A revision of *Begonia* sect. *Sphenanthera* (Hassk.) Warb. from Sumatra

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ABSTRACT. *Begonia* sect. *Sphenanthera* is characterised by robust herbs with fleshy fruits. Three species are recognised from Sumatra (*Begonia longifolia* Blume, *B. multangula* Blume and *B. scottii* Tebbitt) and three names have been reduced to synonyms (*B. sarcocarpa* Ridl. and *B. turbinata* Ridl. = *B. longifolia* Blume and *B. trigonocarpa* Ridl. = *B. multangula* Blume). All species are considered to belong to the IUCN category Least Concern as they have wide distributions within Sumatra and are known from several localities.

Keywords. *Begonia* sect. *Sphenanthera*, conservation status, Sumatra, taxonomy

Introduction

With a rare exception (Kiew 2005) modern monographs and revisions of Southeast Asian *Begonia* are notable for their absence. Reasons for this include the large number of species, a high proportion of undescribed taxa, uncertainty regarding sectional classification and the fact that *Begonia* tend to make poor herbarium specimens. Recently, baseline information regarding sectional placement (Doorenbos et al. 1998) and regional species lists (Hughes, 2008) has become available for facilitating revisionary work. In order to make the task more manageable still, it has been decided to tackle the considerable *Begonia* diversity of Southeast Asia through a series of regional sectional revisions, beginning with Sumatra and *Begonia* sect. *Sphenanthera*.

Begonia sect. *Sphenanthera* currently contains 17 accepted names from Asia. Most of the species diversity is on the continent, tapering off towards the east of the Sunda Shelf and only two species occur east of Wallace's line. The section contains quite robust species, which are most obviously characterised by bearing fleshy fruit, and also flowers with often quite fleshy tepals and male flowers with large androecia consisting of stamens with extended connectives. It bears a strong resemblance to *Begonia* sect. *Platycentrum* (which differs in having 2-locular dehiscent fruits), and indeed molecular evidence shows *Begonia* sect. *Sphenanthera* to be polyphyletic and nested within it (Tebbitt et al. 2006). Nevertheless, *Begonia* sect. *Sphenanthera* continues to be a useful taxonomic unit in partitioning the otherwise unwieldy diversity of the genus, and its status is upheld here.

The revision is based on consulting specimens of *Begonia* sect. *Sphenanthera* from the herbaria A, ANDA, BM, BO, E, FI, K, L, SING and field work in Aceh, North Sumatra and West Sumatra during 2007–2009. Species classified within *Begonia* sect. *Sphenanthera* tend to be amongst the most widespread in the genus, presumably because of the fleshy berry-like fruit syndrome, an adaptation to animal dispersal of their seeds. The combination of being widespread and having a reasonable amount of

population variability, plus the tendency to form hybrids, means the level of synonymy and taxonomic complexity in species from *Begonia* sect. *Sphenanthera* is higher than in other Asian sections of the genus. It also means a wider species concept needs to be applied, particularly as the propensity for forming narrow endemics is not as high as for other Asian sections. Three species are recognised from Sumatra in this revision, and three species are reduced to synonyms. Only one of the species, *Begonia scottii*, is endemic to Sumatra.

Currently, 52 *Begonia* species are recognized from Sumatra (Hughes 2008, Hughes et al. 2009), with most occurring along the Barisan range, which forms the spine of much of the island and in the mountains of North Sumatra and Aceh. Although there may be some further synonymy to be uncovered, the total number of species, and of endemic species, is likely to rise significantly.

Taxonomic part

Begonia* sect. *Sphenanthera (Hassk.) Warb., Nat. Pflanzenfam. 3(6A): 141 (1894). – *Sphenanthera* Hassk., Versl. Akad. Wetensch. Amsterdam, iv: 139 (1855) – *Casparya* sect. *Sphenanthera* (Hassk.) A.DC., Ann. Sci. Nat. Bot., IV 11: 118 (1859). TYPE: *Begonia robusta* Blume.

Casparya sect. *Holoclinium* A.DC., Ann. Sci. Nat. Bot. 4(11): 118 (1859). – *Begonia* sect. *Holoclinium* (A.DC.) Warb., Nat. Pflanzenfam. 3(6A): 142 (1894). TYPE: *Casparya trisulcata* A.DC. (= *Begonia longifolia* Blume).

Casparya sect. *Polyschisma* A.DC., Ann. Sci. Nat. Bot. 4(11): 119 (1859). – *Begonia* sect. *Polyschisma* (A.DC.) Warb., Nat. Pflanzenfam. 3(6A): 149 (1894). TYPE: *Casparya crassicaulis* A.DC. (= *Begonia multangula* Blume)

Robust erect or sprawling fleshy herbs. Stems not woody, stipules large and keeled. Leaves asymmetric. Inflorescences bisexual; male flowers with a large androecium giving rise to buds with a distinct bulge, anthers subequal, dehiscing laterally along the length of the anther, connectives projecting; female flowers with 3 greenish-yellow large stigmas, spirally or convolutely twisted. Fruit fleshy, indehiscent, three locular, each locule with two placentae.

