populations sparsely to moderately hairy; the inflorescences are many- to few-flowered; and the fruits usually exhibit small triangular wings or, more rarely, only slightly prominent ridges. Tebbitt (2003) provides a detailed description of *Begonia aptera* (= *B. cristata* Warb. ex L.B. Sm. & Wassh.), which incorporates most of this variation. However, the material collected on Mt. Mekongga does not conform to this description: *Begonia aptera* subsp. *hirtissima* is densely hairy on all aboveground vegetative parts, the abaxial tepal surfaces and the ovaries and fruits. The primary to tertiary veins on the adaxial leaf surface are deeply impressed in *Begonia aptera* subsp. *hirtissima*, resulting in a rugose appearance of the upper leaf surface, and the leaf margin is deeply double serrate (Fig. 3). In contrast to this, the primary to tertiary veins are usually only slightly impressed in *B. aptera* subsp. *aptera*, and the leaf margin is usually only remotely and shortly double serrate to dentate. Moreover, the densely hairy ovaries and fruits of *Begonia aptera* subsp. *hirtissima* are pale green and exhibit prominent ridges, while *Begonia aptera* subsp. *aptera* usually exhibits dark green, glabrous fruits with small triangular wings or, more rarely, only slightly prominent ridges.

Additional specimen examined: Cultivated at Bali Botanic Garden, from vegetative material collected in the wild (Indonesia, Sulawesi, Southeast Sulawesi, Kolaka, Mala–Mala), 15 v 2008, *D. C. Thomas & W. H. Ardi* 08–75 (E).

ACKNOWLEDGMENT

We are grateful to the New England Tropical Conservatory (NETC), Vermont, USA especially Dr. Mary M. Fuqua and Mr. James M. Hunter for their financial support for our research field trip to Sulawesi. In particular we are grateful to the following persons: Dr. Eko B. Walujo, head of Herbarium Bogoriense (BO). We are also very grateful to Dr. Mark Hughes, Dr. Laurence Skog, Dr. Dan Nicolson, Dr. Robert Mill and Prof. Dr. Mien A. Rifai for their interest, discussion, English editing, Latin diagnosis and valuable comments on the manuscript, as well as to Mr. Wahyudi Santoso and Mrs. Anne Kusumawati for their excellent line drawing.

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