

Five New *Begonia* species (Begoniaceae) from the Niah National Park, Sarawak, Malaysia

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Abstract

Five new *Begonia* species, *Begonia kachak* K.G.Pearce, *B. kasutensis* K.G.Pearce, *B. niahensis* K.G.Pearce, *B. stichochaete* K.G. Pearce and *B. subisensis* K.G.Pearce, were collected from limestone habitats in the Niah National Park. A key, descriptions and illustrations are provided

Introduction

Sarawak's varied geology includes a number of isolated limestone outcrops dating from a range of geological epochs and varying in size. In north Sarawak the large Melinau formation falls partly within the Gunung Mulu National Park, while in west Sarawak there are a number of limestone outcrops around Bau and Serian and south towards Tebedu. Other exposures are scattered in the interior of Sarawak, for example, at Bukit Sarang (Tatau), Ulu Kakus and in the Middle Baram. Between Bintulu and Miri, in the Niah area about 16 km from the coast, there is an isolated limestone massif known as the Subis massif. In 1974, this massif and surrounding forest was constituted as the Niah National Park.

The Bau limestone outcrops, being relatively accessible from Kuching, have been a favourite destination for plant collectors since the mid 19th Century and the Mulu limestone was the focus of intensive botanical collection during the Sarawak Forest Department and Royal Geographic Society Expedition in 1978. In contrast, the Subis massif was, until recently, somewhat neglected by plant collectors. G.D. Haviland, Curator of the Sarawak Museum, Kuching, and C. Hose, District Officer in Baram and Sibiu, together made the first plant collections there in 1894. In 1932, P.M. Syngé, a member of the 1932—33 Oxford University Expedition to Sarawak, visited Subis, while in 1954, W.M.A. Brooke and Ahmad independently made collections in the area under the Sarawak Museum label. In 1962, B.L. Burt with P.J.B. Woods and Chew W.L. collected there as did H.P. Fuchs in 1963 and G.

Alphonso and Samsuri Ahmad of the Singapore Botanic Gardens in 1965. The Botany Unit staff, Sarawak Forest Department, made collecting trips to Niah on a number of occasions from the early sixties onwards, including J.A.R. Anderson, who had a particular interest in the limestone flora of Sarawak (Anderson, 1965) and who collected there in 1966 and 1972. Their collections included specimens of the five begonia species described below but which until now remained unnamed.

All five species are endemic to the Subis limestone.

The highest point of the Subis limestone massif is G. Subis. Bukit Kasut and Gua Pangomah are located on the west of the massif. G. Brangin and G. Bekajang are two discrete hills to the north and northeast of the massif, respectively. The latter is the site of the Niah Great Cave and the Painted Cave, which are important archaeological sites.

The botanical field investigations in Niah National Park were carried out as part of the Sarawak Forest Department/DANIDA Project 'Support to Wild Life Master Plan Implementation through the Improved Management of Totally Protected Areas in Sarawak, Malaysia' and enabled the five *Begonia* species to be re-collected from the limestone habitats and for detailed observation to be made.

Key to *Begonias* in the Niah National Park

- 1a. Leaf ovate, oblong-ovate or obovate2
- 1b. Leaf reniform to sub-orbicular4
- 2a. Leaf 1.5 times or more as long as broad3
- 2b. Leaf less than 1.5 times as long as broad 2. *B. niahensis*
- 3a. Leaf with lines of stiff hairs between veins 3. *B. stichochaete*
- 3b. Leaf without lines of stiff hairs between veins 5. *B. subisensis*
- 4a. Leaf more than 7 cm long and wide 1. *B. kachak*
- 4b. Leaf less than 7 cm long and wide 4. *B. kasutensis*

1. *Begonia kachak* K.G.Pearce, *sp. nov.*

Section *Petermannia*

A *Begonia speluncae* Ridl. foliis majoribus ob internodia longiora non in fasciculis dispositis nec peltatis nec glabris differt. **Typus:** Great Cave, Niah, Miri District J.A.R. Anderson, S. Tan & E.Wright S26074 (holo SAR).

