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Three new species of *Loxocarpus* (Gesneriaceae) from Sarawak, Borneo

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ABSTRACT. Three new species, *Loxocarpus burttii* T.L.Yao, *Loxocarpus littoralis* T.L.Yao and *Loxocarpus segelamensis* T.L.Yao are described from Sarawak, Malaysia.

Keywords. Borneo, Gesneriaceae, *Loxocarpus*, new species, Sarawak

Introduction

Loxocarpus R.Br. is a small genus consisting of 20 species distributed in Sumatra, Peninsular Thailand, Peninsular Malaysia and Borneo. The genus was previously included in *Henckelia* Spreng. (Weber & Burtt, 1998; Banka & Kiew, 2009) but was reinstated by Middleton et al. (2013) based on earlier phylogenetic studies (Weber et al., 2011). The species of *Loxocarpus* from Peninsular Malaysia were revised (as *Henckelia* sect. *Loxocarpus*) by Banka & Kiew (2009), although since then Yao et al. (2012) have described a new species from Kelantan. *Loxocarpus* is most diverse in Borneo, represented by nine species, and here a further three species are described.

All new species described here have a relatively long capsule (10–17.5 mm long). *Loxocarpus* was principally characterised by a short plagiocarpic capsule less than 10 mm long (Banka & Kiew, 2009). However, molecular phylogenetic studies (Yao, 2012) support the inclusion of several long-capsuled species which had been placed in *Didymocarpus* Wall. and *Henckelia*.

Loxocarpus burttii and *L. segelamensis* belong to the 'saintpaulioid' morphological group (Yao, 2012) which is confined to Borneo. Species in this group resemble *Saintpaulia* H.Wendl. (Gesneriaceae) and are characterised by their flat-faced corolla with a pair of exposed stamens. The short campanulate corolla with deltoid lobes observed in *L. littoralis* is shared with *L. argenteus* B.L.Burtt and *L. pauzii* T.L.Yao. All three new species are known only from a single locality each and *L. segelamensis* and *L. littoralis* are represented only by the type specimen.

New species

Loxocarpus burttii T.L.Yao, **sp. nov.**
This species is similar to *Loxocarpus verbeniflos* (C.B.Clarke) B.L.Burtt in its

relatively long capsules (10–12 mm long vs 9–20 mm long) and its usually ovate or elliptic lamina, but differs in its buff trichomes (not silvery) and adpressed trichomes along the petiole (vs spreading in *L. verbeniflos*). – TYPE: Borneo, Sarawak, Miri District, Lambir Hills National Park, below Bkt. Lambir, sandstone cliff, c. 1500 feet, 24 September 1978, *Burtt B11597* (holotype E; isotypes KEP, SAR). (Fig. 1, 2)

Rosulate herb with numerous crowded leaves. ***Rootstock*** woody, 2–4(–9.5) cm long, 4–6 mm thick; trichomes buff, adpressed, dense; adventitious roots long, wiry. ***Petiole*** base of withered leaves persistent. ***Stem*** lacking or distinctive, 1–2 cm long. ***Leaves*** alternate, crowded at the top; trichomes dense, buff, adpressed on petiole, equally dense on lamina above and beneath. ***Petiole*** relatively thick, (0.8–)2.8–3.8 cm long, 0.7–1.1 mm diam., grooved above; longest petiole about equal in length to the lamina. ***Lamina*** dark green above, paler beneath, moderately thick, ovate or elliptic or obovate, (2.5–)3.3–4.1 × (0.8–)1.3–1.5 cm; base cuneate, equal, margin entire or undulate, apex acute or blunt; midrib and veins obscure above, inconspicuous beneath, lateral veins 3 pairs. ***Inflorescence*** axillary, a reduced cyme with a single flower; trichomes buff, eglandular, shaggy, dense on peduncle and bracts; mixed with shorter glandular trichomes on pedicel. ***Peduncle*** slender, 4.5–6.5 cm long; bracts narrowly lanceolate, c. 1.5 × 0.3 mm, apex blunt; pedicel 0.5–0.9 mm long. ***Flower*** trichomes buff and eglandular, shaggy and dense on the outer surface of the calyx, less dense, shorter and erect on the outer surface of the corolla; dense on the ovary. ***Calyx*** green, upper lip 3-lobed, lower lip 2-lobed; lower lobes larger than the upper lobes, tube c. 0.6 mm long, c. 1 mm wide, lobes deltoid, apex acute, c. 1.4 mm long, base c. 0.5 mm wide. ***Corolla*** mauve, flat-faced, tube very short, c. 0.6 mm long, c. 1.1 mm wide; upper lip with 2 lobes c. 2.5 × 2.5 mm, lower lip with 2 lateral lobes c. 2.3 × 2 mm and a median lobe c. 3 × 2.3 mm; lateral and median lobes oblong. ***Fertile stamens*** 2, yellow; anthers projecting beyond corolla tube, exposed; filaments straight, thickened in distal half, c. 2.2 mm long; anthers coherent only at the ventral tip, kidney-shaped, c. 1.7 × 0.7 mm; staminodes 3, club-shaped. ***Nectary*** absent. ***Ovary*** narrowly conical or slightly oblique, c. 1.8 mm long, c. 1 mm wide; style curved upwards near the stigma, c. 3 mm long; stigma capitate, exposed. ***Capsule*** long slender conical, 10–12 mm long, 1.1–1.4 mm wide, style c. 1.5 mm long, sub-persistent; valves straight, splitting dorsally to form a trough; trichomes a mix of eglandular and glandular trichomes, adpressed to erect. ***Seeds*** not seen.

