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Begonias from the Bau Limestone, Borneo, including a New Species

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Abstract

Six *Begonia* species (Begoniaceae) are found on limestone hills in the Bau area, Kuching, Sarawak. One, a new species, *Begonia lailana* Kiew & Geri, is described. A key and habitat notes for all species are provided. The male and female flowers of *B. calcarea* Ridl. and the female flowers of *B. congesta* Ridl., not previously recorded, are here described for the first time.

Introduction

In 1906, Ridley published a paper on the begonias of Borneo that included twenty species, of which five were new species from the Bau limestone (1° 25'N 110° 9'E), 35 km from Kuching, Sarawak. Most were based on his own collections. Two of these were imperfectly known so that descriptions of the male and female flowers of *Begonia calcarea* Ridl. and the female flowers of *B. congesta* Ridl. were lacking.

As part of the recent biodiversity survey of the Bau limestone carried out by the Sarawak Biodiversity Centre, we collected specimens of begonias from 20 hills. All the species described by Ridley were recollected with the addition of a new species, which is described in this paper. Flowering material of *B. calcarea* was also collected and the flowers are described below.

In addition, the habitats of the species, which are quite different, were recorded. The diversity of begonias on a single limestone hill can be attributed to individual species occupying different and non-overlapping niches (Kiew, 1998). Most of the hills at Bau are home to at least three species, *B. pendula* Ridl., *B. rubida* Ridl. and *B. speluncae* Ridl., with four species collected from Gunung (G.) Doya and G. Jebong and five from G. Kawa. *Begonia rubida* grows near the summit of limestone hills above the tree canopy exposed to sunlight or in light shade, while *B. pendula* grows below the tree canopy on damp, mossy, vertical shaded rock-faces. *B. speluncae*, as

its name suggests, is common around cave mouths but also grows on dry rock-faces near the base of the hills where it occurs. The less common species include *B. congesta*, which grows on limestone boulders or damp low rock-faces near the cliff base, and *B. calcarea* and the new species, *B. lailana* Kiew & Geri, which both grow close to limestone hills on soil associated with the limestone. This soil is frequently more friable and more free-draining than soil derived from other rock types and often supports a different suite of plant species. It is significant that these last three species are less common than the others as this habitat is more susceptible to disturbance, particularly from agriculture, which encroaches towards the base of the hills.

Several of these species are decorative and have ornamental value. *Begonia calcarea* is a handsome species with broad upstanding leaves, which are covered in striking long magenta hairs, particularly on the petiole. In addition, it has large, bright orange or orangey-red flowers with a wavy margin. *B. pendula* has attractive foliage – its leaves are variegated with silver-green spots. Ridley (1906) described *B. speluncae* as 'one of the most attractive limestone species' with its tufts of small round leaves.

For identifying species, Ridley's key is not entirely satisfactory as both *B. pendula* and *B. rubida* key out under 'stems short, erect and leafy'. *B. pendula* is a creeping and often pendulous species and *B. rubida* has tall stems. A key to the Bau limestone species is therefore provided.

Key to the Bau Limestone Begonias

1a. Stems erect and cane-like **2**
1b. Stems rhizomatous or creeping **4**

2a. Leaves with veins prominently forked and narrowly diverging, fruits oblong 2. **B. congesta**
2a. Leaves with veins widely diverging when they fork, fruit much wider distally **3**

3a. Leaves ovate, petiole at an angle to the midrib 5. **B. rubida**
3b. Leaves oblanceolate, petiole straight with the midrib 3. **B. lailana**

4a. Stems thin and creeping, leaves widely spaced, longer than broad, spotted silver-green 4. **B. pendula**
4b. Stem thick and rhizomatous, leaves tufted, as wide as broad, dark green, not spotted **5**

5a. Robust plant, lamina more than 15 cm wide, petiole more than 15 cm long with dense long magenta hairs, flowers orange 1. **B. calcarea**

5b. Diminutive plant, lamina up to 4 cm wide, petiole up to 7 cm long, hairs not long nor magenta, flowers white 6. **B. speluncae**

1. **Begonia calcarea** Ridl., J. Str. Br. Roy. As. Soc. 46 (1906) 260. **Holotype**: Sarawak, Gunung Bra'ang *Haviland s.n.* (not seen).
Sect. *Diploclinium*

Ridley (1906) described this handsome begonia from a fruiting specimen. It is a very striking plant due not only to its broad, upstanding leaves but also to its long magenta hairs, which cover the whole plant and are particularly striking on the petioles. It is unusual among Bornean begonias in having orange flowers (most begonias have pale pink or white ones). The flowers are produced below the leaves from the prostrate rhizome. They are described here from *SBC 3854* for the first time.