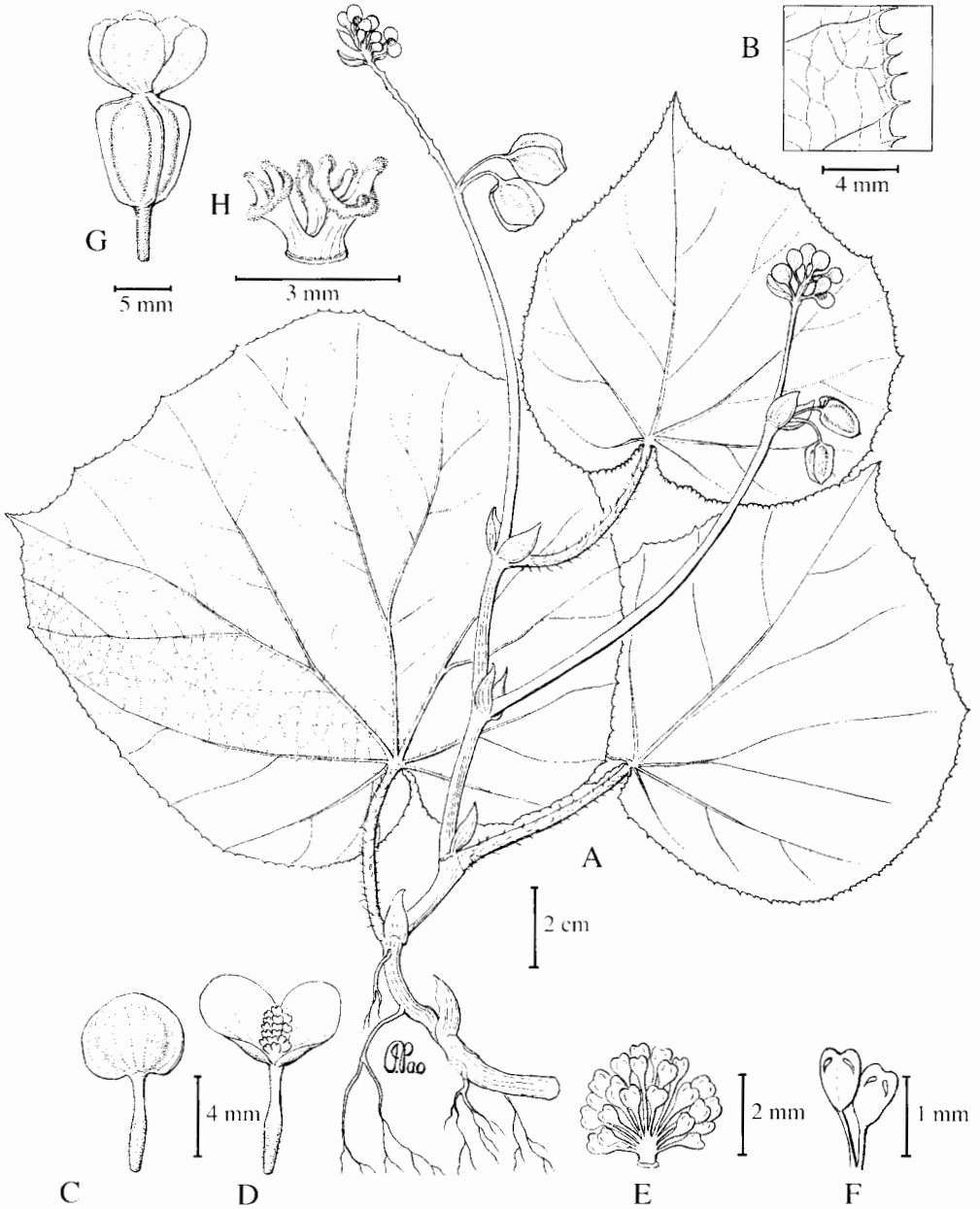


Figure 1. *Begonia kachak*

A Habit, B Detail of leaf margin, C Male bud, D Male flower, E Androecium, F Stamens, G Female flower, H Style and stigma. (from S26074).

Figure 1

Creeping herb or low root climber, roots fibrous, produced at the nodes in contact with the substrate. Stem and petiole with minute appressed to oblique brown hairs; distal end of young petiole, main veins on abaxial surface, margins of young leaf and main vein of stipule with stiff pink-brown trichomes to 1 mm long. *Leafy stem* 6–28 cm long, 3 mm diam., little branched, internodes 1–5 cm long. *Stipules* broadly triangular with a distinct midrib, 4.5 x 7 mm, margin entire, prolonged into an acuminate apex, persistent. *Leaves* alternate; petiole 1.8 cm in upper leaves, to 17 cm in lower leaves; lamina minutely papillose above and below, upper surface somewhat lustrous, olive-green to yellowish green especially near margins, lower surface pale green or in some specimens brownish pink with pale green veins, oblique, reniform to sub-orbicular, 7.5–12.5 x 7.5–15 cm, base cordate with the basal lobes hardly overlapping, rounded, 0.2–4.7 cm long, margin irregularly and indistinctly serrate, teeth setose, apex acute to acuminate, venation pinnate-palmate, main veins 4 pairs, branching about half way to the margin, with 2 more veins in the broader and one in the narrower basal lobe, sunken above, prominent beneath. *Inflorescences* axillary, protogynous, obliquely erect cymose panicles, 8.5–29 cm long, of which peduncle is up to 14 cm long, with one or two female flowers proximally and many male flowers distally; bracts pink, similar to stipules, 6.5 x 3 mm, persistent, bracteoles pale pink-brown, broadly ovate, 4 x 3 mm, apex setose, persistent. *Male flowers* with pink pedicel to 7.5 mm long, tepals 2, white translucent margins pink before anthesis, minutely papillose, orbicular, 7 x 5.5 mm, margin entire, apex rounded, stamens yellow, c. 29, in a spherical cluster, joined in a torus c. 3 mm diam., filaments to 1 mm long, anthers pale yellow, obovate, c. 0.7 mm long, emarginate. *Female flowers* on pedicels 5.5 mm long, minutely hairy; ovary pink, oblong-obovoid, 10.5 x 7 mm, wings pink, 3, subequal, c. 1.5 mm wide; tepals 5, white translucent or palest pink, with scattered minute, deeper pink hairs, unequal, oblong with rounded apex, to 9.5 x 5.5 mm, margin entire; styles 3, free, each 2 mm to bifurcation from where papillose stigmatic surface forms a continuous twisted band. *Fruits* with decurved pedicel, 1–1.9 cm long; capsule asymmetric, broadly oblong-elliptic, to 1.9 cm x 1.6 cm, minutely hairy, papillose, locules 3, each with 2 placentae, dehiscing between wing and locule, wings 3, unequal, thin, narrowed to base and apex, two narrower wings to 5 mm wide, broader wing to 7 mm wide, style caducous. *Seeds* cylindrical, c. 0.3 x 0.2 mm, surface areolate, areoles more or less equal sided at base and apex and elongate along seed axis.

Distribution: Borneo – SARAWAK: endemic in the Subis limestone (G. Brangin, Niah Great Cave and Gua Pangomah).

Habitat: Locally abundant in the shelter of overhangs in somewhat dry areas or

creeping up rocks at cave mouths, infrequently at level ground in deep shade adjacent to limestone outcrops.

Notes: This is a conspicuous begonia with large shiny leaves, commonly bearing a cluster of delicate, pale pink male flowers. It is easily observed on limestone outcrops along the Plank Walk to the Niah Great Cave and around the cave mouth. It takes its name from *kachak*, the Malay word meaning handsome.