Key to species of *Begonia* sect. *Sphenanthera* from Sumatra

1. Leaves sub-orbicular to broadly ovate, with 5–7 broad pointed lobes .... **2. *Begonia multangula***
   Leaves ovate or lanceolate, not lobed 2

2. Leaves ovate, fruits borne in pairs or fours ..... **3. *Begonia scottii***
   Leaves lanceolate, fruits borne in clusters of 2–15 ..... **1. *Begonia longifolia***

1. *Begonia longifolia* Blume, Catalogus 102 (1823); Blume, Enum. Pl. Javae 1: 97 (1827); Candolle, Prodr. 15(1): 398 (1864); Koorders, Exkurs.–Fl. Java 650 (1912); Tebbitt, Brittonia 55: 25 (2003); Tebbitt, Begonias 168 (2005); Kiew, Begonias Penins. Malaysia 107 (2005); Gu, Peng & Turland, Fl. China 13: 184 (2007); Hughes, An Annotated Checklist of Southeast Asian Begonia 72 (2008). – *Diploclinium longifolium* (Blume) Miq., Fl. Ned. Ind. 1(1): 687 (1856). TYPE: Java, Salak, *C.L.v. Blume 740* (holo B).

Casparya trisulcata A.DC., Ann. Sci. Nat. Bot., IV 11: 119 (1859); Candolle, Prodr. 15(1): 277 (1864). – *Begonia trisulcata* (A.DC.) Warb., Nat. Pflanzenfam. 3(6A): 142 (1894). TYPE: Java, Mt. Jojing, 1 May 1845, *H. Zollinger 2850* (holo G-DC; iso B, BM, P [2 sheets]).

Begonia inflata C.B.Clarke in Hook.f., Fl. Brit. Ind. 2: 636 (1879); Clarke, J. Linn. Soc., Bot. 18: 115 (1881); Burkill, Rec. Bot. Surv. India 10: 412 (1924); Craib, Fl. Siam 1: 774 (1931); Grierson, Fl. Bhutan 2: 242 (1991); Tebbitt, Brittonia 55(1): 25 (2003); Uddin, J. Econ. Tax. Bot. 31(3): 594 (2007). TYPE: *W. Griffith 2587* (lecto K; isolecto B, GH *n.v.*, K, P here designated).

Begonia sarcocarpa Ridl., J. Fed. Malay States Mus. 8(4): 38 (1917) ***syn. nov.***; Tebbitt, Brittonia 55: 27 (2003). TYPE: Sumatra, West Sumatra, Korinchi, Barong Baru, 5 Jun 1914, *H.C. Robinson & C.B. Kloss 61* (holo BM).

Begonia tricornis Ridl., J. Roy. Asiat. Soc., Straits Br. 75: 35 (1917); Tebbitt, Brittonia 55(1): 25 (2003). TYPE: Peninsular Malaysia, Pahang, Telom, Nov 1900, *H.N. Ridley 14123* (holo SING; iso K).

Begonia turbinata Ridl., J. Fed. Malay States Mus. 8(4): 37 (1917) ***syn. nov.***; Tebbitt, Brittonia 55: 28 (2003). TYPE: Sumatra, West Sumatra, Korinchi, Siolak Dras, 15 Mar 1914, *H.C. Robinson & C.B. Kloss s.n.* (lecto BM; isolecto BM, K designated by Tebbitt 2003 *loc. cit*.).

Begonia crassirostris Irmsch., Mitt. Inst. Allg. Bot. Hamburg 10: 513 (1939); Tebbitt, Brittonia 55(1): 25 (2003). TYPE: Hainan, Lam Ko District, Lin Fa Shan, 2 Aug 1927, *Tsang Wai Tak 278* (lecto E; isolecto G *n.v.*, K *n.v.*, MO *n.v.*, UC *n.v.* here designated).

Begonia roxburghii auct. non (Miq.) A.DC. *sensu* Ridley J. Fed. Malay States Mus. 4: 20 (1909), Fl. Malay Penins. 1: 854 (1922).

Plant erect, 40–100(–200) cm high. ***Stem*** up to 2 cm thick at the base, c. 5 mm thick towards the apex, not woody, green to red, internodes around 8–12 cm apart, glabrous or with minute glandular hairs. ***Stipules*** deciduous, lanceolate, keeled, glabrous, c. 25 × 7 mm, tip extended. ***Leaves***: petiole 2–7 cm long; lamina lanceolate, base shallowly cordate, strongly asymmetric, upper surface dark green, (6–)10–18 × 2.5–6(–10) cm, midrib (5–)8.5–14 cm, underside pale green, glabrous or with scattered short hairs on the veins, upper surface darker green, usually glabrous or sometimes with scattered short bristly hairs, venation pinnate-palmate; margin dentate-denticulate; apex acute. ***Inflorescences*** axillary, cymose, branching 1–3 times, bisexual, male and

