

TAXONOMIC REVISION OF GEESINKORCHIS (COELOGYNINAE; EPIDENDROIDEAE; ORCHIDACEAE)

SHIH-CHUNG HSU^{1,2}, BARBARA GRAVENDEEL¹ & ED F. DE VOGEL¹

SUMMARY

An updated taxonomic description of the orchid genus *Geesinkorchis* and a new identification key are given in addition to a distribution map, photographs and analytical drawings. Two new species (*G. quadricarinata* and *G. breviunguiculata*) are described from Borneo and Sumatra, respectively.

Key words: Coelogyninae, *Geesinkorchis*, Orchidaceae, Borneo, Sumatra, taxonomy.

INTRODUCTION

The orchid genus *Geesinkorchis* de Vogel (Coelogyninae; Epidendroideae) was first described in 1984 by De Vogel to commemorate the late botanist Rob Geesink. According to De Vogel (1984), the characters distinguishing *Geesinkorchis* from other genera in the Coelogyninae are the successively flowering inflorescences in combination with small flowers, floral bracts caducous at anthesis, few sterile bracts, and the presence of a minute, thin stipe. The latter structure was recently identified as a caudicle rather than a stipe (Hsu et al., unpubl. data). Although caudicles are common in other Coelogyninae, phylogenetic studies of the subtribe so far (Gravendeel, 2000; Gravendeel et al., 2001; Gravendeel et al., 2005) indicate that *Geesinkorchis* can be considered a separate genus, nonetheless.

In all publications on *Geesinkorchis* to date, only two species from Borneo are mentioned (De Vogel, 1986; Beaman et al., 2001; Wood, 2003). In the past decade, plant material was collected in Indonesia and Malaysia that did not match the existing descriptions (Beaman et al., 2001) and two new species of *Geesinkorchis* are published here together with an updated generic description.

TAXONOMIC TREATMENT

GEESINKORCHIS

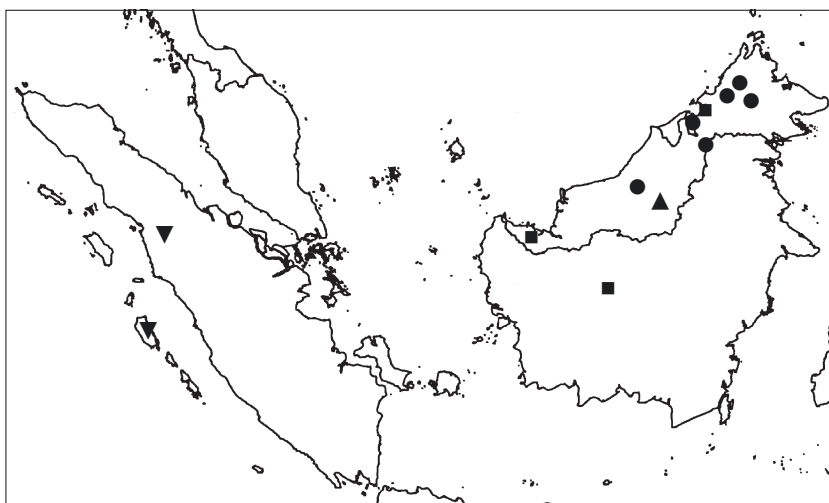
Geesinkorchis de Vogel (1984) 199–201; (1986) 43–44; T.E. Beaman et al. (2001) 324; J.J. Wood & P.J. Cribb (1994) 197. — Type species: *Geesinkorchis alaticalloso* de Vogel.

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Epiphytes (sometimes also terrestrial or lithophytic). *Roots* sparsely branched, puberulous. *Rhizome* creeping, sometimes branched. *Pseudobulbs* close together, elliptic or narrowly ovoid, flattened, with two to several longitudinal ridges. Scales of the young shoot triangular, imbricate, distichous, papyraceous to thin pergamentaceous, soon dry but long persistent, finally disintegrating into fine fibres, nerves many, apex acute. *Leaves* two per pseudobulb, petiolate; petioles deeply channelled; blade narrowly (ob)ovate, subcoriaceous to coriaceous, more or less stiff, main nerves prominent, other nerves much less so to rather indistinct, apex acute. *Inflorescence* terminal, erect, rigid, starting proteranthous, continuing to produce flowers in succession until long after the pseudobulb and leaves are fully developed. *Peduncle* erect, consisting of one internode, not elongating after anthesis, long, sturdy. *Rachis* elongating during anthesis, straight to zigzag; internodes short. Sterile bracts at base of the rachis absent or few, caducous at anthesis. *Floral bracts* entirely covering the young floral buds, closely imbricate, distichous, pergamentaceous to papyraceous, caducous at anthesis, triangular, with several groups of minute, stellately arranged uniseriate hairs inside, folded along the midrib; nerves many, fine, apex acute. *Flowers* up to 150, opening in succession from the base upwards, one or two open at the same time, widely opening; lip mostly turned downward. *Pedicel* curved, terete to more or less angular. *Ovary* more or less angular with 3 rather prominent ribs. *Median sepal* deeply concave, ovate, hairy inside just like the floral bracts; midrib prominent; apex acute. *Lateral sepals* oblique, ovate to ovate-elliptic, hairy inside just like the floral bracts, concave in the basal half, midrib usually prominent and keel-like, apex acute. *Petals* linear, sometimes oblique, curved or slightly rolled backwards, nerves 3, apex rounded to truncate. *Lip* pandurate when flattened. *Hypochilium* base saccate, hairy or glabrous, with or without keels, lateral lobes triangular or spatulate, often oblique, apex curved upward or erect or curved downward. *Callus* starting from or beyond the hypochilium base, ending on the claw or at the base of the epichilium, consisting of two or four lateral keels, usually curved inward, and sometimes also a central erect ridge. *Epichilium* spatulate, distinctly or indistinctly clawed; blade usually channelled, erect along the midvein or more or less flat; margin irregular, apex acute, broadly rounded, or retuse and 2-lobed when flattened. *Column* hood-like, curved or straight in lateral view, base with or without a swollen transverse ridge, apex acute to broadly acute or truncate when flattened, with lateral lobes or teeth, margin irregular. *Anther* oblong-ovate to broadly ovate-triangular in outline, erect or incumbent, base cordate, apex acute to acuminate, recurved or straight. *Pollinarium* consisting of a caudicle bearing 4 pollinia. Caudicle elastic when fresh, with or without lateral lobes attached to the base of each pair of pollinia and always with a minute, elastic band attached to the centre of each pollinium. *Pollinia* obliquely elliptic, with a shallow depression where connected to the caudicle. *Stigma* cup-shaped, ovate to triangular in outline, rostellum bifid, not clearly separated from the stigma. *Capsule* ellipsoid; ribs 6, juga 3, flat and band-like, valvae 3, entire, in the centre elevated in longitudinal keels; perianth fragments and the column persistent on the apex. *Seeds* small, many, fusiform.