Specimens examined: SARAWAK: Gunung Subis, Niah *B.L. Burt & P.J.B. Woods B2010* (SAR), *Mohidin S21603* (SAR); Great Cave *K.G. Pearce, Bibian Diway, Saupel Atot & Dami Jude S78536* (SAR), *Jemree Sabli S89062* (SAR); G. Brangin, Ulu Sg Subis *Yii Puan Ching S40168* (SAR), Gua Pangomah *J.A.R. Anderson S31691* (SAR, SING), Near Sg Subis *K.G. Pearce S89463* (SAR); Niah Caves *Alphonso & Samsuri A217* (SING), *A222* (SING), *A248* (SING).

2. *Begonia niahensis* K.G.Pearce, *sp. nov.*

Section *Petermannia*

A *Begonia congesta* Ridl. habitu erecto vel effuso (non cauli longo), capsula oblongo-ovoidea (non longa oblongaque) differt. **Typus:** Niah Caves *B.L. Burt & P.J.B. Woods B 2009* (holo SAR).

Figure 2

Herb with *stems* to 75 cm long, branching near base with some spreading horizontally, some vertical and some drooping and then curving upward. Young stems and petioles with minute, erect translucent hairs. Older stems brown and semi-woody, to 1 cm diam., young stems brownish pink, internodes 2–8.5 cm long. *Stipules* green flushed brownish pink at centre, plicate, broadly ovate, 14 x 7 mm, margin entire with translucent hairs at base, apex acute, persistent. *Leaves* spirally arranged; petiole from c. 5 cm long in the upper leaves to 22 cm in the lower leaves, deep brownish pink; lamina medium green above, paler below, with veins on both surfaces deep pink at base and at the point where they branch, pinkish between, minutely papillose with a velvety appearance above, translucent hairy beneath, oblique, broadly ovate, 15–20 x 12–16.6 cm, base cordate with basal lobes not or hardly overlapping, rounded, to 9 cm long, margin irregularly and indistinctly serrate, translucent hairy, teeth with translucent setae, apex acute, venation pinnate-palmate, main veins 4–5 pairs, branching near base, with 2 or 3 smaller veins in broader basal lobe and 1 or 2 in narrower basal lobe. *Inflorescences* axillary, protogynous, obliquely upright, cymose panicles 3–8 cm long, of which the peduncle is 2.5–6 cm long, with 1 or 2 pairs of female flowers at the base with many male flowers tightly congested distally, bracts

plicate, pale green, broadly ovate, to 2–2.3 x 1.2 cm, persistent. *Male flowers* opening one at a time, pedicel obscured by congested bracts and male flower buds, tepals 2, white translucent, margins entire, orbicular, c. 6 x 7 mm, apex rounded; stamens yellow > 30, in hemispherical cluster, joined in a torus c. 1 mm diam., filaments c. 0.5 mm long, anthers yellow, emarginate, 0.8 mm long, opening by apical slits. *Female flowers* with pedicel c. 9 mm long; ovary yellow-green to pink, obovoid, 19 x 7 mm, wings 3, pale green, subequal, 1.5 mm wide; tepals 5, white translucent, subequal, broadly elliptic-obovate, 13 x 7 mm, margins entire except at fringed, obtuse apex, outer surface and margins minutely translucent hairy; styles 3, c. 1 mm long; stigmas bifurcated, stigmatic surface a minutely papillose, orange yellow spiral band. *Fruits* with a stiff, decurved pedicel, c. 1.5 cm long, pale green flushed pink at base; capsule oblong, to 3.2 x 1.4 cm, sparsely translucent-hairy, locules 3, each with 2 placentae, dehiscing between wing and locule, wings 3, subequal, thin, broadest at apex, c. 4 mm wide, style caducous. *Seeds* cylindrical to obovoid, c. 0.3 x 0.2 mm, surface areolate, areoles more or less equal sided at base and apex and elongate along seed axis.

Distribution: Borneo – SARAWAK: endemic in the Subis limestone (G. Brangin, Niah Great Cave and Painted Cave areas).

Habitat: Below cave mouths, rooted in pockets of soil on ledges and in crevices on steeply sloping limestone rock or in light shade under canopy of small trees.

Notes: This robust and handsome begonia has large, asymmetric, velvety hairy leaves that sometimes have a bluish cast. The leaves are positioned more or less vertically against the limestone rock face in somewhat sheltered sites. It can be observed on limestone outcrops along the Plank Walk to the Painted Cave. It has been named for the type location - the Niah Caves. Its habit of drooping and upcurving stems and handsome, velvety leaves held vertically, give this species potential as an ornamental plant.

Specimens examined: SARAWAK: G. Brangin *Yii Puan Ching S40166* (SAR); Great Cave *J.A.R. Anderson, S. Tan & E. Wright S26075* (SAR, SING), *K.G. Pearce, Bibian Diway, Saupel Atot & Dami Jude S78537* (SAR); Near Sg Subis *K.G. Pearce S89460* (SAR).

3. *Begonia stichochaete* K.G.Pearce, *sp. nov.*

Section *Petermannia*

A *Begonia congesta* Ridl. foliis angustioribus seriebus setarum inter venas gerentibus, capsulis longioribus oblongis (non oblongo-ovoideis) differt. **Typus:** Subis, Niah Caves *Ahmad 14* (holo SAR; iso SING).