female flowers open at the same time; bracts caducous, lanceolate, 6–12 × 2–4 mm; primary and secondary peduncles stout, distinctly swollen near the nodes, 2 mm thick, primary c. 1 cm long, secondary shorter, each unit consisting of 1 male and 2 female flowers, (3–)7–15 flowers in total, bracteoles often present on terminal female flowers, bracteoles 5 × 1–2 mm. ***Male flowers***: pedicels 25–30 mm; tepals 4, white; outer 2 elliptic-orbicular, slightly cup-shaped, fleshy, with a thinner rim, 10–12 × 8–9 mm; inner 2 spathulate-elliptic, 9–10 × 6–7 mm; androecium symmetric, a loose globose cluster; stamens bright yellow, 35–90, subequal; filaments slightly shorter than the anthers, more so for the outer stamens; anthers c. 2 mm long, linear with a rounded tip, dehiscing through lateral slits running almost the entire length of the anther. ***Female flowers***: pedicels 7–12 mm; ovary pale green, fleshy, lobed-triangular in cross-section, c. 7–9 × 10 mm, with three ridges or small fleshy wings on the lobes, 3-locular, placentae bifid; tepals (rarely 4–)6, white, elliptic-spathulate, subequal, 8–14 × 5–7 mm; styles 3, greenish yellow, deciduous, bifid, c. 4 mm long, papillose surface spirally twisted. ***Fruit*** borne in clusters of (1–)2–15, green, fleshy, globose-triangular, pendulous on a stiff pedicel, 10–14 mm diameter, apex sometimes slightly extended. (Fig. 1)

Fig. 1. *Begonia longifolia habit* (main photo), female and male flowers (inset top left) and ripening fruit (inset bottom right). All from one plant, Gunung Sorik Merapi, North Sumatra. Photo credits: Mark Hughes.

Material seen: SUMATRA. **Aceh**: Gunung Leuser Nature Reserve, Air Panas, 19 Mar 2008, *P. Wilkie, et al. PW784* (BO, E). **North Sumatra**: Asahan, Aek Si Tamboerak, 28 Oct 1936, *Rhamat si Boeea 10653* (A); Asahan, Dolok Si Manoek-manoek, 5 Oct 1936 - 20 Nov 1936, *Rhamat si Boeea 10246* (A, K, L); Asahan, Hoeta Bagasan, 7 Sep 1934 - 4 Feb 1935, *Rahmat si Boeea 1082* (A); Baboeli - Paekas, 9 Jan 1932, *Bangham 776* (A); Berastagi Woods, 8 Feb 1921, *H.N. Ridley s.n.* (BM, K); ibid, 10 Jun 1928, *C. Hanel & Rahmat si Boeea 580* (A); Berastagi Woods, West Hill, 14 Feb 1921, *H.N. Ridley s.n.* (K); Dolok Sibual Buali, 15 Jan 2000, *S.J. Davies & S.K.*

Rambe 2000-44 (A); Gunung Sibayak, 15 Feb 1932, *Bangham 1018* (A, K); ibid, 12 May 2007, *M. Hughes & D. Girmansyah MH1387* (E [2 sheets]); Gunung Sinabung, 14 May 2007, *M. Hughes & D. Girmansyah MH1395* (E); Gunung Sorik Merapi, 17 May 2007, *M. Hughes & D. Girmansyah MH1399* (E); Karoland, 4 Jun 1918, *H.H. Bartlett & C.D. La Rue 100* (L). **West Sumatra**: Andalas Baruh Bukit, 19 Mar 1986, *Anda collectors 2366* (ANDA); ibid, 19 Mar 1986, *Anda collectors 2367* (ANDA); Barisan Range, Air Sirah, 4 Feb 1981, *Anda collectors 208* (ANDA); Bukit Batabuah, 29 Nov 1997, *Anda collectors 32* (ANDA); Bukit Kayo Aro, 18 Mar 1999, *Anda collectors 993258* (ANDA); Bukit Tamasoe, Gunung Talang, 28 Jul 1984, *M. Hotta & et al. 197* (ANDA); Desa Ulu Tambulun, 7 Mar *1999*, *Anda collectors 993228* (ANDA); Gunung Merapi, 29 Nov 1989, *Anda collectors 04* (ANDA); ibid, 29 Nov 1989, *Anda collectors 07* (ANDA); ibid, 26 Apr 1991, *Anda collectors 13* (ANDA); ibid, 26 Jul 2009, *M. Hughes & A. Taufiq MH1572* (ANDA, BO, E); ibid, 19 Jul 2006, *D. Girmansyah, A. Poulsen, I. Hatta & R. Nelvita 759* (E); Gunung Talang, Kayujao, 3 Feb 1989, *H. Nagamasu 3546* (ANDA, BO, L); Kerinci-Seblat National Park, Bukit Sako, 3 May 1996, *Anda collectors 7750* (ANDA); Korinchi, Sungei Karing, 2 Mar 1954, *A.H.G. Alston 14040* (BM, L); Korinchi, Sungei Penoh - Indrapura, 8 Mar 1954, *A.H.G. Alston 14312* (A, BM, L); Padang, Limau Manis, 7 Mar 1954, *A.H.G. Alston 14310* (BM); Padang, Lubuk Sulasi, 30 Jun 1953, *J.v. Borssum Waalkes 2765* (BO, L); Pajakumbuh, Mt. Sago, 11 Mar 1989, *Anda collectors 10* (ANDA); ibid, 11 Mar 1989, *Anda collectors 124* (ANDA); (ANDA); ibid, 5 May 1957, *W. Meijer 5752* (L); ibid, 30 Dec 1907, *E. Meijer Drees 7446* (L); Panti Cermin Nature Reserve, 1 Jun 2007, *M. Hughes & D. Girmansyah MH1431* (BO, E); ibid, 2 Jun 2007, *M. Hughes & D. Girmansyah MH1438* (BO, E); ibid, 2 Jun 2007, *M. Hughes & D. Girmansyah MH1439* (BO, E); Puncak Pato, 12 Mar 1989, *Anda collectors 17* (ANDA); Rintis, 11 Sep 1941, *H. Surbeck 536* (L); Taman Hutan Raya, Ladang Padi, 27 Jul 2009, *M. Hughes & Nurainas MH1580* (ANDA, BO, E). **Bengkulu**: 14 Jan 1931, *C.N.A. de Voogd 572* (BO, L).