Inflorescences from the leaf axils or from the prostrate rhizome. Female flowers, 1–2 at one node, bracts c. 10 x 4 mm. Male flowers in umbels 2.5–5 cm long, rachis rosy pink to pale pink, male flowers 3–6; bracts lanceolate 7–10 x 2–4 mm, apex setose; bracteoles 2–6 x 1–3 mm. *Male flowers* with pedicel 4–19 mm long, *tepals* 4, orangey-red to deeper red around the margin, margin undulate, glabrous inside and out; isomorphic, outer two broadly oval to almost rotund, apex rounded, 7–11 x 5–9 mm, inner ones slightly narrower, 7–11 x 4–6 mm; stamen cluster hemispherical, c. 4–5 x 8 mm, almost sessile, *stamens* 25–35, filament c. 1.5–2 mm long, anthers deep yellow, obovate, c. 1.5–2 mm long, apex emarginate. *Female flowers* with rosy pink peduncle and pedicel, bracteole oval, c. 5 x 2 mm, apex acuminate, *ovary* c. 19 x 20 mm, glabrous, locules 3, placentas bifid; *tepals* 5, isomorphic, orangey-red, margin undulate, c. 6 x 7 mm, *stigma and styles* c. 4 mm long. *Fruits* with peduncle and pedicel 20–40 mm long, capsule 11–21 x 15–21 mm, wings 3, equal, rounded, 4–12 x 5–7 mm, thinly fibrous. *Seeds* barrel-shaped, light brown, c. 0.2 mm long, collar cells (0.25–)0.75 length of seed.

Doorenbos *et al.* (1998) doubtfully included *Begonia calcarea* in sect. *Diploclinium*. Examination of the female flower shows its ovary and fruit to have three locules and bifid placentas, which confirms its position within this section.

Haviland recorded its habitat as 'top of Mt Bra'ang, old jungle, limestone', hence the name 'calcarea' that Ridley gave. However until our survey, no further specimens had been identified as this species so that there was some doubt that it was a limestone plant. It is certainly a rare species as, although 20 hills were surveyed, it was only found at the base of two of them. It is the most endangered among the Bau limestone species because its habitat is vulnerable to encroaching agricultural practices

from farms close to the base of the hills.

A similar specimen (*Native Collector 1255*) was collected from Gunung Dulit casting doubt as to whether this species is restricted to limestone and endemic to limestone in the Kuching District.

Distribution: Malaysia, Sarawak - Kuching limestone and possibly also from non-limestone habitats on G. Dulit.

Specimens examined: Gunung (G.) Angob *Anderson S27513* (SAR); G. Kawa *Connie Geri et al. SBC 3577* (SBC); G. Lanyang (G. Meraja) *Burtt B8154* (SAR), G. Manok *Burtt B8134* (SAR), *B8154* (SAR); G. Tabai *Connie Geri et al. SBC 3854* (SBC).

2. **Begonia congesta** Ridl., J. Str. Br. Roy. As. Soc. 46 (1906) 253. **Holotype**: Sarawak, Bau *Ridley s.n.* (not seen).
Sect. *Petermannia*

This is a distinct begonia because its leaves are corrugate due to the many, narrowly bifurcating veins. As its name suggests, the inflorescence appears congested because the lateral branches are clustered at the base but above which there is a long (up to 14 cm long) rachis bearing male flowers. This rachis dies and falls before the fruits are mature and was obviously not present in the plants Ridley described. The plant is protogynous with two female flowers produced at the base followed by many small male flowers, which are produced later on short lateral branches and on the erect rachis.