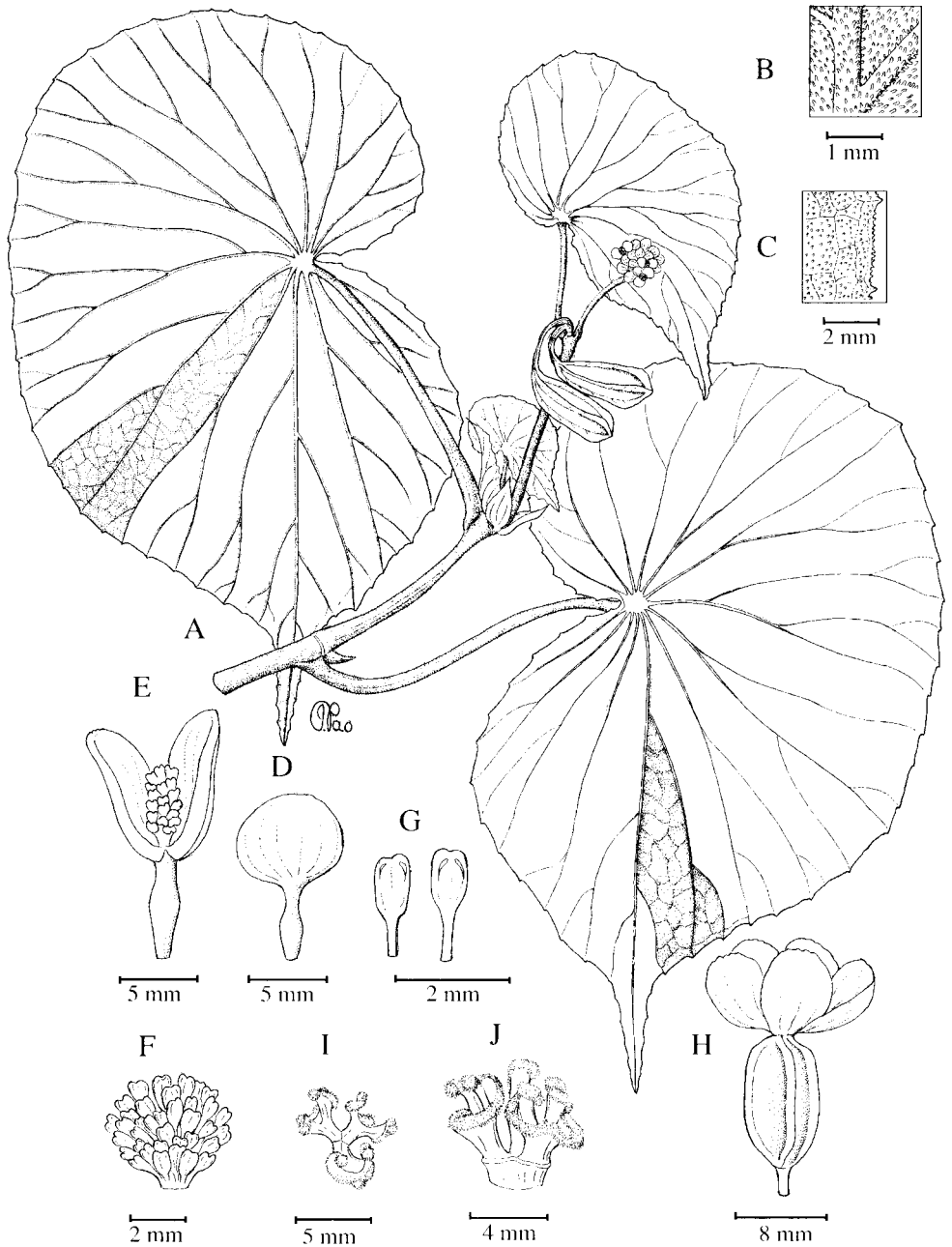


Figure 2. *Begonia niahensis*

A Habit, B Detail of leaf undersurface, C Detail of leaf margin and upper surface, D Male bud, E Male flower, F Androecium, G Stamens, H Female flower, I Style and stigma from above, J Style and stigma. (A—C from *Burt* 2009, D—I from *S89460*).

Figure 3

Erect herb rooting at the base of the stem and at nodes along the horizontal rhizome which creeps below the soil surface and gives rise to shoots at intervals. Indumentum of stiff trichomes to 2.2 mm long, each on a raised conical base, pale brown to pinkish brown to deep brownish red on stem, young petiole and veins on lower and upper lamina surfaces, dense on young stem and petiole, less so on stipule margin and sparse on outer surface of stipule midrib and on the main veins of the upper lamina surface, in a row or rows between each pair of veins and on and between the teeth of the dentate margin, moderately dense on the main veins of the lower leaf surface. Upright *stem* to c. 42 cm long, 5–9 mm diam., unbranched, internodes 2.5–5 cm long to 8 cm long at base of stem. *Stipules* oblong-ovate with a distinct midrib, 17 x 11 mm, margin entire, apex setose, caducous. *Leaves* spirally arranged; petiole 0.7 cm in upper leaves, to 2.5 cm in lower leaves; lamina at first yellowish green then medium green on upper surface (rarely dark blackish-green), lower surface paler yellowish green or olive-green or deep pink or red, asymmetric, irregularly obovate, 11–19 cm long, narrower side to 2.5 cm wide towards apex, curving inwards towards base and hardly or not lobed at base, broader side 6–7.5 cm wide with a cordate base and a rounded basal lobe to 17 mm long, margin irregularly serrate (appearing almost praemorse), each tooth setose, with several setae between each pair of teeth, apex toothed, venation pinnate, c. 4 pairs of veins, branching with another 1–3 veins in basal lobes, impressed above, prominent beneath. *Inflorescences* axillary, protogynous, erect cymose panicles to 3.4 cm long, of which the peduncle is 2.3 cm, with 1–2 female flowers at base with distally many male flowers crowded in a terminal cluster; bracts similar to stipules, deep red, 13 x 10 mm, persistent; bracteoles pale brown to deep pink, broadly ovate, to 12 x 12 mm, apex setose, persistent. *Male flowers* with a green to deep pink pedicel with deep pink bristles, 7 mm long; tepals 2 or 4, the outer pair translucent white flushed pink at margin and base, the inner pair translucent white, at first finely hairy on outer surface near base, broadly elliptic, c. 4 x 3 mm, margin entire, apex rounded; stamens pale yellow, c. 32, in an ovoid cluster, joined in a torus c. 1 mm diam., filaments to 1 mm long, anthers obovate, to 1.5 mm long, shortly apiculate, opening by terminal pores which develop into slits. *Female flowers* solitary or in pairs; pedicels 5 mm long, medium pink with minute appressed to slightly oblique hairs; ovary pale pink tinged green with deep pink bristles, oblong-obovoid, to 24 x 16 mm, wings 3, deep pink to translucent white with margins flushed pale pink, subequal, c. 7 mm wide; tepals 5, translucent white flushed pale pink at margins or palest pink, deeper pink at base and on marginal teeth with scattered deeper pink hairs, on outer surface sparsely hispid, oblong with rounded apex, inner two larger, c. 6 x 2–4 mm, margin toothed from near base to fringed apex; styles 3, free to base, 3 mm long, bifurcating; stigmas forming a continuous twisted band, yellowish-green to bright yellow. *Fruits* with stiff, decurved pedicels, 5–9 mm long; capsule oblong, to 29 x 18 mm.