Distribution — Borneo (three species) and Sumatra including Mentawi Islands (one species). See Map 1.



Map 1. Distribution of *Geesinkorchis alaticcallosa* de Vogel (●), *G. phaiostele* (Ridl.) de Vogel (■), *G. quadricarinata* Shih C. Hsu, Gravend. & de Vogel (▲) and *G. breviunguiculata* Shih C. Hsu, Gravend. & de Vogel (▼).

Habitat & Ecology — Epiphytes, sometimes growing on the ground or on rocks, in montane forest or kerangas vegetations on podsolic soils in the shade to full sun, between 400–2000 m above sea level.

Conservation status — *Geesinkorchis quadricarinata* and *G. breviunguiculata* are known from few collections only and must be considered rare. *Geesinkorchis alaticcallosa* and *G. phaiostele* are locally common in Brunei, Sarawak, Sabah, and Kalimantan, but suitable habitats are rapidly decreasing.

Artificial hybrids — None registered.

KEY TO THE SPECIES

- 1a. Callus on the lip with a central erect ridge. Column base without a swollen transverse ridge **1. *G. alaticcallosa***
- b. Callus on the lip without a central erect ridge. Column base with a swollen transverse ridge **2**
- 2a. Epichilium apex deeply retuse when flattened. Anther incumbent. Column hood with two incurved lateral lobes with rounded apex **2. *G. phaiostele***
- b. Epichilium apex rounded to acute when flattened. Anther not incumbent. Column hood with two flattened lateral teeth with acute apex **3**
- 3a. Epichilium 5.3–5.7 by 7.2–8 mm, broadly triangular-ovate, apex acute; claw 1.9–2.1 mm long. Callus with four keels, two longer ones on the hypochilium, two shorter ones on the claw **3. *G. quadricarinata***
- b. Epichilium 3.3–4.1 by 3.8–4.2 mm, suborbicular, apex rounded; claw 0.3–0.6 mm long. Callus with two keels **4. *G. breviunguiculata***