Distribution. Borneo, Sarawak, known only from Lambir FR, Bukit Lambir.

Habitat. Hill forest at c. 460 m asl. On sandstone cliffs or on acidic sandy soil.

Etymology. This species is named after the collector of the type, B.L. Burtt (1913–2008), a British botanist who collected extensively and is well known for his contributions to the taxonomy of the Old World Gesneriaceae.

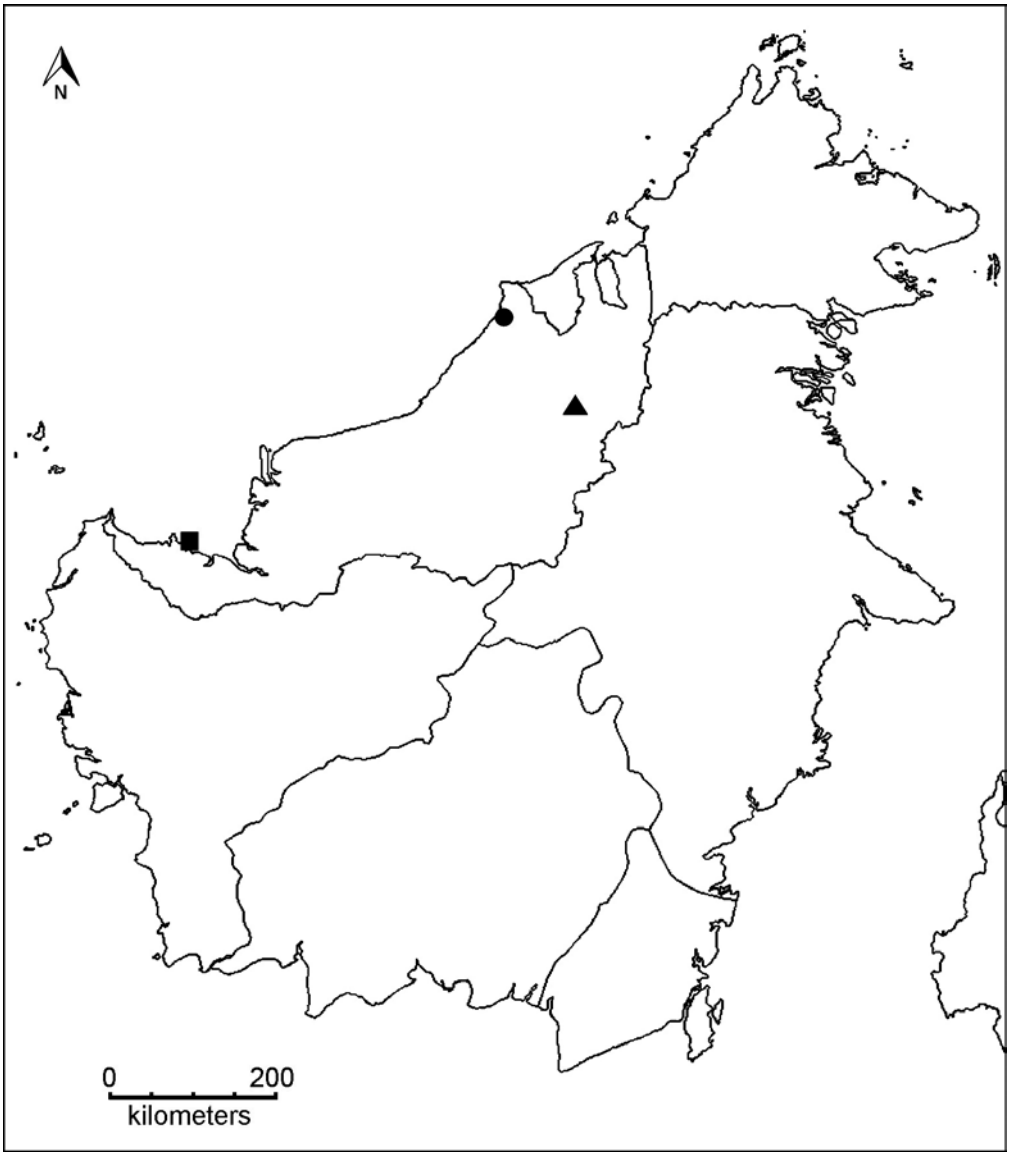

Fig. 1. Distribution map of *Loxocarpus burttii* T.L.Yao (●), *L. littoralis* T.L.Yao (■) and *L. segelamensis* T.L.Yao (▲).

Additional specimens examined. MALAYSIA: **Sarawak:** Bukit Lambir, 23 Oct 1993, *Ali & La Frankie AI 191* (SING [SING106370]); ibidem, 25 Oct 1993, *Ali & La Frankie AI 192* (SING [SING106371]); ibidem, 2 Nov 1976, *Ilias & Yeo S.38365* (K, KEP [KEP60951], SAR).

Note. A handwritten annotation by Burtt on the folder of the specimen selected here as the holotype mentioned that it is possibly a new species and listed *S.38365* as conspecific.