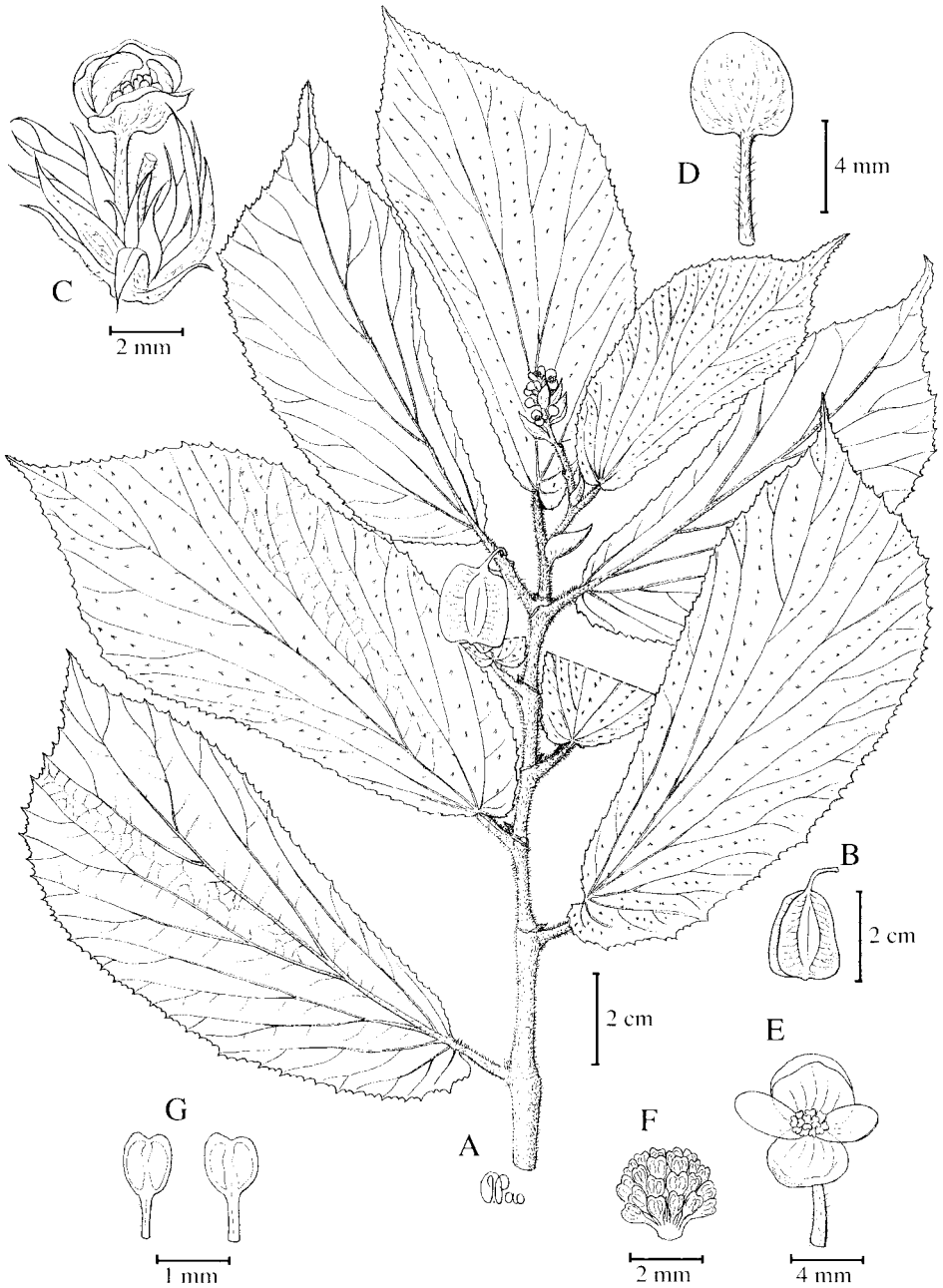


Figure 3. *Begonia stichochaete*

A Habit, B Fruit, C Male inflorescence, D Male bud, E Open male flower, F Androecium, G Stamens. (A from S40075, B from Ahmad 14, C–G from S89014).

sparsely hispid, minutely papillose, locules 3, each with 2 placentae, dehiscing between wing and locule, wings 3, subequal, thin, narrowed to base, truncate distally, two narrower wings to 5 mm wide at midpoint and 6 mm at apex, broader wing to 6 mm wide at midpoint to 7 mm at apex, style caducous. *Seeds* cylindrical-spherical, c. 0.3 x 0.25 mm, surface areolate, areoles more or less equal sided at base and apex and elongate along seed axis.

Distribution: Borneo – SARAWAK: endemic in the Niah National Park (Kuala Subis, the Sekaloh area and near the trail to Bukit Kasut).