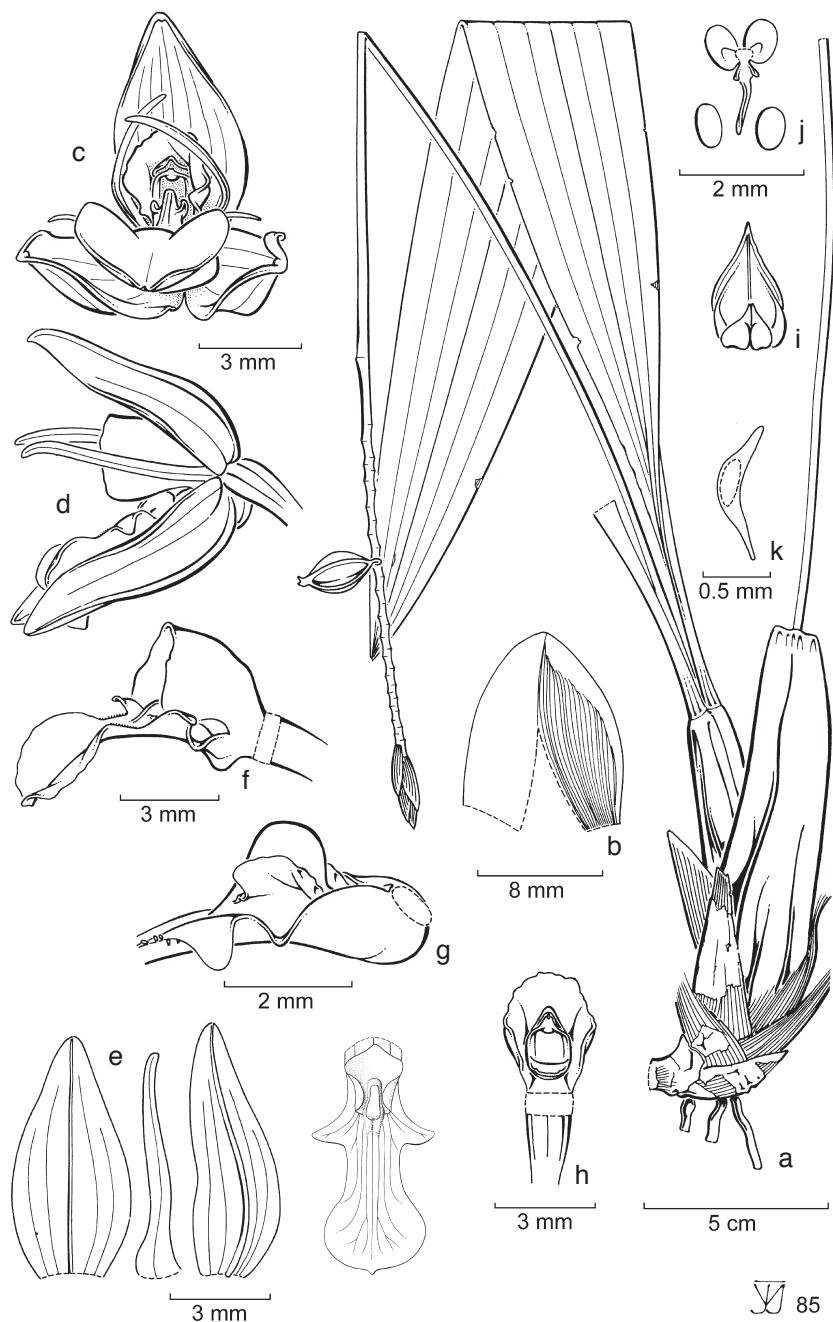


Fig. 1. *Geesinkorchis alaticullosa* de Vogel. a. Habit; b. floral bract; c. flower, frontal view; d. flower, side view; e. dorsal sepal, petal, lateral sepal, and lip; f. flower with sepals and petals removed, side view; g. lip, side view; h. column; i. anther; j. pollinia; k. seed (a–e: *Leiden cult.* 30182; f–k: *Geesink* 8965). Drawings Jaap Jan Vermeulen and Barbara Gravendeel.

1. *Geesinkorchis alaticcallosa* de Vogel — Fig. 1, Plate 1a

Geesinkorchis alaticcallosa de Vogel (1984) 201; (1986) 44; T.E. Beaman et al. (2001) 324; J.J. Wood & P.J. Cribb (1994) 197. — Type: *Geesink* 8965 (holo L; iso BO), Indonesia, Borneo.

Plant 50–80 cm high. Roots up to 25 cm long, 1–3.5 mm diameter. *Pseudobulbs* ovate-elliptic, rather sturdy, (5–)7.5–9.5(–12) cm long. Scales of the young shoot 4–10, smallest one 1.5–3.5 cm long, longest one 5–8 cm long, nerves 60–80. *Petiole* 3–10 cm by 2–4 mm. *Leafblade* 16–32 by 2.5–5 cm, main nerves 3–7. *Inflorescence* producing up to 75 flowers. *Peduncle* 27–43 cm long, 3–4 mm diameter. *Rachis* 17–27 cm long, internodes 3–6 mm long. *Floral bracts* 13–15.5 by 9–11.5 mm when flattened, nerves 27–34. *Pedicel* 0.5–0.8 mm diameter. *Ovary* 1.2–1.6 mm diameter. *Median sepal* 7–8 by 3.5–4 mm, nerves 7–9. *Lateral sepals* obliquely ovate-oblong, 7–10 by 2.5–4 mm, nerves 5–7. *Petals* curved backward in apical third, 7.7–9 by c. 1 mm. *Lip* 7–9 mm long when flattened. *Hypochilium* 3.2–4 mm long, base 1–1.2 by 2–3.1 mm, 1–1.4 mm deep, with simple hairs inside, without keels, lateral lobes more or less triangular, 1.5–2 by 1.5–2 mm, width over the lateral lobes 5.5–6.5 mm, margin glabrous, apex rounded, curved downwards. *Callus* consisting of a keeled, elevated ridge, in lateral view oblique semi-ovate, in front shallowly grooved, starting from the hypochilium base and extending up to halfway onto the claw, 4–4.5 by 1.6–1.9 mm; keels 2, running from the base of the callus to halfway the hypochilium, in front gradually lowering, 3.5–3.8 mm long, 0.5–1 mm high; ridge abruptly ascending at the basal third of the callus, abruptly descending at the middle of the callus while dividing into two keels reaching up to halfway the claw, 2.7–3 mm long, 1–1.5 mm high, 0.3–0.4 mm thick, apex glabrous. *Epichilium* broadly and shortly spatulate when flattened, 3.6–6.1 mm long, widest part 3–6 mm wide, claw 1.1–1.9 by 2–3.4 mm, its margin covered by minute warts, blade when flattened 2.5–4.2 by 3–6 mm, medially channelled, laterally somewhat convex, margin slightly irregular, apex rounded to broadly acute. *Column* straight in lateral view, 3.8–4.6 by 2.2–3 mm, 2–3.4 mm deep, base without a swollen transverse ridge; column hood not lobed, margin more or less entire, curved inward, apex truncate. *Anther* oblong-ovate in outline, 1.9–2.3 by 1.3–1.5 mm, not incumbent, apex acute, straight. *Pollinia* 0.6–0.8 by 0.35–0.5 mm. Caudicle 1.3–1.8 by 0.3–0.4 mm, with two oblong lateral lobes connected to the base of the pollinia, 0.25–0.35 by c. 0.1 mm. *Stigma* including rostellum ovate in outline, 2.3–2.7 by 1.5–1.8 mm; rostellum triangular, apex acute. *Capsule* 16–20 by 8–11 mm. *Seeds* 0.5–1 by 0.2–0.3 mm.