Male flowers with pedicel 5–7 mm long, with pale brown hairs c. 0.25 mm long; *tepals* 2, cream and rosy pink at base, minutely hairy outside, glabrous inside, upper rotund, 4–5 x 4–5 mm, lower broadly oval, 4–5 x 3–4 mm; stamen cluster hemispherical, c. 3–3.5 x 3–4 mm, joined at base in a stalk c. 0.5 mm long; *stamens* c. 35, filament c. 0.75 mm long, anther obovate, c. 1 mm long, apex not emarginate. *Female flowers* with pedicel 4–11 mm long with dense glandular hairs, *ovary* oblong, to 20 x 17 mm, wing 3–4 mm wide, isomorphic, rounded distally, locules and wings minutely hairy, locules 3, placentas bifid; *tepals* 5, isomorphic, oval, c. 18 x 6 mm, toothed in distal half, each tooth terminating in a hair, minutely hairy outside, glabrous inside; *styles* 3, c. 3 mm long, bifid, stigma a spiral papillose band. *Fruits* pendent, broadly oblong, to 2.5 x 1.7 cm, wings 3, equal, thin and fibrous. *Seeds* barrel-shaped, c. 0.3 mm long, collar cells c. 0.75 seed length.

Ridley (1906) recorded the tepals as shorter than the stamens (surely an error as the stamens are less than 2 mm long) and the stamen number as 12. We counted

about 35 stamens.

The species is endemic in the Kuching limestone. Ridley cited a specimen from the Niah limestone under this species but this has proved to be a distinct species (Pearce, 2003).

Distribution: Malaysia, Sarawak - endemic in the Kuching limestone.

Specimens examined: Bau *Abang Mohtar S52906* (SAR), *Brooke 9875* (SING), *Purseglove P4468* (SAR, SING); Bidi *Mamit S42147* (SAR); Bukit Kapur *Burtt & Woods B1881* (SAR); Bukit Krian *Anderson S25137* (SAR); Fairy Cave *Jugah et al. S70076* (SAR); G. Angob *Anderson S27493* (SING); G. Batu *Martin S39276* (SAR), *Meekiong et al. SBC 2125* (SBC); G. Doya *Julia et al. SBC 2062* (SBC), *Meekiong et al. SBC 2244* (SBC), *Raymond et al. SBC 3459* (SBC); G. Jebong *Meekiong et al. SBC 2076* (SBC), *Paul & Ilias S25626* (SAR); G. Kawa *George S38280* (SAR), *Meekiong et al. SBC 3113* (SBC); G. Krian *Meekiong et al. SBC 1614* (SBC); G. Lanyang *Julia et al. SBC 1224* (SBC), *SBC 2938 (SBC)*; G. Pambur *Julia et al. SBC 1270* (SBC); G. Ropih *Donny et al. SBC 2001* (SBC), *Julia et al. SBC 1295* (SBC); Seburan *Anderson 8984* (SAR), *S14580* (SAR), *Woods B2890* (SAR); G. Tai Ton *Denis et al. SBC 1410* (SBC), *Julia et al. SBC 726* (SBC); G. Tongga *Burtt B8179* (SAR).

3. Begonia lailana Kiew & Geri, **sp. nov**.

Differt a *Begonia oblongifolia* foliis latioribus (8–10 cm nec 5 cm latis), floribus nec albis et fructis alis latioribus (8–11 mm nec 5 mm latis).

Typus: Malaysia, Sarawak, Bau, Gunung Kawa. *Connie Geri et al. SBC 3753* (holo SAR, iso K, L, SAN, SBC, SING).

Section: *Petermannia*

Figure 1

Cane-like begonia up to 1 m tall with several erect stems from the base, some plants branching near the base to form a bushy crown. *Stem* succulent becoming woody, reddish or greenish brown, swollen at nodes, up to c. 7 mm diam., glossy and glabrous or hispid with uniseriate translucent hairs c. 2 mm long, dense on the upper internodes and petioles. *Stipules* lanceolate, pale green, 15–27 x 6–10 mm, midrib prominent, margin entire, apex narrowly pointed, caducous. *Leaves* alternate, 7(–11) cm apart; *petiole* reddish, densely hirsute, 3–5 mm in upper leaves, 8–10 mm in lower leaves, thickened at the base, slightly grooved above, in line with the midrib, *lamina* in juvenile leaves silver-spotted between the veins, in mature leaves matt, plain light green with a red patch at junction with petiole, beneath whitish or sometimes deep red or reddish purple, oblanceolate, asymmetric, 12.5–17 x 8–10 cm, broad side 5–6.5 cm wide,