Habitat: This species occurs both in limestone habitats and undisturbed Mixed Dipterocarp Forest on loamy soil or brown clay as well as in secondary forest on alluvial soil. On limestone, it grows on low outcrops with little soil and in soil at the base of limestone cliffs in deep shade and damp conditions, where it is locally frequent.

Notes: This erect begonia is characterised by its bristly leaves bearing rows of stiff hairs between the veins. It grows in shady sites, both on or near limestone outcrops and in forest away from the limestone. The species shows striking variation with the upper leaf surface ranging from mid-green to dark blackish-green. It is named for its bristly leaves.

Specimens examined: SARAWAK: Niah National Park *Bernard Lee S40075* (SAR), Kuala Niah near confluence with Sg Subis *K.G. Pearce, Bibian Diway, Saupel Atot & Dami Jude S78539* (SAR); Route to Bukit Kasut *K.G. Pearce & Narawi b. Johari S78597* (SAR); Sekaloh *Jemree Sabli S89014* (SAR), *K.G. Pearce S89267* (SAR).

4. *Begonia kasutensis* K.G.Pearce, *sp. nov.*

Section *Petermannia*

A Begonia conipila Irmsch. ex Kiew trichomatibus brevioribus sine basibus conicalibus, foliis suborbicularibus (non valde asymmetricis), punctis maculisque praesentibus, inflorescentiis contra folia insertis differt. **Typus**: Great Cave, Gunong Subis, Niah, Miri District *J.A.R. Anderson S31940* (holo SAR; iso SING).

Figure 4

Creeping herb with fibrous roots produced at the nodes. Stem and petiole with white minutely appressed hairs on distal end of petiole; main veins, lamina undersurface and margin with scattered pale orange-brown hairs to 0.7 mm long, more or less regularly arranged. *Leafy stem* to c. 15 cm long, 1.5 mm diam., not or hardly branched, internodes to 4 cm long. *Stipules* oblong-ovate with a distinct midrib, to 9 x 4 mm,

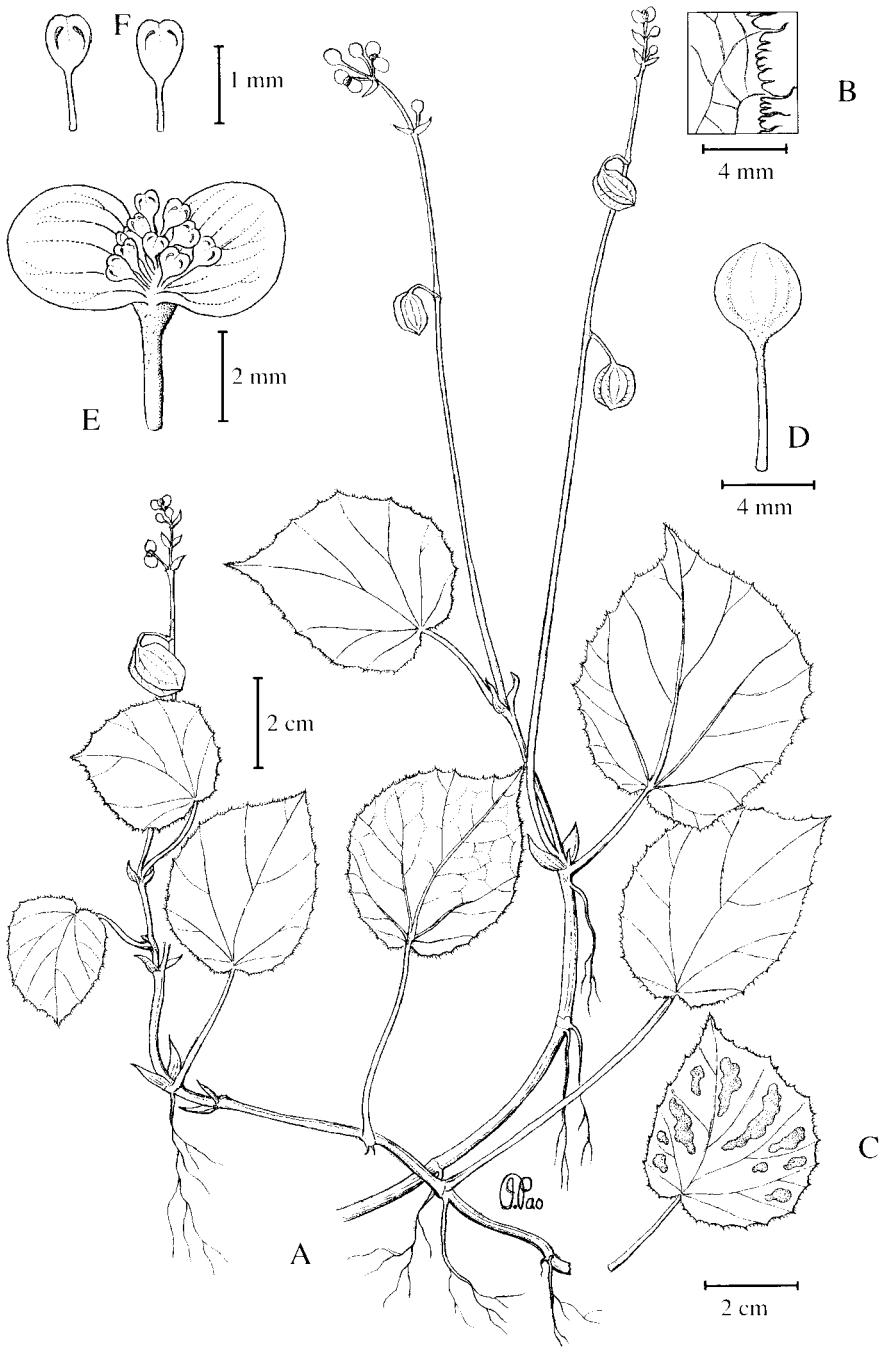


Figure 4. *Begonia kasutensis*

A Habit, B Detail of leaf margin, C Leaf showing variegation, D Male bud, E Male flower, F Stamens. (A & B from S31940, C from S27269, D-F from S31940).