Distribution — Borneo: Brunei, Kalimantan, Sabah, Sarawak.

Altitude — 400–1000 m.

Notes — 1. The epithet *alaticcallosa* (which is Latin for with a winged callus) refers to the central erect ridge on the callus which is ornamented with two keels.

2. Pedicel and ovary apple green; sepals and petals light yellow; lip white or light yellow, tinged reddish brown; callus white, tinged reddish brown; column chocolate brown to dark maroon; anther rusty brown. Sweet smell.

3. This species can easily be recognized by the central erect ridge of the callus of the hypochilium.

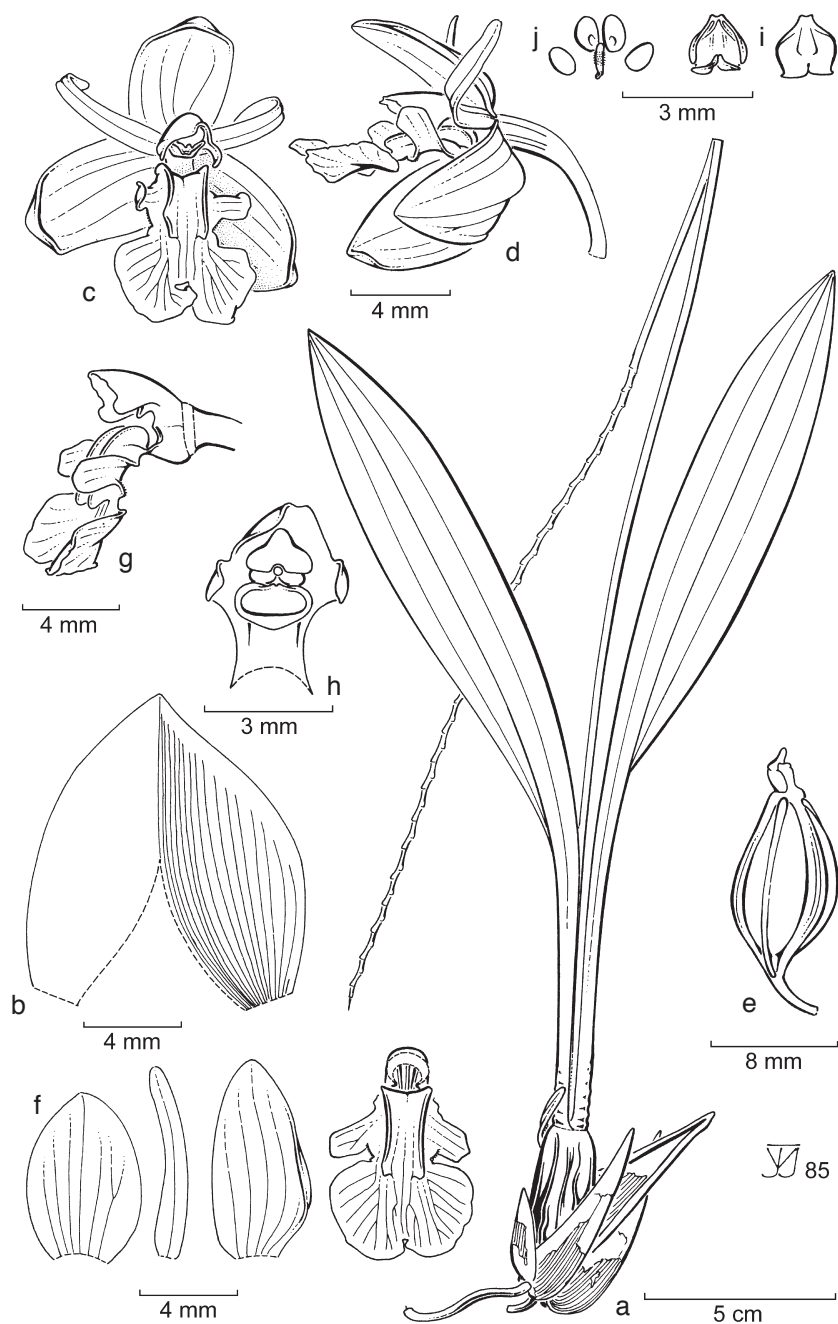


Fig. 2. *Geesinkorchis phaiostele* (Ridl.) de Vogel. a. Habit; b. floral bract; c. flower, frontal view; d. flower, side view; e. capsule; f. dorsal sepal, petal, lateral sepal, and lip; g. flower with sepals and petals removed, side view; h. column; i. anther; j. pollinia (all: *Leiden cult.* 22090). Drawing Jaap Jan Vermeulen.