upper surface glabrous or with scattered dark red bristles between veins and on the veins and midrib, the lower surface with lamina and veins glabrous or veins and midrib minutely hispid, succulent in life, papery when dry, base cuneate and subequal or unequal with the basal lobe of the larger side rounded, 0.5–1 cm long, margin minutely toothed, apex acuminate; venation palmate-pinnate with 2 pairs at base and 3 lateral pairs along midrib, branching towards margin, impressed above, beneath prominent and concolorous with lamina or sometimes red, basal lobe with 2 veins. Plant protogynous. *Inflorescences* axillary, erect, cymose panicle, 10–16 cm long of which peduncle is 0–3.5 cm long, greenish to dark red, minutely pilose, lowest node with 1–2 female flowers, above up to 11 short branches 1–1.5 cm long with many male flowers. Bracts green, ovate, 3–4 mm long. *Male flowers* with pale red pedicel 4–9 mm long, *tepals* 2, glabrous, deep pink or pale cream and deeper pink towards the base, rotund, 6–7 x 6–7 mm or oval 5–8 x 3–7 mm, apex rounded; stamen cluster 3–5 x 2–3 mm with a stalk c. 1 mm long, *stamens* more than 35, filament c. 0.5 mm long; anther pale yellow, obovoid, c. 1–1.5 mm long, apex emarginate, dehiscing by longitudinal slits in upper half. *Female flowers* with pedicel 7–9 mm long, reddish green; *ovary* pale green sometimes with red veins on the wings, 13–18 mm long, locules 3, each with 2 axile placentas, wings 3, equal, 3–5 mm wide; *tepals* 5, pale peach to pale pink or green, sometimes deep ruby red at the base, slightly obovate, 6–12 x 3–8 mm, innermost smaller 4–10 x 3–7 mm, the margin entire or with 4–5 minute teeth towards the apex, apex acute, the outer surface sometimes with scattered translucent hairs; *styles* 3, bifurcating, spirally twisted, yellowish-green to pale green, 2–6 mm long; *stigma* a glistening papillose spiral band. *Fruits* with stiff, decurved pedicel 10–13 mm long, capsule glabrous, 2–2.7 x 1.8–2.8 cm, wings slightly unequal, slightly pointed at tip, thinly fibrous, widest wing 8–11 mm wide, narrowest 6–8 mm wide, dehiscing between locule and wing, style not persistent. *Seeds* barrel-shaped, light brown, c. 0.4 mm long, collar cells c. 0.4 length of seed.

Distribution: Malaysia, Sarawak - endemic in Kuching limestone. Locally common on G. Aup, G. Poing and G. Tabai.

Habitat: At the base of limestone hills, in light shade.

Notes: *Begonia lailana* is named in honour of YABhg. Datuk Amar Puan Sri Dr Hajjah Laila Taib, wife of the Chief Minister of Sarawak.

This species belongs to sect. *Petermannia* because the ovary has three locules each with two placentas. It resembles *B. oblongifolia* in being a cane-begonia with obovate leaves, paniculate male inflorescences and oblong fruits about 2 cm long. However, it is distinct from this species in its leaves which are narrower, less than twice as long as broad (they are c. 5 cm wide and more than twice as long as broad in *B. oblongifolia*), in having fewer veins (8 in *B. oblongifolia*), larger, light red male