margin entire, apex setose, caducous. *Leaves* spirally arranged; petiole 1.5 cm in upper leaves, to 3.8 cm in lower leaves; lamina minutely papillose above and beneath, variegated, upper surface slightly lustrous, olive to dark green with irregular spots and blotches of pale grey-green between veins, lower surface reddish, sometimes light green towards base, slightly asymmetric, sub-orbicular, 4.7–6.2 x 3.9–5.5 cm, base cordate with rounded basal lobes not overlapping, to 8 mm long, margin irregularly, indistinctly and distantly serrulate, apex cuspidate, venation palmate, main veins 2 pairs, the two 'middle' ones branching near mid-point or towards margin, with 1–2 veins in each basal lobe, sunken above, slightly prominent beneath. *Inflorescences* leaf-opposed, protogynous, racemes of cymules, to 11.5 cm long, including peduncle to 5.7 cm, with a single female flower at base and many male flowers distally; bracts similar to stipules, 4 x 2.5 mm, caducous; bracteoles pale green flushed pink, broadly ovate, 3.5 x 2 mm, apex setose, caducous. *Male flowers* with pink pedicel to 1 cm long; tepals 2, palest pink translucent, suborbicular, c. 7 x 4 mm, margin entire, apex rounded; stamens yellow, c. 20, in a more or less hemispherical cluster, joined in a torus 0.3 mm diam., filaments to c. 1 mm long, anthers bright yellow, c. 0.5 mm long, opening by pores, obovate, emarginate. *Female flower* not seen. *Fruits* with stiff, decurved pedicel, 7 mm long; capsule suborbicular, 1.6 x 1.2 cm, locules 3, each with 2 placentae, dehiscing between wing and locule, wings 3, unequal, thin, narrowed to base, truncate distally, the two narrower wings c. 1.5 mm wide, broader wing c. 2.5 mm wide, style caducous. *Seeds* cylindrical, c. 0.3 x 0.25 mm, surface areolate, areoles more or less equal sided at base and apex and elongate along seed axis.

Distribution: Borneo – SARAWAK: endemic in the Subis limestone (Niah Great Cave, Bukit Kasut and G. Subis).

Habitat: Infrequent, on limestone rock faces in shaded and dry crevices or in soil between limestone rocks on slopes of limestone hills up to where the canopy cover starts to thin out.

Notes: This decorative begonia is characterised by its diminutive, sub-orbicular variegated leaves that have a pink undersurface, and by its delicate inflorescences. Its small size and elegant features give it potential as an ornamental species. It has been named for Bukit Kasut, one of the locations where it occurs.

Specimens examined: SARAWAK: Subis *Ahmad No. 3* (SAR, SING); Niah Cave *Ahmad No. 65* (SING); Gunung Subis *Jemree Sabli S89049* (SAR); Southern slopes of G. Subis, near Sekaloh River *S. Tan & E. Wright S 27269* (SAR, SING); Route to Bukit Kasut *K.G. Pearce & Narawi b. Johari S78596* (SAR).

5. *Begonia subisensis* K.G.Pearce, *sp. nov.*

Section *Petermannia*

A *Begonia pendula* O. E. Schulz habitu majore caulibus erectis rigidisque, foliis setis inter dentes setiferos carentibus, fructibus latioribus oblongis differt. **Typus:** G. Subis 'in Sekaloh River', Niah, Miri District *J.A.R. Anderson, S. Tan & E. Wright S27574* (holo SAR; iso SING).

Figure 5

Cane-like, semi-herbaceous begonia with woody stems ascending, then held at 45°, drooping at apex, arising at intervals from a woody, branched rhizome c. 7–9 mm diam. bearing roots at the nodes, some stem bases bearing adventitious roots. Stem and petiole with minutely appressed brown hairs. *Stems* to >76 cm long, from 6 mm diam. at base to 1.5 mm at apex, bearing leaves only near apex, unbranched or with few branches, internodes 1.2 to >5 cm long. *Stipules* lanceolate, without a distinct midrib, 5.5 x 1.5 mm, margin entire, apex setose, caducous. *Leaves* spirally arranged; petiole 1–2.5 cm; lamina minutely papillose above and below, upper surface with a reflective sheen, medium to olive-green (those of young vegetative shoots variegated, olive-green with irregular spots of pale grey-green between veins), lower surface dull green or pinkish between veins to deep pink near veins, asymmetric, oblong-ovate, to c. 11.3 x 3.6–4.1 cm, lower half of leaf somewhat inwardly curved, base cordate with a rounded basal lobe to 1.3 cm long on one side, cuneate or slightly lobed at base on the other side, margin irregularly serrate, apex acute, venation pinnate-palmate, veins 3–4 pairs, branching except for the outermost two or three, flat or very slightly raised above, deep pink and prominent beneath. *Inflorescences* axillary, protogynous, cymose panicles held obliquely above the subtending leaf, axis pale to deep brownish pink, to 7.5 cm long with 1 or 2 female flowers at the base and up to 10 male flowers distally or sometimes, in the lower leaf axils, by reduction, only the female flowers present; bracts similar to stipules, 4 x 2.5 mm, caducous; bracteoles pale green flushed pink, lanceolate, 1.5 x 6 mm, apex setose, caducous. *Male flowers* with pink pedicel to 9 mm long; tepals 2, translucent white to palest pink, some flushed deeper pink at base, elliptic, 6.5 x 4 mm, margin entire, apex rounded; stamens yellow, to 26, in a more or less obovoid cluster, joined in a 1 mm-diam. torus, filaments c. 1 mm long, anthers yellow, obovate, emarginate. *Female flowers* on a peduncle to 3 mm long; pedicels deep pink to 2.5 cm long, glabrous; ovary oblong, truncate, 1.6 x 2 cm, wings 3, subequal, c. 6 mm wide; tepals 5, palest pink flushed deeper pink at base, ovate, the outer two smaller than the inner three, c. 9 x 5 mm, margin entire, apex obtuse, glabrous; styles 3, bifurcated, 2–3 mm long to bifurcation, stigmatic surface orange with fine colourless papillae forming a continuous, twisted band. *Fruits* with flexuous pedicels, to 3 cm long; capsule oblong, 14 x 23 mm, locules 3, equal, each with 2 placentae, dehiscing between wing and locule, wings 3, unequal, thin, narrowed to base, truncate distally, two narrower wings 10 mm wide, broader wing 11.5 mm wide, style caducous.