2. *Geesinkorchis phaioatele* (Ridl.) de Vogel — Fig. 2, Plate 1b

Geesinkorchis phaioatele (Ridl.) de Vogel (1984) 198; (1986) 45; T.E. Beaman et al. (2001) 324; J.J. Wood & P.J. Cribb (1994) 199. — *Coelogyne phaioatele* Ridl. (1910) 51. — Lectotype: *Lewis s.n.* (K), Malaysia, Borneo, June 1909.

Coelogyne ridleyana Schltr. (1910) 561. — Type: *Brooks 14* (holo BM; iso K), Malaysia, Borneo. *Pholidota triloba* J.J. Sm. (1931) 105. — Type: *Clemens & Clemens 20398* (holo L; iso NY), Indonesia, Borneo.

Plant 25–60 cm high. Roots up to 25 cm long, 1–3 mm diameter. *Pseudobulbs* elliptic-oblong, very slender to short and thick, 3–8(–24) cm long. Scales of the young shoot 5–11, smallest one 0.5–1 cm long, longest one 6.5–12.5 cm long, nerves 45–80. *Petiole* 3–17.5 cm by 2–4 mm. *Leaf blade* 6.5–30 by 1.3–4.2 cm, main nerves 3–5. *Inflorescence* producing 50 to over 100 flowers. *Peduncle* 8–33 cm long, 1.5–3 mm diameter. *Rachis* 20–35 cm long, internodes 3–5 mm long. *Floral bracts* 12–17 by 8–13 mm when flattened, nerves 30–47. *Pedicel* 0.3–0.5 mm diameter. *Ovary* 0.7–1.2 mm diameter. *Median sepal* 5.5–8.4 by 3–5 mm, nerves 5–7. *Lateral sepals* obliquely ovate to ovate-elliptic, 5.2–10 by 2.3–5.2 mm, nerves 5 or 6. *Petals* rather strongly curved backward in apical third, 5–8 by 0.5–1.5 mm. *Lip* 4.5–10 mm long when flattened. *Hypochilium* 3–4 mm long, base 1–2 by 1–1.6 mm, 1–1.5 mm deep, glabrous, with or without 3 short keels, lateral lobes (obliquely) spatulate, 0.5–2.3 by 0.5–1.2 mm, width over the lateral lobes 2–7 mm, margin near the claw with many minute warts, apex rounded to truncate, curved upwards. *Callus* consisting of two keels but without an erect central ridge, starting beyond the hypochilium base and ending at the base of the epichilium, 4–5.4 by 2–2.3 mm, keels running along the whole length of the callus, 3–4 mm long, 0.7–1 mm high, apex covered by minute warts. *Epichilium* broadly ovate when flattened, 3–4.9 mm long, widest part 5–6 mm wide, its margin covered by minute warts, claw 0.8–1.1 by 1.8–3 mm, covered by many minute warts, blade when flattened 2.7–4 by 4–5 mm, median channelled, curved downward at apical half part, margin irregular, wavy, apex retuse, lobules often curved upward, slightly overlapping. *Column* straight in lateral view, 3–4.5 by 2.3–3 mm, 2–2.5 mm deep, base with a swollen transverse ridge; column hood 3-lobed, median lobe with broadly rounded apex, margin slightly irregular serrate, lateral lobes elliptic, curved inward, apex rounded. *Anther* broadly ovate-triangular in outline, 1–1.2 by 1–1.2 mm, incumbent, apex acute, truncate when flattened, folded along the midvein and recurved. *Pollinia* 0.5–0.7 by 0.3–0.4 mm. Caudicle 0.6–0.75 by c. 0.2 mm, minutely branched at the apex where connected to the pollinia. *Stigma* including rostellum ovate in outline, 0.8–1.5 by 1–1.5 mm; rostellum broadly triangular, apex acute. *Capsule* c. 12 by c. 7.5 mm. *Seeds* up to 1 mm long.

Distribution — Borneo: Kalimantan, Sarawak.

Altitude — 750–2000 m.

Notes — 1. The epithet *phaioatele* (which is Latin for dark column) refers to the maroon column.

2. Pedicel and ovary pink; sepals and petals light yellow; lip white, with small central brownish tinged patch; callus white; column light brown to very dark maroon; anther orange brown. Sweet smell.

3. This species can easily be recognized by the retuse apex of the epichilium and column hood with incurved lateral lobes with rounded apex.