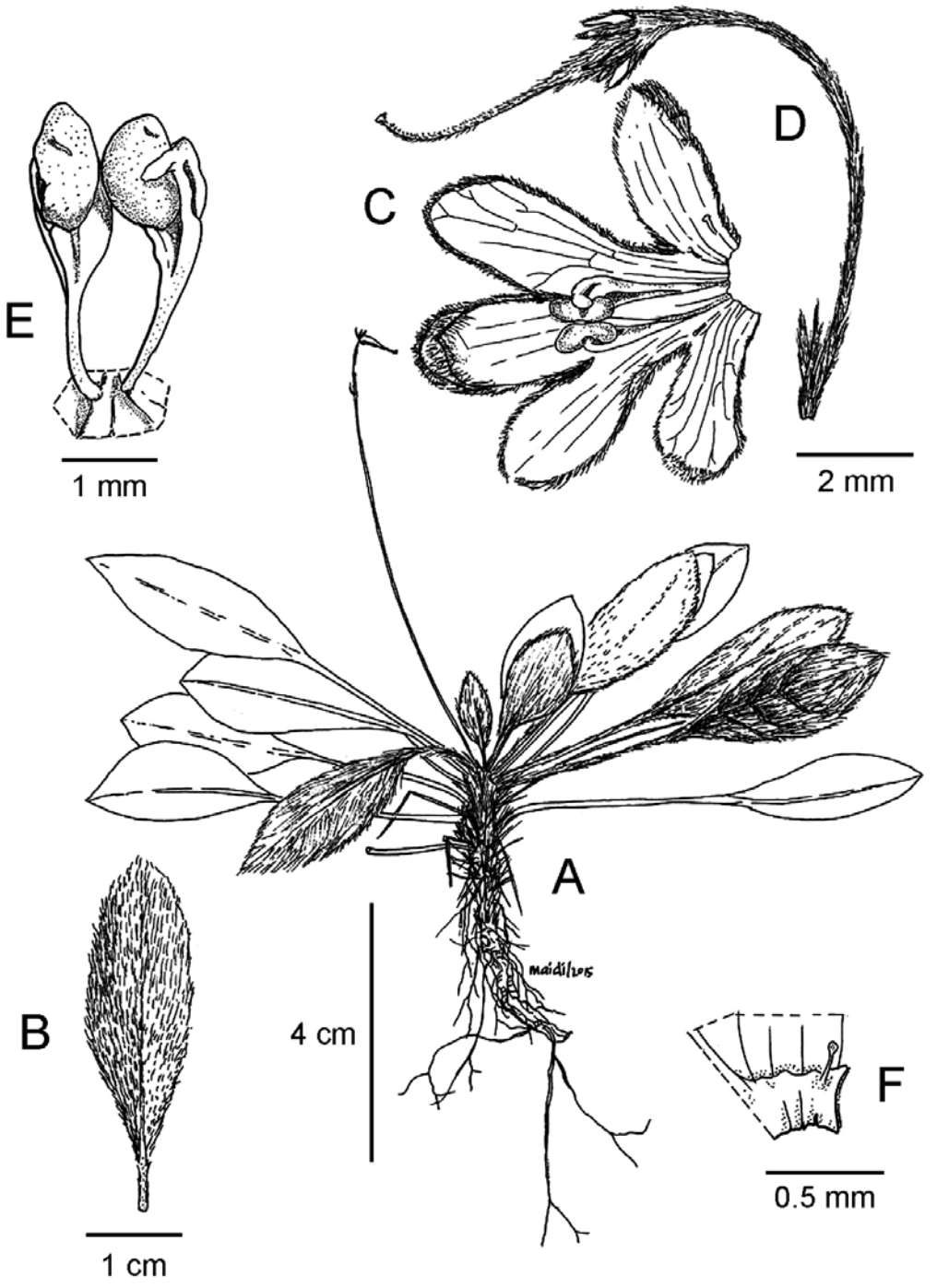

Fig. 2. *Loxocarpus burttii* T.L.Yao. **A.** Habit. **B.** Leaf. **C.** Corolla opened to show stamens. **D.** Bracts, calyx, ovary, style and stigma. **E.** Stamens. **F.** Staminode. Drawn by N. Mohamad Aidil from (A, B) *Burtt B11597,* and (C–F) *Ilias & Yeo S.38365*.

Loxocarpus littoralis T.L.Yao, **sp. nov.**
This species has a relatively long capsule similar to that of *Loxocarpus violoides* (C.B.Clarke) T.L.Yao (17 mm long vs 15–30 mm long) but differs in the dense spreading woolly trichomes on the lamina upper surface (not thin adpressed), grooved upper surface of the petiole (not terete), deltoid corolla lobes (not oblong) and conical capsule (not cylindric). – TYPE: Borneo, Sarawak, Kuching District, Tanjung Po, in deep shade on dripping wet rocks near the sea, 5 October 1955, *Brooke 10614* (holotype L [L645488]). (Fig. 1)

Rosulate herb. ***Rootstock*** woody, to 1 cm long, c. 3 mm thick or lacking; rootstock with buff trichomes; adventitious roots long, wiry. ***Petiole*** base of withered leaves caducous. ***Stem*** lacking. ***Leaves*** alternate, crowded at the top of the rootstock; trichomes buff, woolly and shaggy, dense on lamina above and less dense beneath. ***Petiole*** slender, c. 2 cm long, c. 1 mm thick, grooved above; longest petiole shorter than the lamina. ***Lamina*** moderately thick, ovate or broadly ovate, c. 2.5 × 1.7 cm; base cuneate or rounded, equal, margin shallowly serrate, apex blunt; midrib and veins obscure above, distinct beneath, lateral veins 3 pairs. ***Inflorescence*** axillary, a reduced cyme with a single flower; trichomes buff, shiny. ***Peduncle*** slender, c. 5 cm long; bracts narrowly lanceolate, c. 3 × 0.5 mm, apex acute; pedicel c. 3 mm long. ***Flower:*** corolla violet, tube short with deeply dissected lobes; upper lip with 2 upper lobes, lower lip with 2 lateral lobes and a median lobe; upper lobes smaller, lateral and median lobes larger, lobes recurved, deltoid. ***Capsule*** long, slender conical, c. 17 mm long, c. 2.5 mm wide; valves straight, splitting dorsally to form a trough. ***Seeds*** not seen.