Seeds cylindrical, c. 0.4 x 0.25 mm, surface areolate, areoles more or less equal sided at base and distally, and elongate along seed axis above base.

Distribution: Borneo – SARAWAK: endemic in the Subis limestone (Niah Great Cave and Bukit Kasut).

Habitat: Locally frequent on limestone rock faces and the steep slopes of limestone hills in deep litter layer or between limestone rocks where the canopy cover starts to thin out.

Notes: The leaves of this attractive cane begonia have a reflective sheen on the upper surface and are deep pink below. The young plant has variegated leaves. The inflorescence is delicate and, in fruit, the capsule dangles on a long, flexuous pedicel. It has been named for the type locality, G. Subis.

Specimens examined: SARAWAK: Great Cave J.A.R. Anderson S31939, Bukit Kasut K.G. Pearce, Bibian Diway, Saupel Atot & Dami Jude S78538 (SAR).

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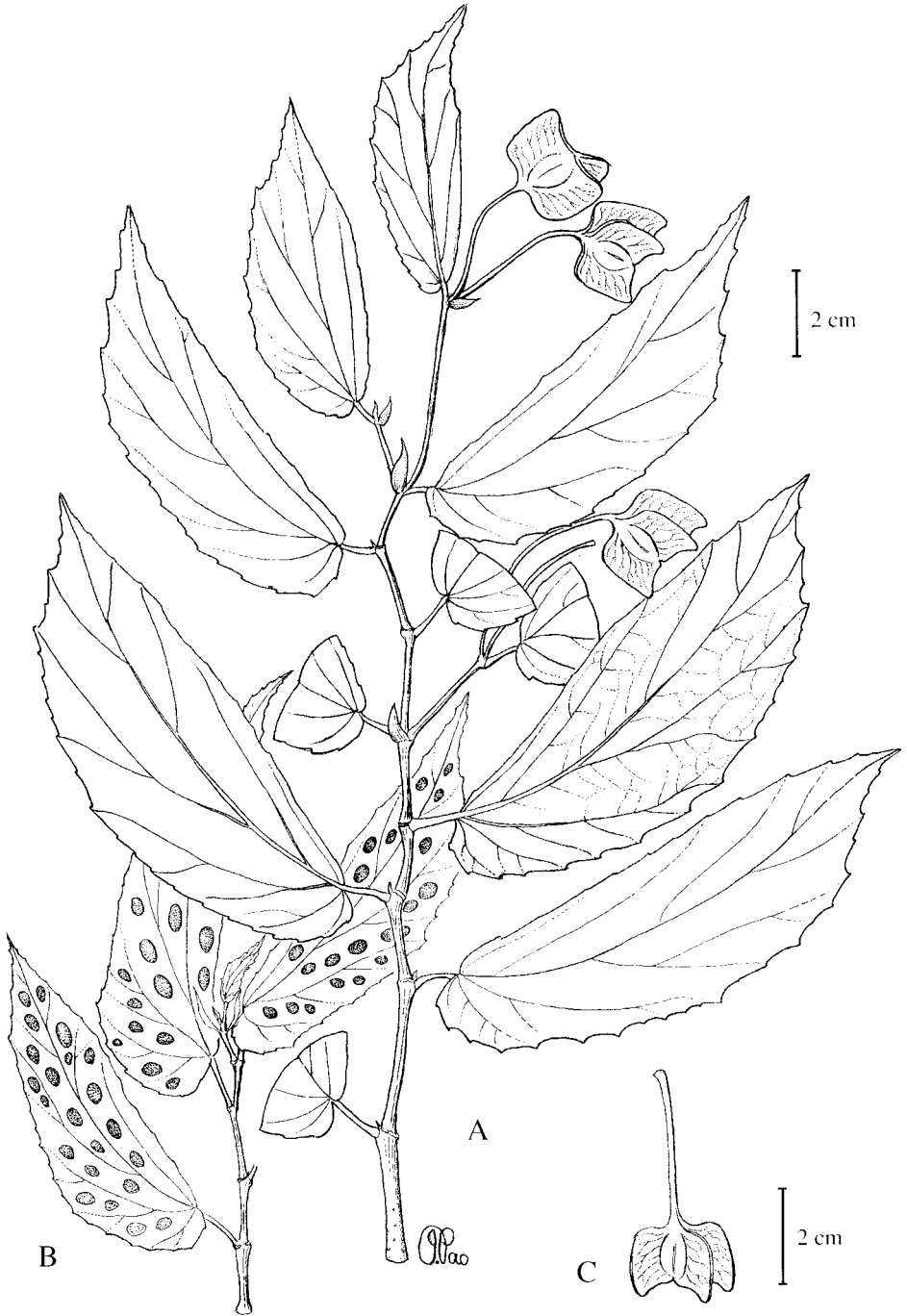


Figure 5. *Begonia subisensis*

A Habit, B Juvenile shoot with variegated leaves, C Fruit. (A & C from S27574, B from S78538).

Reference

- Anderson, J.A.R. 1965. Limestone habitat in Sarawak. *Symposium on Ecological Research in the Humid Tropics*. Kuching, Sarawak. Sarawak Government and UNESCO. pp. 49–57.