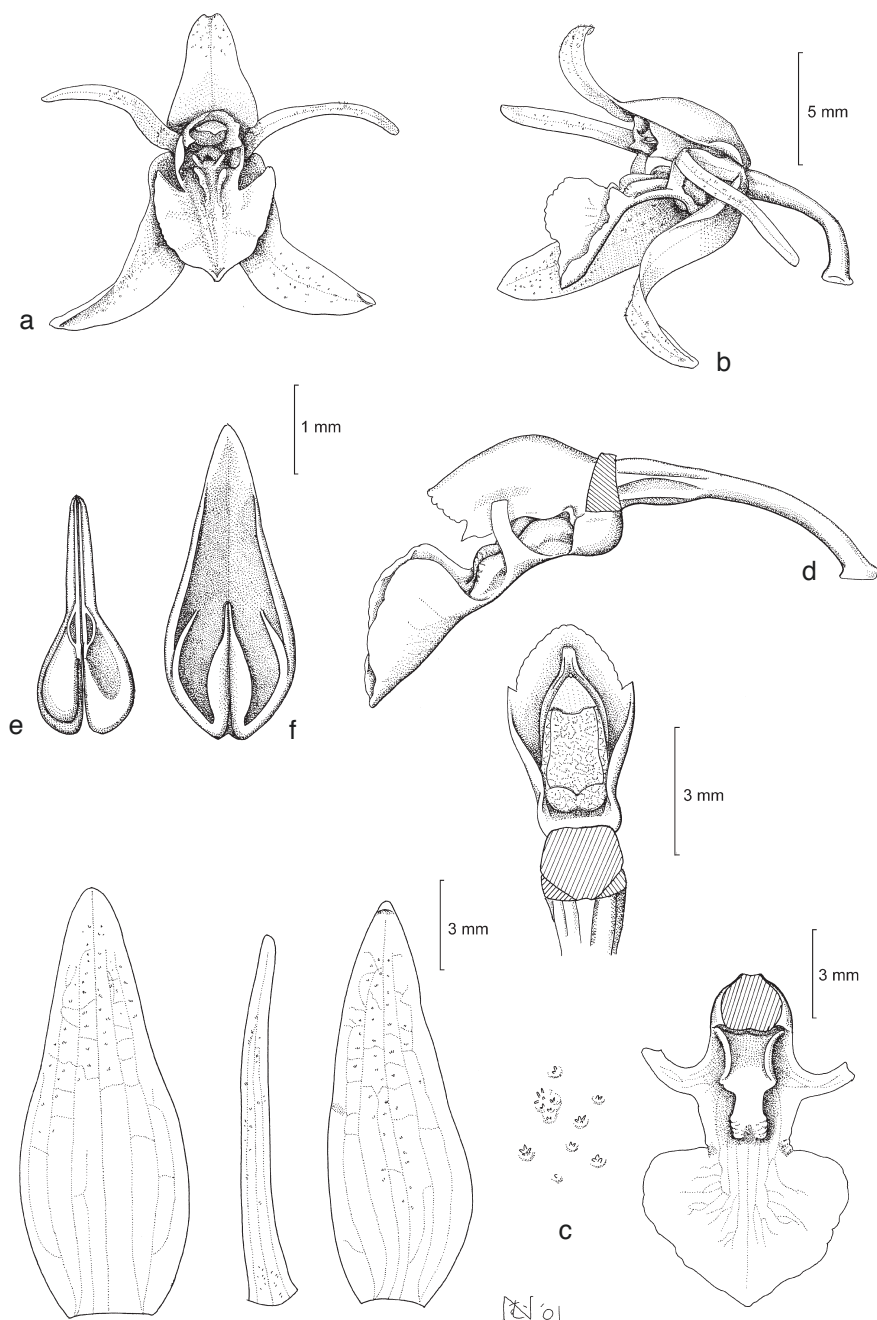


Fig. 3. *Geesinkorchis quadricarinata* Shih C. Hsu, Gravend. & de Vogel. a. Flower, frontal view; b. flower, side view; c. dorsal sepal, petal, lateral sepal with magnification of hairs inside, and lip; d. flower with sepals and petals removed, side view; e. pollinia; f. anther (all: *Leiden cult.* 914139). Drawing Mutsuko Nakajima.

3. *Geesinkorchis quadricarinata* Shih C. Hsu, Gravend. & de Vogel, *spec. nov.* — Fig. 3, Plate 1c

Labelli callus carinis lateralibus quatuor, duabus longioribus in hypochilio, brevioribus in ungue. Epichilium late triangulare ovatum apice acuto. — Typus: *Leiden cult. 914139* (de Vogel) (holo L), Malaysia, Borneo, Sarawak, Hose Mountains.

Sterile parts not seen. *Inflorescence* not seen. *Floral bracts* 18–22 by 9.5–12.5 mm when flattened, nerves 28–35. *Pedicel* 0.75–0.9 mm diameter. *Ovary* 1.4–1.6 mm diameter. *Median sepal* 12–13.5 by 4.9–5.2 mm, nerves 7. *Lateral sepals* slightly oblique-ovate, 12–13 by 3.7–4.3 mm, nerves 5–7. *Petals* curved backward, 11.5–12.2 by 0.9–1 mm. *Lip* 10.5–11 mm long when flattened. *Hypochilium* 3.5–4 mm long, base 0.7–0.9 by 2.3–2.7 mm, 0.5–0.7 mm deep, glabrous, without keels, lateral lobes spatulate, 2.3–2.6 by 0.7–0.8 mm, width over the lateral lobes 7.4–7.8 mm, margin glabrous, apex rounded to truncate, curved backwards. *Callus* consisting of four lateral keels but without an elevated central ridge, starting from the hypochilium base and ending at the base of the epichilium, 4.6–4.9 by 1.35–1.55 mm, two basal lateral keels starting beyond the base of the callus and ending at the apex of the hypochilium, sometimes slightly extending onto the claw, 2.5–2.7 mm long, 0.5–0.7 mm high, two frontal lateral keels semi-elliptic in lateral view, starting at more or less the middle of the claw and ending at the apex of the claw, sometimes extending onto the epichilium, 0.8–1.1 mm long, 0.4–0.5 mm high, apex glabrous. *Epichilium* broadly ovate when flattened, 5.3–5.7 mm long, widest part 7.2–8 mm wide; claw 1.9–2.1 by 2.9–3.3 mm, glabrous, blade when flattened 5–5.5 by 7.5–8 mm, folded along the midvein, margins slightly irregular, apex acute to rounded. *Column* more or less curved in lateral view, 5–5.45 by 3.2–3.6 mm, 2.6–2.75 mm deep, base usually with a swollen transverse ridge; column hood not lobed, margin irregular, lateral sides with two small triangular teeth with acute apex, apex broadly acute. *Anther* oblong-ovate in outline, 3.4–3.7 by 1.5–1.7 mm, not incumbent, apex acuminate, straight. *Pollinia* 0.9–1.1 by 0.48–0.6 mm. Caudicle 1.8–2 by 0.3–0.4 mm, with two elliptic lateral lobes connected to the base of the pollinia. *Stigma* including rostellum more or less triangular in outline, 3.4–3.8 by 1.6–1.8 mm; rostellum triangular, apex acute. *Capsule* not seen.