Distribution. Borneo, Sarawak, known only from the type specimen from Tanjung Po (Bako NP).

Habitat. On dripping wet rocks near the sea in deep shade.

Etymology. It is named for its seashore habitat.

Note. There is only one fully opened flower on the type specimen which I decided not to dissect, thus preventing a fuller description of the calyx and corolla lobes. More material is needed.

Loxocarpus segelamensis T.L.Yao, **sp. nov.**
This species is similar to *Loxocarpus violoides* in the relatively long capsule (17.5 mm vs 15–30 mm long) and in the ovate laminas, but differs in its buff trichomes (not silvery), the longer lamina (c. 7.4 cm long vs up to 5.5 cm), and the presence of c. 10 inflorescences in flower at any one time, with each inflorescence bearing 3–7 flowers (vs 1–2 inflorescences per plant, bearing 1 or rarely 2 flowers). – TYPE. Borneo, Sarawak, Marudi District, Baram, Sungai Segelam, around Long Selatong Lepo Ga', on rocky ridge, 24 July 1977, *Chin 2797* (holotype KLU [KLU29970]). (Fig. 1, 3)

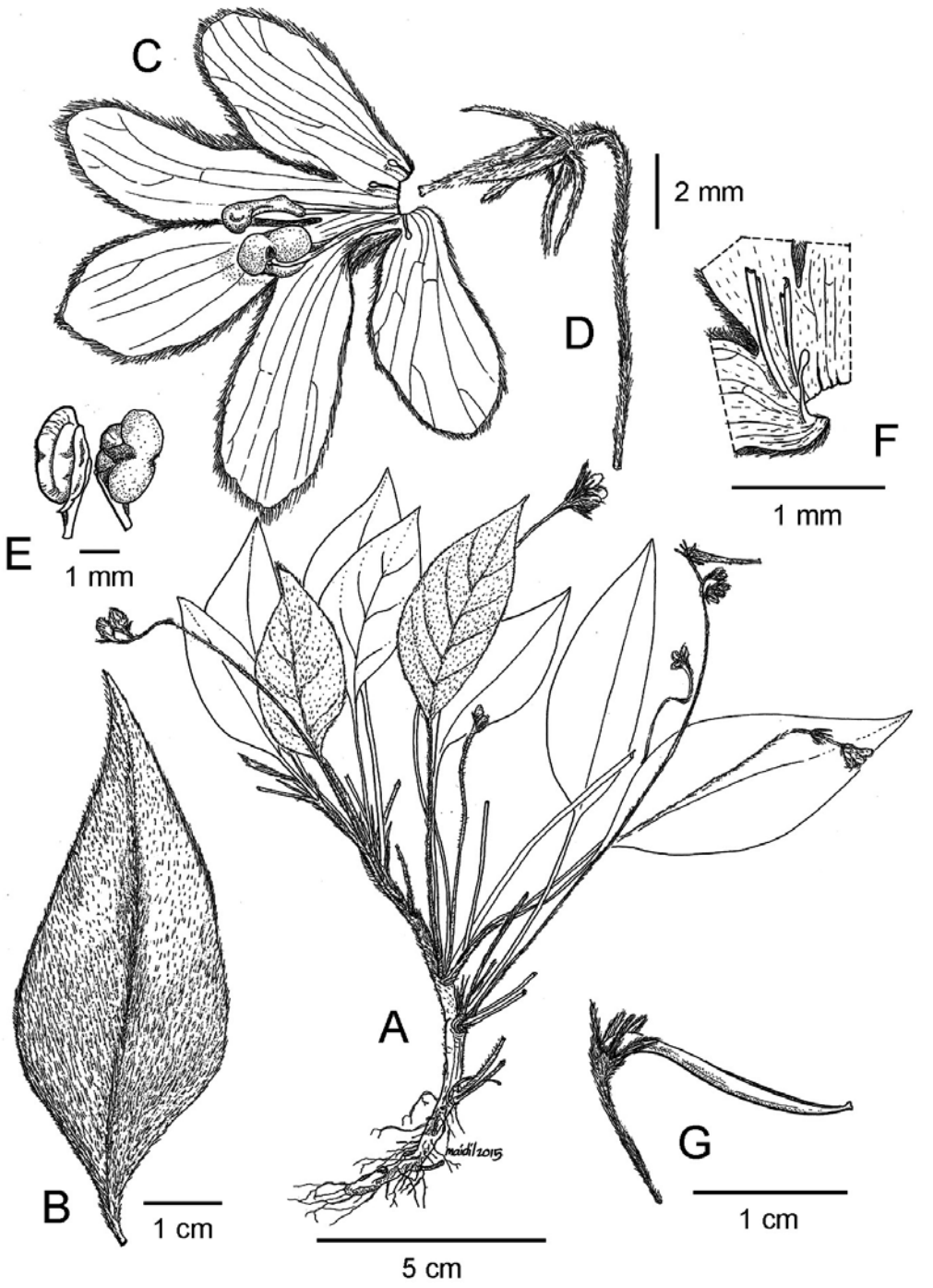

Fig. 3. *Loxocarpus segelamensis* T.L.Yao. **A.** Habit. **B.** Leaf. **C.** Corolla opened to show stamens. **D.** Calyx, ovary, style and stigma. **E.** Anthers. **F.** Staminode. **G.** Capsule. Drawn by N. Mohamad Aidil, all from *Chin 2797.*

Creeping herb with buff, shiny trichomes, stem decumbent. ***Rootstock*** c. 6 cm long, c. 2 mm thick; trichomes adpressed, dense; adventitious roots wiry. ***Petiole*** base of withered leaves persistent. ***Erect stem*** distinct, c. 8 cm long. ***Leaves*** alternate, below well-spaced, crowded at the top; trichomes adpressed, dense on petiole, on lamina above and beneath dense. ***Petiole*** slender, c. 6 cm long, terete; longest petiole about equal in length to the lamina. ***Lamina*** dark green above, paler beneath, thin, ovate, c. 7.4 × 2.9 cm; base cuneate, equal, margin finely serrulate, apex