Notes. Although Ridley transformed our understanding of the Malesian flora, it is tempting at times to accuse him of being slightly profligate with plant names. *Begonia turbinata* Ridl. was upheld by Tebbitt (2003) due to its turbinate fruit and slender, red-tinged stems. However this species is impossible to separate satisfactorily in the herbarium, and duplicates were seen carrying conflicting determinations. Also, red-tinged stems have also been noted in plants with robust stems, and the fruit shape on the type and isotypes of *B. turbinata* fit within the range observed in *B. longifolia*. *Begonia sarcocarpa* Ridl. also has the same fruit type as *B. longifolia*, but differs in its smaller size and having 5 (not 6) tepals in the female flower. However, the large number of specimens housed at ANDA from West Sumatra show a range of intermediate sizes linking *B. longifolia* and *B. sarcocarpa*, and observations in the field and from cultivated material show that tepal number is not a stable character and can vary within individuals. Also, *B. sarcocarpa* is known only from the type, which has only one or two female flowers. It seems appropriate to consider these two species as representing population variants of *Begonia longifolia*.

Ecology and distribution. Bhutan, northeast India, southern China, Burma, Taiwan, Thailand, Vietnam, Peninsular Malaysia, Sumatra, Java, Lesser Sunda Islands. Within Sumatra, *Begonia longifolia* occurs along the whole of the Barisan range at altitudes of

500–1500 m, though most collections are from 900–1200m (Fig. 2). On steep banks, often near streams, in primary or secondary forest. IUCN category Least Concern.

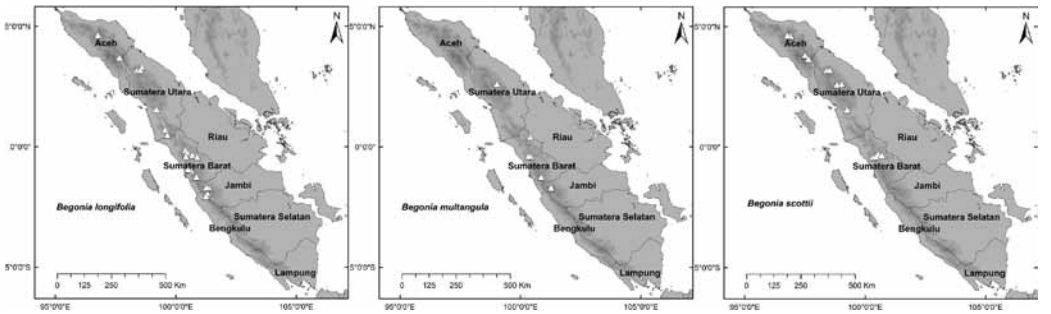

Fig. 2. Distribution of *Begonia longifolia* (left), *B. multangula* (middle) and *B. scottii* (right) on Sumatra.

2. *Begonia multangula* Blume, Enum. Pl. Javae 1: 96 (1827); Candolle, Prodr. 15(1): 275 (1864); Koorders, Exkurs.–Fl. Java 646 (1912); Doorenbos, Begonian 47: 213 (1980); Tebbitt, Begonias 205 (2005); Hughes, An Annotated Checklist of Southeast Asian Begonia 86 (2008). – *Platycentrum multangulum* (Blume) Miq., Fl. Ned. Ind. 1(1): 695 (1856). – *Sphenanthera multangula* (Blume) Klotzsch, Bot. Zeitung 15: 181 (1857). – *Casparya multangula* (Blume) A.DC., Prodr. 15(1): 275 (1864). TYPE: Java, *Blume s.n.* (lecto BO, sheet no BO:1818963, here designated).

Platycentrum multangulum var. *glabrata* (Miq.) Miq., Fl. Ned. Ind. 1(1): 695 (1856); Klotzsch, Bot. Zeitung 15: 182 (1857). – *Begonia multangula* var. *glabrata* Miq., Pl. Jungh. 4: 418 (1857). – *Casparya multangula* var. *glabrata* (Miq.) A.DC., Prodr. 15(1): 276 (1864). TYPE: Java, Gunung Merapi, *F.W. Junghuhn s.n.* (not located).

Casparya crassicaulis A.DC., Ann. Sci. Nat. Bot., IV 11: 119 (1859); Candolle, Prodr. 15(1): 278 (1864). – *Begonia crassicaulis* (A.DC.) Warb., Nat. Pflanzenfam. 3(6A): 149 (1894); Smith & Wasshausen, Phytologia 52: 442 (1983). – *Begonia pachyrhachis* L.B.Sm. & Wassh., Phytologia 52: 442 (1983). TYPE: *W.H. de Vriese* (holo K *n.v.*).

Casparya robusta var. *glabriuscula* A.DC., Prodr. 15(1): 275 (1864). – TYPE: Java, 1 May 1845, *H. Zollinger 2844* (lecto B; isolecto BM, P designated by Hughes (2008) *loc. cit.*).