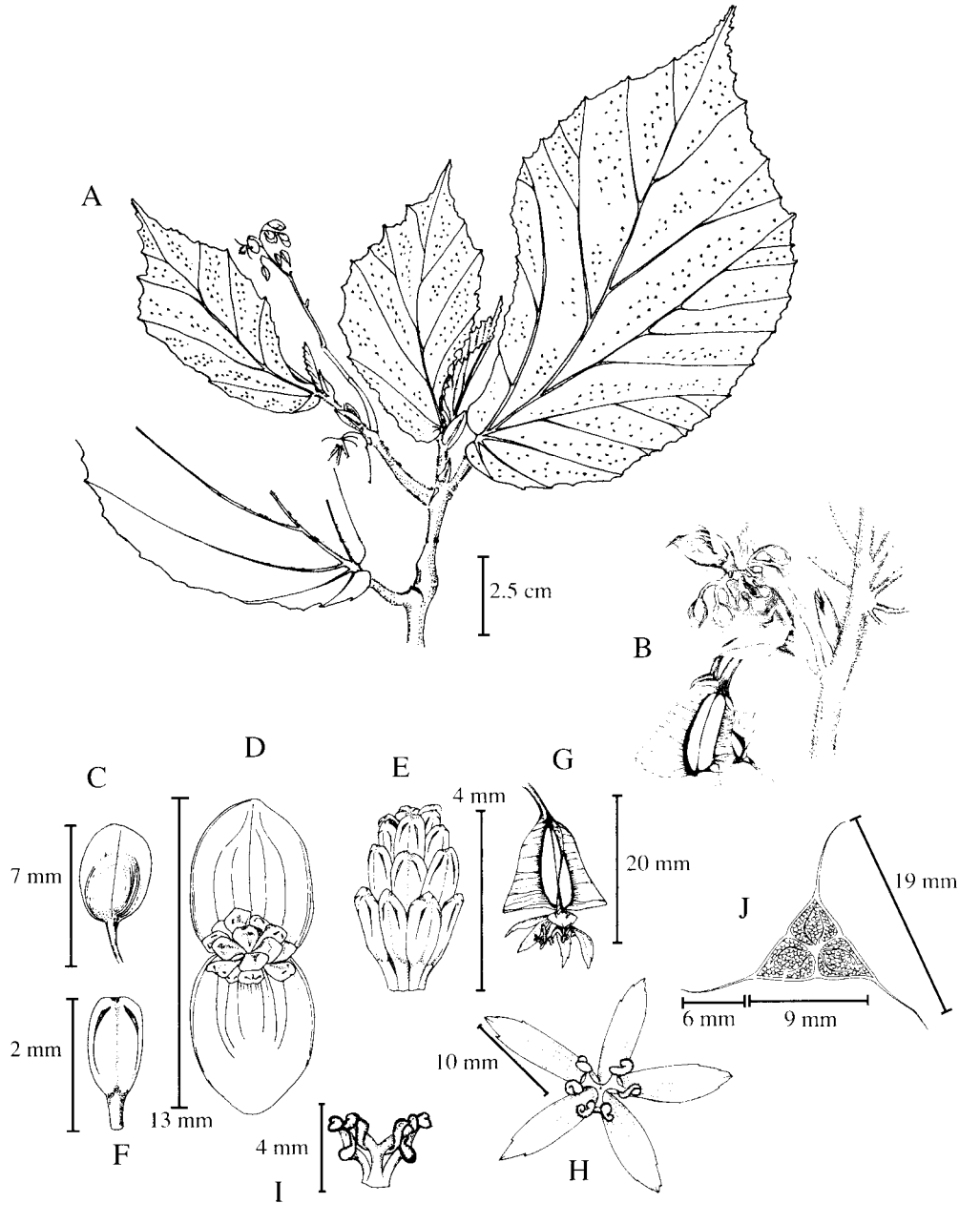

Figure 1. ***Begonia lailana*** **Kiew and Geri.**
A foliage; B partial inflorescence; C male bud; D male flower; E stamen cluster; F. stamen; G & H female flower; I style and stigma; J. TS ovary.

flowers (3 mm long and green in *B. oblongifolia*) and wider wings (c. 5 mm wide in *B. oblongifolia*).

Begonia lailana populations and individuals show some variation in leaf colour and indumentum, and in ovary colour. Plants in some populations have completely green leaves (e.g. at G. Kawa), in others most plants have green leaves with some plants with red veins on the lower surface (e.g. at G. Tabai), or have most or some plants with a deep red or purplish red undersides to the leaf (e.g. at G. Poing and G. Aup, respectively). The shape of the silver spots on the juvenile leaves also varies between populations: either discrete (e.g. at G. Kawa and G. Poing) or coalescent (e.g. at G. Aup). Some populations have completely green ovaries (e.g. at G. Aup and G. Poing), or the wings of the green ovary have fine red veins (e.g. at G. Kawa and G. Tabai). Begonias are notoriously polymorphic for colour and patterning of the leaves so these differences are not considered significant taxonomically.