Distribution — Borneo: Sarawak (Bahagian Kapit).

Altitude — 800–1000 m.

Notes — 1. The epithet *quadricarinata* (which is Latin for four-keeled) refers to the number of keels of the callus on the lip.

2. Pedicel and ovary green; sepals and petals brownish ochre; lip yellowish cream, with two brown lines bordering the front of the raised median band with the keels; column hood dark brown, stigma ochreous. Smell not recorded.

3. This species can easily be recognized by the four keels of the callus; two on the hypochilium and two on the claw, and the broadly triangular-ovate apex of the epichilium.

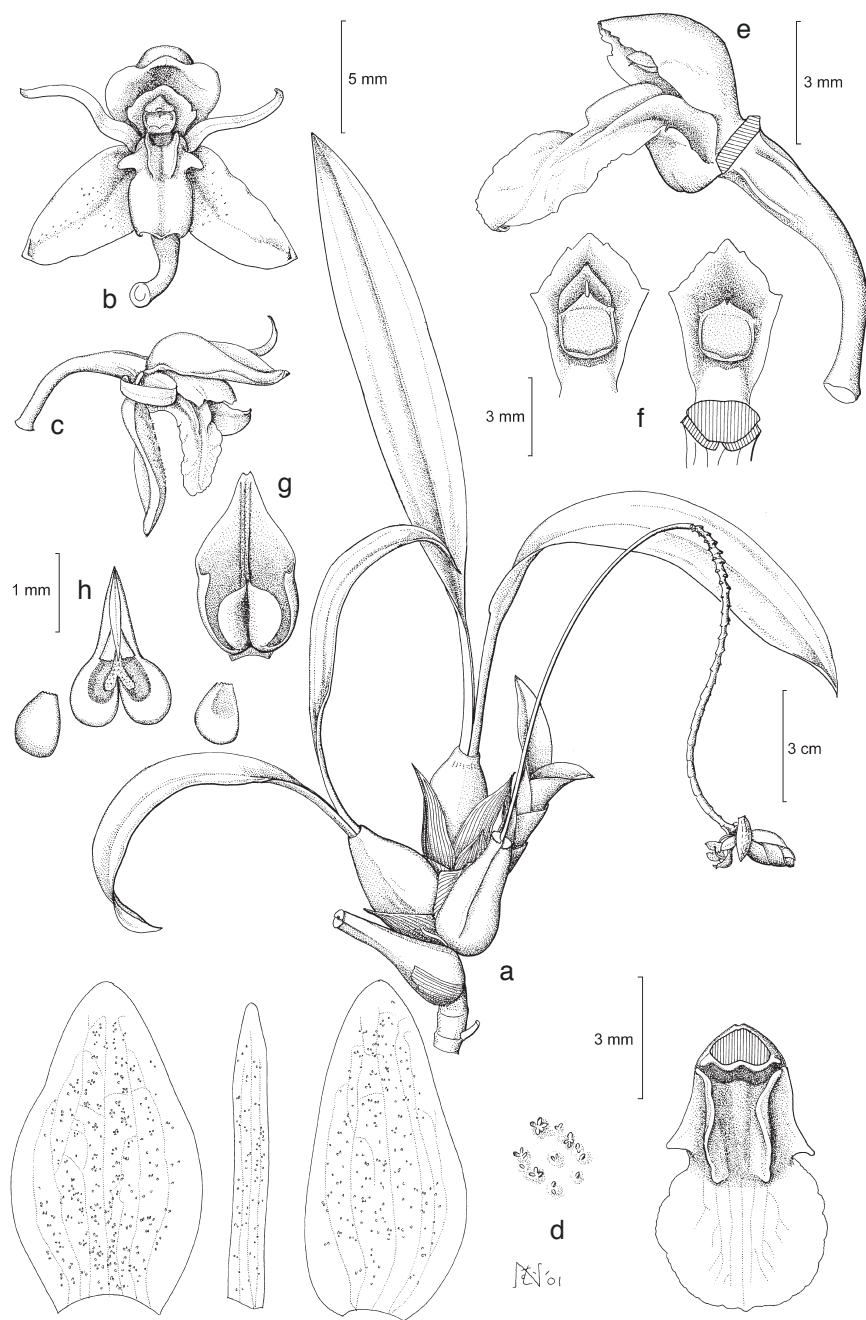


Fig. 4. *Geesinkorchis breviunguiculata* Shih C. Hsu, Gravend. & de Vogel. a. Habit; b. flower, frontal view; c. flower, side view; d. dorsal sepal, petal, lateral sepal with magnification of hairs inside, and lip; e. flower with sepals and petals removed, side view; f. column; g. anther; h. pollinia (all: *Leiden cult.* 20010030). Drawing Mutsuko Nakajima.