Begonia trigonocarpa Ridl., J. Fed. Malay States Mus. 8(4): 38 (1917) ***syn. nov.*** TYPE: Sumatra, West Sumatra, Korinchi, Sungei Kumbang, 1 Apr 1914, *H.C. Robinson & C.B. Kloss s.n.* (lecto BM [barcode 00001733]; isolecto BM, K here designated).

Begonia discolor auct. non R.Br. *sensu* Blume Enum. Pl. Javae 1: 96 (1827).

Plant repent to erect, 50–150 cm tall. ***Stem*** rhizomatous at the very base, thick, fleshy, erect portion with internodes 5–15 cm apart, glabrous or with scattered hairs to densely hairy with long usually white hairs, rarely reddish. ***Stipules*** large, semi persistent,

broadly lanceolate, keeled, glabrous or hairy along the keel, 40 × 15 mm. ***Leaves***: petiole 17–25 cm long, glabrous or with short or long hairs, hairs usually white, rarely reddish; lamina broadly ovate to suborbicular with 5–7 broadly triangular lobes, base cordate with lobes overlapping, asymmetric, (15–)24–35 × (15–)20–30 cm, midrib (10–)16–22 cm, venation palmate, margin dentate-denticulate; upper surface glabrous or with scattered short hairs, lower surface glabrous or with scattered short hairs, denser on the veins. ***Inflorescences*** a cluster of flowers on a long peduncle, axillary, sometimes appearing pseudo-terminal between a pair of leaves, cymose, branching twice, male and female flowers open at the same time; bracts caducous, elliptic, c. 1.5 cm long, glabrous or slightly fimbriate; primary peduncle 2.5–12 cm × 4–5 mm, glabrous or with long hairs, secondary peduncles 1–1.5(–3.5) cm, tertiary 3–4(–10) mm, remainder of the peduncles very compressed and appearing sub-umbellate. ***Male flowers***: pedicels c. 15–25 mm long, glabrous or with scattered hairs; tepals 4, white or pale pink; outer tepals orbicular-ovate 20–25 × c. 20 mm, with hairs on the reverse; inner tepals, orbicular-elliptic, glabrous, c. 15–20 × 15 mm; androecium symmetric, a loose globose cluster; stamens bright yellow, c. 80 in number; filaments unequal, 1.5–3 mm long, shorter on the basal stamens; anthers elliptic, c. 1.5 mm long, connective slightly extended, dehiscing through slits running nearly the entire length of the anther. ***Female flowers***: pedicels c. 10 mm long; ovary fleshy, lobed-triangular in cross-section, c. 8–12 mm diameter, with three ridges or small warty wings on the lobes, 1 wing sometimes larger, 3-locular, placentae bifid; tepals 5–6, white, elliptic-spathulate, subequal, c. 18–20 × 11–14 mm; styles 3, greenish yellow, semi-persistent, bifid, c. 4 mm long, papillose surface spirally and convolutely twisted. ***Fruit*** green or red, fleshy, globose-triangular, c. 15–18 mm diameter, borne in bunches of around 10–15, with three fleshy ridges, one sometimes more prominent and often slightly warty. (Fig. 3)

Material seen. SUMATRA. **North Sumatra**: Gunong Batu Lopang, *de Wilde & de Wilde-Duyfies 13531* (L). **West Sumatra**: Gunung Merapi, 19 Jul 2006, *D. Girmansyah, et al. 760* (E); Kerinci-Seblat National Park, Bukit Sako, 25 Jan 1995, *Anda collectors 2679* (ANDA); ibid, 25 Jan 1985, *D. Arbain 4279* (ANDA); Korinchi, Barong Baru, 8 Jun 1914, *H.C. Robinson & C.B. Kloss s.n.* (BM); Mt. Singalan, *O. Beccari HB4513* (FI [2 sheets]); ibid, *O. Beccari HB4513A* (FI [2 sheets]); Palupuh, 17 Mar 1988, *Anda collectors 166* (ANDA [2 sheets]); Panti Cermin Nature Reserve, 1 Jun 2007, *M. Hughes & D. Girmansyah MH1428B* (BO, E); ibid, 1 Jun 2007, *M. Hughes & D. Girmansyah MH1430B* (BO, E); ibid, 2 Jun 2007, *M. Hughes & D. Girmansyah MH1436* (BO, E). **Jambi**: Korinchi, 21 Jan 2000, *S.J. Davies & S.K. Rambe 2000-128* (A); Korinchi, Sungei Penoh, 3 Jun 2004, *D. Girmansyah 384* (BO [3 sheets]).

Notes. Begonia multangula is a new record for Sumatra, and this extension of its range westwards means that it is considerably more variable than previously circumscribed. *Begonia trigonocarpa* is reduced here as it fits within the variation of *B. multangula* comfortably. The small fruit size as noted by Ridley on the type of *B. trigonocarpa* is due to immaturity - the plant is still in flower, and similar size fruits are found on specimens of *B. multangula* at the same stage of development. Many of the leaves on parts of the type specimen are more elongate than is typical for *B. multangula* on Sumatra, and in combination with the plant being glabrous this hints at the possibility of introgression with *B. longifolia*. A small number of individuals on Sumatra have

reddish hairs, and these are probably hybrids with *B. scottii* (see notes under that species) rather than records of the allied *B. robusta*, which is endemic to western Java. *Begonia multangula* is also allied to *B. chlorocarpa* from Borneo, from which it differs most noticeably in not having spurred fruit.