While the stiff red bristles on the upper lamina surface are conspicuous, they are not always present in all plants, e.g. the G. Aup population has glabrous leaves, the Poing population has mostly glabrous individuals with a few with bristly leaves, while the G. Kawa population has plants with bristly leaves. The female flower may also vary in that the tepal margin may be entire or slightly toothed. However, this difference does not correlate with any other character and is therefore not considered taxonomically significant.

Other specimens examined: Gunung (G.) Aup *Connie Geri et al. SBC 3756* (SBC), *Malcom et al. SBC 3303* (SBC); G. Batu *Meekiong et al. SBC 2136* (SBC); G. Doya *Julia et al. SBC 2055 (SBC), Raymond et al. SBC 3451* (SBC), *SBC 3473* (SBC); G. Kawa *Connie Geri et al. SBC 3753 (SBC), SBC 3592* (SBC, SING), *Meekiong et al. SBC 3114* (SBC); G. Lanyang *Julia et al. SBC 2901* (SBC, SING); G. Podam *Malcom et al. SBC 3364* (SBC); G. Poing *Julia et al. SBC 353* (SBC); *Connie Geri et al. SBC 3755* (SBC), *Malcom et al. SBC 1555* (SBC); G. Tabai *Connie Geri et al. SBC 3757* (SBC), *Julia et al. SBC 3414* (SBC).

4. **Begonia pendula** Ridl., J. Str. Br. Roy. As. Soc. 46 (1906) 257. **Holotype**: Jambusan *Ridley 11772* (K).
Sect. *Petermannia*

This species is endemic in the Kuching District where it is common on most limestone hills. It creeps over vertical mossy cliff faces below the tree canopy with its thin stems rooting at the nodes. Ridley (1906) named it 'pendula' describing its habit as having trailing stems hanging down rock-faces. It is a decorative species as its bright green leaves are variegated with silver-green elongated spots between the veins that in some

plants are discrete and in others coalescent. Some plants have leaves with the lower surface maroon, others are green. The male flowers are deep pink and the female flowers are red.

Distribution: Malaysia, Sarawak - endemic in Kuching limestone.

Other specimens examined: Bau *Abang Mohtar et al. S52914* (SAR), *Anderson 7799* (SAR, SING), *Brooke 9891* (SING), *Ridley 11774* (K); Bidi *Clemens 20680* (SAR), *Yii et al. S50381* (SAR); Bukit Boring *Yii et al. S50360* (SAR); G. Apin *Donny et al. SBC 1360* (SBC), *Jugah et al. S79954* (SAR), *Makom et al. SBC 1107* (SBC), *Malcom et al. SBC 1107* (SBC); G. Aup *Julia et al. SBC 568* (SBC), *Malcom et al. SBC 3301* (SBC); G. Batu *Meekiong et al. SBC 2126* (SBC), *Meekiong et al. SBC 2126* (SBC), *SBC 2127* (SBC); G. Berloban *Yii & Othman S46234* (SAR); G. Doya *Burtt B8187* (SAR), *Julia et al. SBC 2027* (SBC), *SBC 2144* (SBC), *SBC 2154* (SBC), *SBC 2162* (SBC), *Sheavy et al. SBC 3056* (SBC); G. Jebong *Donny et al. SBC 2095* (SBC), *Meekiong et al. SBC 2074* (SBC), *Paul & Ilias S25623* (SAR); G. Juita *Connie Geri et al. SBC 3425, 3426* (SBC), *Julia et al. 1293* (SBC); G. Pambur *Julia et al. SBC 1263* (SBC) G. Podam *Meekiong et al. SBC 3206* (SBC); G. Poing *Julia et al. SBC 364* (SBC); G. Ropih *Julia et al. SBC 2101* (SBC), *Meekiong et al. SBC 3186* (SBC), *Shaevy et al. SBC 2426* (SBC); G. Selabor *Sinclair SFN 38471* (SING); G. Setiak *Martin S38660* (SAR); G. Stulang *Malcom et al. SBC 640* (SBC), *SBC 643* (SBC); G. Tabai *Burtt B8158* (SAR), *Julia et al. SBC 1293* (SBC), *SBC 2513* (SBC), *SBC 2563* (SBC); G. Tai Ton *Julia et al. SBC 2677* (SBC), *Stevens et al. 204A* (SAR), *Yii et al. S51208* (SAR), *S51210* (SAR); G. Tongga *Donny et al. SBC 1777* (SBC); G. Umbut *Julia et al. SBC 2622* (SBC); Lobang Angin *Yii et al. S51265* (SAR); Saburan *Anderson S19119* (SAR).