acuminate or acute; midrib and veins obscure above, distinct beneath, lateral veins 4(–5) pairs, lowermost pair arising from lamina base. ***Inflorescences*** axillary, a reduced cyme with a single flower or once branched, c. 10 per plant, flowers 3–7; trichomes eglandular, adpressed on peduncle, bracts and pedicel. ***Peduncle*** slender, 10.5–11.5 cm long; bracts linear, c. 4.4 × 0.4 mm, apex acuminate; pedicel to 1.2 mm long. ***Flower*** trichomes eglandular, adpressed on calyx, outer surface of the corolla and ovary, dense. ***Calyx*** green, upper lip 3-lobed, lower lip 2-lobed; lower lobes larger than the upper lobes, tube c. 1 mm long, c. 1.9 mm wide, lobes linear-lanceolate, apex thickened, blunt, c. 3.9 mm long, base c. 1 mm wide. ***Corolla*** pale blue, flat-faced, tube very short, c. 1.8 mm long, c. 2.9 mm wide; upper lip with 2 lobes c. 7 × 3.8 mm, divided to the base, lower lip with 2 lateral lobes, c. 5.6 × 3.5 mm and a median lobe c. 4.8 × 3 mm, lobes deeply divided; lateral and median lobes oblong. ***Fertile stamens*** 2, yellow; anthers projecting beyond the corolla tube, exposed; filaments straight, thickened in the distal half, c. 4.5 mm long; anthers coherent only at the ventral tip, kidney-shaped, c. 2.5 × 1.4 mm; staminodes 3, the two lateral club-shaped, the central a minute protrusion. ***Nectary*** absent. ***Ovary*** conical, slightly oblique, c. 2.8 mm long, c. 1.8 mm wide; style straight, c. 2.3 mm long; stigma capitate, exposed. ***Capsule*** slender cylindric, c. 17.5 mm long, c. 1.9 mm wide, style sub-persistent; valves straight, splitting dorsally to form a trough; trichomes eglandular, adpressed, dense. ***Seeds*** not seen.

Distribution. Borneo, Sarawak, known only from the type specimen from Ulu Long Selatong.

Habitat. On rocky ridge.

Etymology. It is named for its type locality, Sungai Segelam.

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