Ecology and distribution. Sumatra, Java, Lesser Sunda Islands. Within Sumatra, *Begonia multangula* is found in the mountains of the West and North at altitudes of 700–2500 m, with most collections being from around 1200–1600 m (Fig. 2). Sprawling on stream banks and slopes in rain forest. IUCN category Least Concern.

Fig. 3. *Begonia multangula* habit (main photo), inflorescence (inset top left; Gunung Merapi, West Sumatra) and fruits (insets, bottom). Habit and fruit photographs from Pantai Cermin, West Sumatra. Photo credits: Mark Hughes and Deden Girmansyah.

3. *Begonia scottii* Tebbitt, Blumea 50(1): 154 (2005); Hughes, An Annotated Checklist of Southeast Asian Begonia 72 (2008). TYPE: Sumatra, Aceh, Gunung Leuser Nature Reserve, Gunung Ketambe, *de Wilde & de Wilde-Duyfies 14309* (holo L *n.v.*; iso BO, L).

Plant repent to erect, erect portion 25–50(–100) cm high. ***Stem*** rhizomatous at base, plants entirely rhizomatous when juvenile with very short internodes, internodes extending to 5–15 (–30) cm apart when mature, sub-glabrous to hairy, hairs white

or red. ***Stipules*** persistent, lanceolate, keeled, the keel sometimes with long hairs, with a fimbriate filiform extension at the tip, 20–30 × 8–15 mm. ***Leaves***: petiole 6–28 cm long, hairy or with scattered hairs 1–2 mm long; lamina ovate, base cordate with lobes overlapping, 11–23 × 6–16 cm, smaller on juvenile plants, midrib 8.5–16 cm long, underside with scattered hairs, denser on the veins, upper surface glabrous or with scattered hairs, hairs white or sometimes reddish on young leaves, venation palmate-pinnate; margin denticulate. ***Inflorescences*** axillary, cymose, bisexual, male and female flowers open at the same time; bracts lanceolate, c. 15 mm long, smaller towards the apex of the inflorescence, margin entire or fimbriate; primary peduncle 2–8 cm, secondary 5–15 mm. ***Male flowers***: pedicels c. 10–15 mm long, hairy; tepals 4, white, outer ovate-orbicular, size c. 18 × 18, with red hairs on the outside (always?); inner tepals elliptic, 15 × 10 mm, glabrous; androecium symmetric, a loose globose cluster; stamens bright yellow, c. 80 in number, subequal; filaments longer than the anthers, 2–3 mm long; anthers narrowly elliptic, 1.5–2 mm long, dehiscing through slits running nearly the entire length of the anther, connective extended. ***Female flowers***: pedicels 10–15 mm long; tepals 5, white, subequal, elongate-elliptic, outer c. 17 × 12 mm decreasing to 17 × 8 mm for the innermost, outer sometimes with scattered red hairs; ovary lobed-triangular in cross section, c. 10–15 mm in diameter, either glabrous or red-hairy, with 3 pronounced fleshy ridges sometimes developed into fairly distinct triangular equal to subequal wings c. 5mm long, 3-locular, placentae bifid; styles 3, large, greenish yellow, bifid, stigmatic surface twice spirally and convolutedly twisted, stigma persistent. ***Fruit*** green to reddish, globose-triangular, pendulous, borne in pairs or fours, 15–20 × 17–20 mm; with three fleshy ridges or stubby wings up to 5–6 mm wide; glabrous or with scattered hairs; tip bearing remnants of the styles, which wear away as they become brittle with age. (Fig. 4 & 5)

Material seen. SUMATRA. **Aceh**: Boer ni Bias, 31 Aug 1934, *C.G.G.J.v. Steenis 6207* (BO); ibid, 1934, *C.G.G.J.v. Steenis 6237* (BO); Gajolanden, 6 Feb 1904, *R.M. Pringgo Atmodjo 25* (L); Gunung Kemiri, 23 Aug 1971, *K. Iwatsuki et al. 1095* (BO); Gunung Leuser Nature Reserve, Gunung Ketambe, 7 Aug 1972, *de Wilde & de Wilde-Duyfies 14121* (BO); ibid, 13 Aug 1972, *de Wilde & de Wilde-Duyfies 14248* (L); Gunung Leuser Nature Reserve, Gunung Mamas, 10 May 1962, *de Wilde & de Wilde-Duyfies 16757* (BO, L); Kampong Burni Bies, 3 Sep 1971, *K. Iwatsuki et al. 1562* (BO). **North Sumatra**: Asahan, Dolok Si Manoek-manoek, 28 Oct 1936, *Rahmat si Boeea 10651* (A); Berastagi Woods, 15 Feb 1921, *H.N. Ridley s.n.* (K); ibid, 24 May 1921, *J.A. Lorzing 8385* (BO); Gunong Batu Lopang, 8 Jul 1972, *W.J.J.O. de Wilde 13497* (BO [2 sheets], L); Gunung Sibayak, Feb 1921, *H.N. Ridley s.n.* (K); ibid, 12 May 2007, *M. Hughes & D. Girmansyah MH1385* (BO, E); ibid, 12 May 2007, *M. Hughes & D. Girmansyah MH1390* (BO, E); Gunung Sinabung, 14 May 2007, *M. Hughes & D. Girmansyah MH1396* (BO, E); Sipirok, Sibual-buali, 19 May 1993, *J.J. Afriastini 2374* (BO). **West Sumatra**: Bukik Bulek, 19 Apr 2003–20 Apr 2003, *Anda collectors s.n.* (ANDA); Gunung Merapi, 26 Jul 2009, *M. Hughes & A. Taufiq MH1569* (ANDA, BO, E); ibid, 22 Jun 1953, *J.v. Borssum Waalkes 2191* (BO); ibid, 16 Sep 1918, *H.A.B. Bunnemeijer 4644* (BO, L); ibid, 20 Jul 2006, *D. Girmansyah & et al. 772* (BO, E); ibid, 18 Feb 1998, *W.S. Hoover & J.M. Hunter 877* (BO [2 sheets]); Mt. Tandikat, 6 Aug 1988, *H. Nagamasu 3002* (ANDA, L); Pajakumbuh, Mt. Sago, 19 Oct 1986, *Anda collectors 13* (ANDA).