5. **Begonia rubida** Ridl., J. Str. Br. Roy. As. Soc. 46 (1906) 256. **Lectotype**: Jambusan *Ridley 12393* (K, here designated).
   Sect. *Petermannia*

As the name suggests, this species has ruby-red male flowers and its stems are also bright red. It grows above the tree canopy on the shoulders of the summit, often on peaty soil among sparse vegetation in light shade to full sunlight. Its leaves are thick and succulent and are held vertically, unlike the leaves of the other cane-like begonias that grow in shaded conditions, e.g. *B. lailana* and *B. congesta*, the leaves of which are held horizontally. This difference is probably a response to light conditions: the horizontal leaf surface will intercept more light in shaded conditions, while leaves held vertically will absorb less heat in bright sunlit conditions.

Distribution: Malaysia, Sarawak – endemic in Kuching limestone.

Other specimens examined: Bau *Brooke 9832* (SING), Bidi *Clemens 20681* (SAR); Bukit Jebong *Johnson S29403* (SAR), *Paul & Ilias S25617* (SAR); Bukit Manok *Anderson S27416* (SING), *Erwin & Paul S27416* (SAR); Bukit Numpang *Chai & Seng S22861* (SAR); Bukit Regu *Paul et al. S37392* (SAR); G. Apin *Donny et al. SBC 1361* (SBC), *Jugah et al. S79953* (SAR), *Malcom et al. SBC 1108* (SBC); G. Batu *Meekiong SBC 2136, 2137* (SBC); G. Juita *Connie Geri et al. SBC 3427* (SBC); G. Meraja *Julia et al. SBC 315* (SBC); G. Pambur *Julia et al. SBC 1240* (SBC), *SBC 1264* (SBC); G. Ropih *Julia et al. SBC 2100* (SBC), *Connie Geri et al. SBC 3516* (SBC); G. Setiak *Martin S38670* (SAR), G. Taiton *Julia et al. SBC 710* (SBC); G. Tongga *Denis et al. SBC 1722* (SBC), *SBC 1732* (SBC); G. Umbut *Julia et al. SBC 2584* (SBC).

6. Begonia speluncae Ridl., J. Str. Br. Roy. As. Soc. 46 (1906) 258. **Lectotype**: Jambusan *Ridley 11773* (K, here designated).
Sect. *Reichenheimia*

This begonia is, as its name suggests, a species that grows around cave mouths. It also grows on dry rock cliff faces at the base of hills. It is endemic in the Kuching limestone and has been collected from most hills in this area.

Doorenbos *et al.* (1998) placed this species doubtfully in sect. *Reichenheimia* as the placenta type was not known. We confirm that it belongs to this section because the ovary and fruit have three locules and the placenta is unbranched, i.e. one per locule.

Other specimens examined: Bidi *Anderson 75* (K), *Brooks s.n.* (K) *Clemens 20644* (K, SAR), *Mjoberg 177* (K); Bukit Pait *Erwin & Paul S27429* (SAR); Bukit Selabor *Paie S28044* (SAR, SING); Fairy Cave *Rantai et al. S 70059* (SAR); G. Aup *Julia et al. SBC 707* (SBC); G. Bar *Rantai et al. S66034* (SAR); G. Batu *Meekiong et al. SBC 2135* (SBC); G. Doya *Julia et al. SBC 2159* (SBC), *Shaevy et al. SBC 3047* (SBC); G. Jebong *Lehman S30143* (SAR), *Meekiong et al. SBC 2072* (SBC); G. Kawa *Meekiong et al. SBC 2797* (SBC); G. Lanyang *Julia et al. SBC 1229* (SBC), *SBC 2905* (SBC), *Denis et al. SBC 1439* (SBC); G. Manok *Burtt B8132* (SAR); G. Meraja *Julia et al. SBC 301* (SBC); G. Podam *Malcom et al. SBC 814* (SBC); G. Poing *Julia et al. SBC 355* (SBC); Quop *Hewitt s.n.* (K); Sungai Serian *Jacobs 5177* (SAR).

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