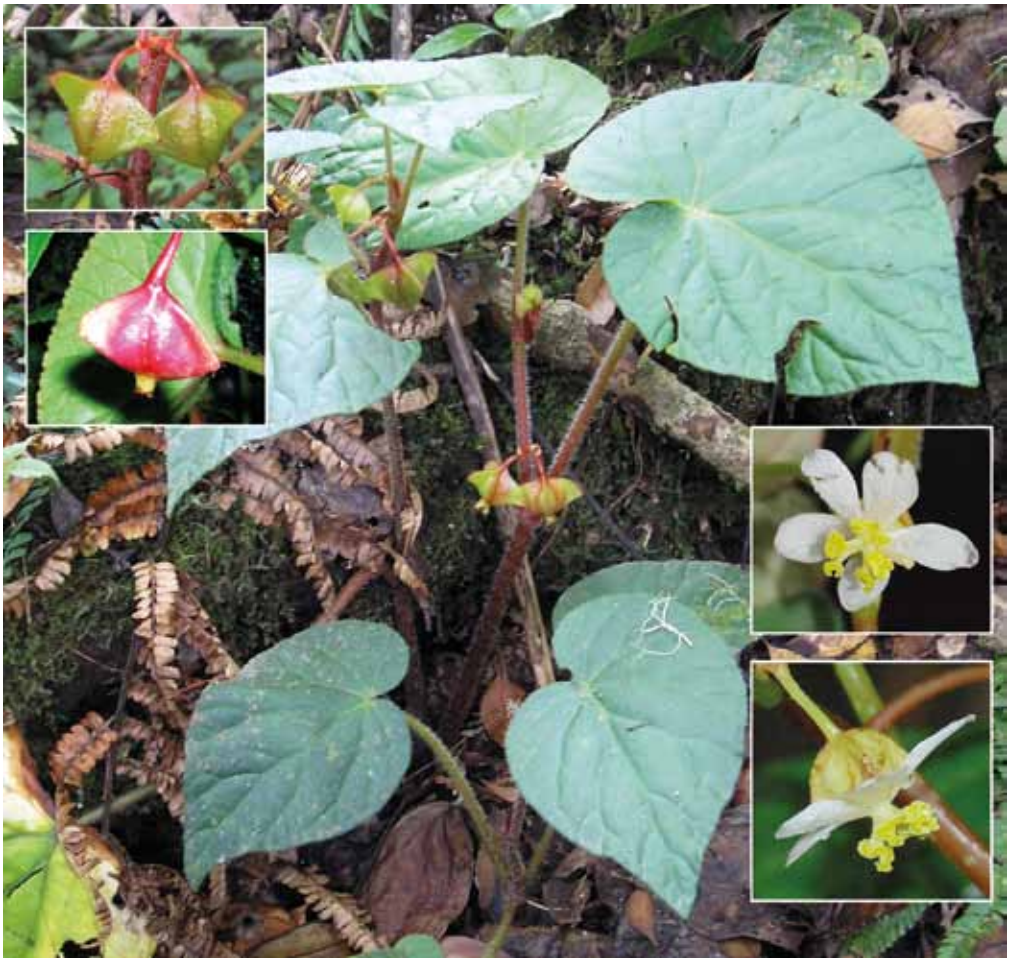

Fig. 4. *Begonia scottii* habit (main photo) and fruits from Gunung Merapi, West Sumatra (inset top left) and from Gunung Kemiri, Aceh (inset lower left). Female flower and ovary (inset right and bottom right) from Gunung Sorik Merapi, North Sumatra. Photo credits: Deden Girmansyah and Mark Hughes.

Notes. Despite being quite widely collected, this species was only recently described. Ridley determined some of his collections of this species to his *B. trigonocarpa* (=*B. multangula*), but the two species differ considerably; *B. scottii* has smaller, ovate (not broadly lobed) leaves and often comparatively thin-skinned fruit usually borne in pairs or fours on slender pedicels (not clusters of c. 10 thicker walled berries on stout pedicels). Three collections from the northern part of Sumatra (*van Steenis 6207* and *6237*, *de Wilde & de Wilde Duyfjes 13531* [BO duplicate]) are more robust than is typical for *B. scottii*, and also have more fruit per infructescence. These specimens possibly represent some introgression with *B. multangula*. The *de Wilde & de Wilde Duyfjes 13531* duplicates in L show that this collection is mixed (or at least extremely variable) as these 2 sheets are *B. multangula*, although the reddish hairs suggest these also have been introgressed with *B. scottii*.

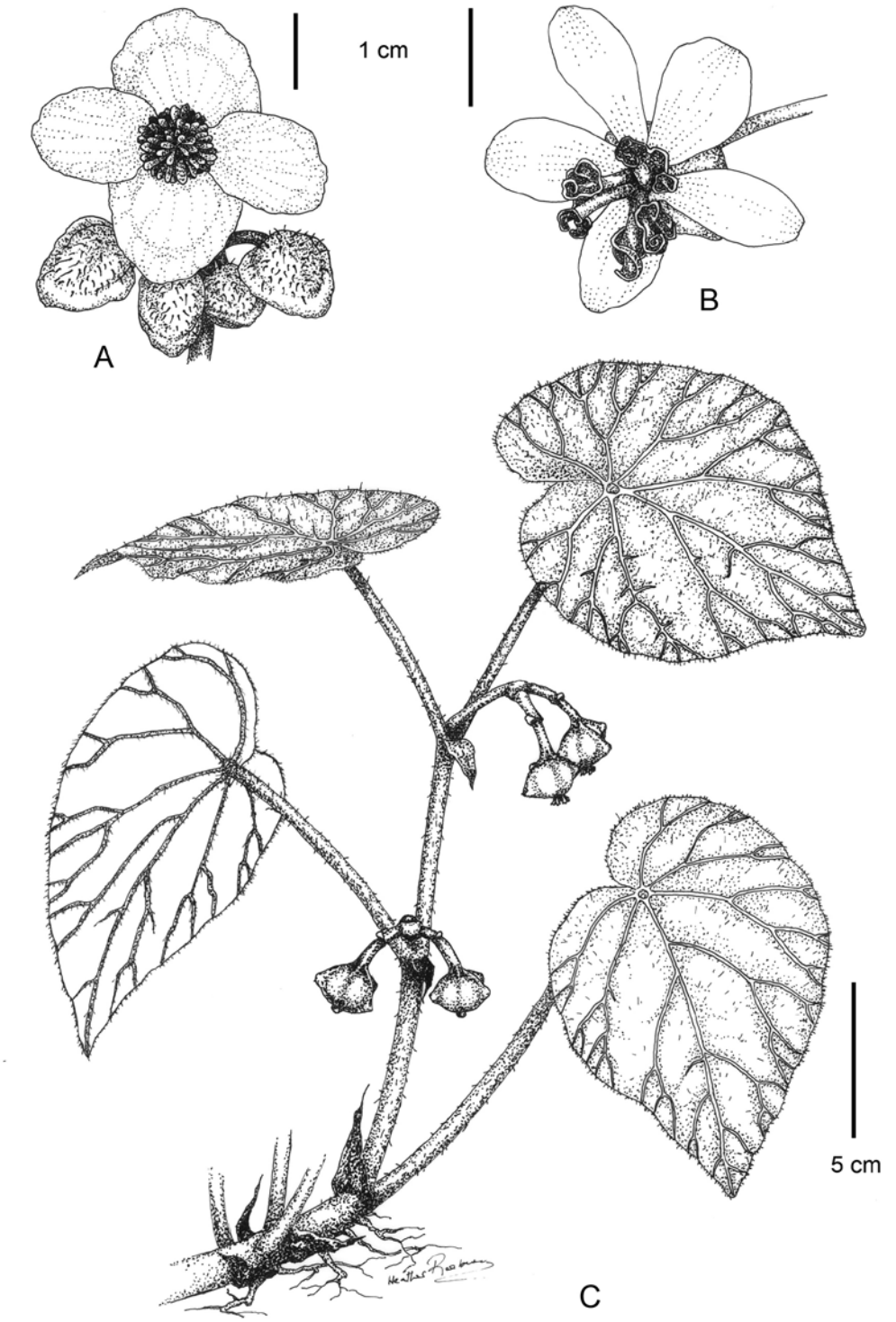

Fig. 5. *Begonia scottii.* A. Inflorescence and open male flower; B. Female flower. C. Mature plant in fruit. Drawn by: Heather Raeburn

Ecology and distribution. Endemic to Sumatra. In moss and montane rain forest in West Sumatra, North Sumatra and Aceh at 900–2600 m, though most frequently reported from 1400–1700 m (Fig. 2). In primary and secondary forest, on steep banks, stream sides or at the base of tree trunks or rotting logs. IUCN category Least Concern.

Excluded name

Begonia robusta var. *hirsutior* (Miq.) Golding & Kareg., Phytologia 54(7): 499 (1984) –*Platycentrum robustum* var. *hirsutior* Miq., Fl. Ned. Ind., Suppl. 1: 322 (1861). TYPE: Sumatra, Palembajan, *J.E. Teijsmann* (not located).

Miquel created this taxon for a specimen he originally cited under *Diploclinium areoatum* Miq (=*Begonia areolata* (Miq.) Miq.). It differs from the type variety of *B. robusta* Blume in having '*foliis minoribus, paniculis longe pedunculatis, ovarii maturescentis alulis subaequalibus*'. The type, collected in West Sumatra by Teijsmann cannot be located despite a thorough search in B, BO, K, L and U, and the description is not sufficient to identify the taxon with certainty. It seems unlikely to represent the sole record of the otherwise entirely Javanese *B. robusta*, but could possibly be referable to *Begonia multangula*.

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