4. *Geesinkorchis breviunguiculata* Shih C. Hsu, Gravend. & de Vogel, *spec. nov.* — Fig. 4, Plate 1d

Labelli callus carinis lateralibus duabus. Epichilium suborbiculare apice rotundato. — Typus: *Leiden cult. 20010030* (Wubben) (holo L), Indonesia, Sumatra, Siberut.

Plant 25–40 cm high. Roots up to 4.5 cm long, 2–2.5 mm diameter. *Pseudobulbs* narrowly ovoid, sturdy, 4.5–5 cm long. Scales of the young shoot 3–6, smallest one 2–2.5 cm long, longest one 3.5–4 cm long, nerves 40–60. *Petiole* 2.8–6 cm by 1.5–2 mm. *Leaf blade* 9–14 by 1.4–2.2 cm, main nerves 4–7. *Inflorescence* producing up to 150 flowers. *Peduncle* 6.5–35 cm long, 1.5–2 mm diameter. *Rachis* 8–17 cm long, internodes 1–4 mm long. *Floral bracts* 11–12 by 8–10 mm when flattened, nerves 30–34. *Pedicel* 0.4–0.5 mm diameter. *Ovary* 0.8–1.1 mm diameter. *Median sepal* 7–7.4 by 3.6–4 mm, nerves 7. *Lateral sepals* obliquely ovate-oblong, 7.3–7.7 by 3.4–3.7 mm, nerves 5. *Petals* usually curved backward at apical third part, 6.8–7 by 0.7–0.9 mm. *Lip* 6.6–7 mm long when flattened. *Hypochilium* 2.4–2.7 mm long, base 0.7–0.8 by 1.9–2.2 mm, c. 0.7 mm deep, glabrous, without keels, lateral lobes deltoid to obliquely deltoid, 0.4–0.6 by 0.4–0.5 mm, width over the lateral lobes 3.4–3.8 mm, margin glabrous, apex rounded, sometimes turned downwards. *Callus* consisting of two lateral keels but without an elevated central ridge, starting beyond the hypochilium base and ending at the basal portion of the epichilium, 2.6–3 by 1.5–1.9 mm, keels running along the whole length of the callus, in front gradually lowering, 0.7–0.9 mm high at the base, 3–4 mm high in front, apex glabrous. *Epichilium* suborbicular when flattened, 3.3–4.1 mm long, widest part 3.8–4.2 mm wide, claw 0.3–0.6 by 2.7–3 mm, glabrous, marginal half portion concave, blade when flattened 3.5–4 by 3.7–4.2 mm, median slightly channelled, margin slightly irregular, apex broadly rounded. *Column* curved in lateral view, 3.8–4.6 by 2.8–3.1 mm, 1.9–2.3 mm deep, base with a swollen transverse ridge; column hood not lobed, margin irregular with 4–6 teeth, lateral sides with a small triangular tooth, apex (broadly) acute. *Anther* oblong-ovate in outline, 2.2–2.3 by c. 1.4 mm, not incumbent, apex acuminate to rounded to truncate, slightly contracted above the anther, straight. *Pollinia* 0.7–0.74 by 0.43–0.52 mm. Caudicle 1.5–1.55 by 0.3–0.35 mm, with two oblong lateral lobes connected to the base of the pollinia. *Stigma* including rostellum broadly ovate in outline, 1.1–1.6 by 1.1–1.5 mm; rostellum broadly triangular, apex acute. *Capsule* not seen.

Distribution — North Sumatra and Siberut.

Altitude — Circa 200 m.

Notes — 1. The epithet *breviunguiculata* (which is Latin for shortly clawed) refers to the short claw of the lip.

2. Pedicel and ovary green; sepals and petals ochre yellow; lip light yellow, faintly orange-brown at the base; margins of the midlobe white; keels white at the base of the lip, in front with light brown edge. Smell not recorded.

3. This species can easily be recognized by the suborbicular and indistinctly clawed epichilium.

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IDENTIFICATION LIST

Dates are used if the number of the collection is unknown.

1. = *G. alaticallosa*; 2. = *G. phaiostele*; 3. = *G. quadricarinata*; 4. = *G. breviunguiculata*
- Afriastini 2719: 4 — Anderson 175: 2; 225: 2.
- Beaman 11575: 2; 11882: 2 — Boden Kloss 12290: 4 — Brooks 14: 2.
- Chan s.n. (April 2000): 1 — Clemens & Clemens 20398: 1 — Cribb 89/68: 1.
- De Vogel 9370: 3; 8227: 1.
- Geesink 8965: 1.
- Hewitt 12: 2.
- Kostermans 14016: 1.
- Lamb 224/85: 1; 351/85: 1 — Leiden cult. 22090: 2; 30182: 1; 30700: 2; 914139 (de Vogel): 3; 914307: 3; 970467: 1; 20010030 (Wubben): 4 — Lewis s.n. (June 1909): 2.
- Mogea 3847: 1.
- Dwi Murti Puspitaningtyas s.n. (photograph): 4.
- S series (Martin) 37582: 2; (Awa et al.) 50465: 1; (Mohtar & Yui) 66149: 1.
- Vermeulen & Lamb 313: 1.
- Wood 751: 1.

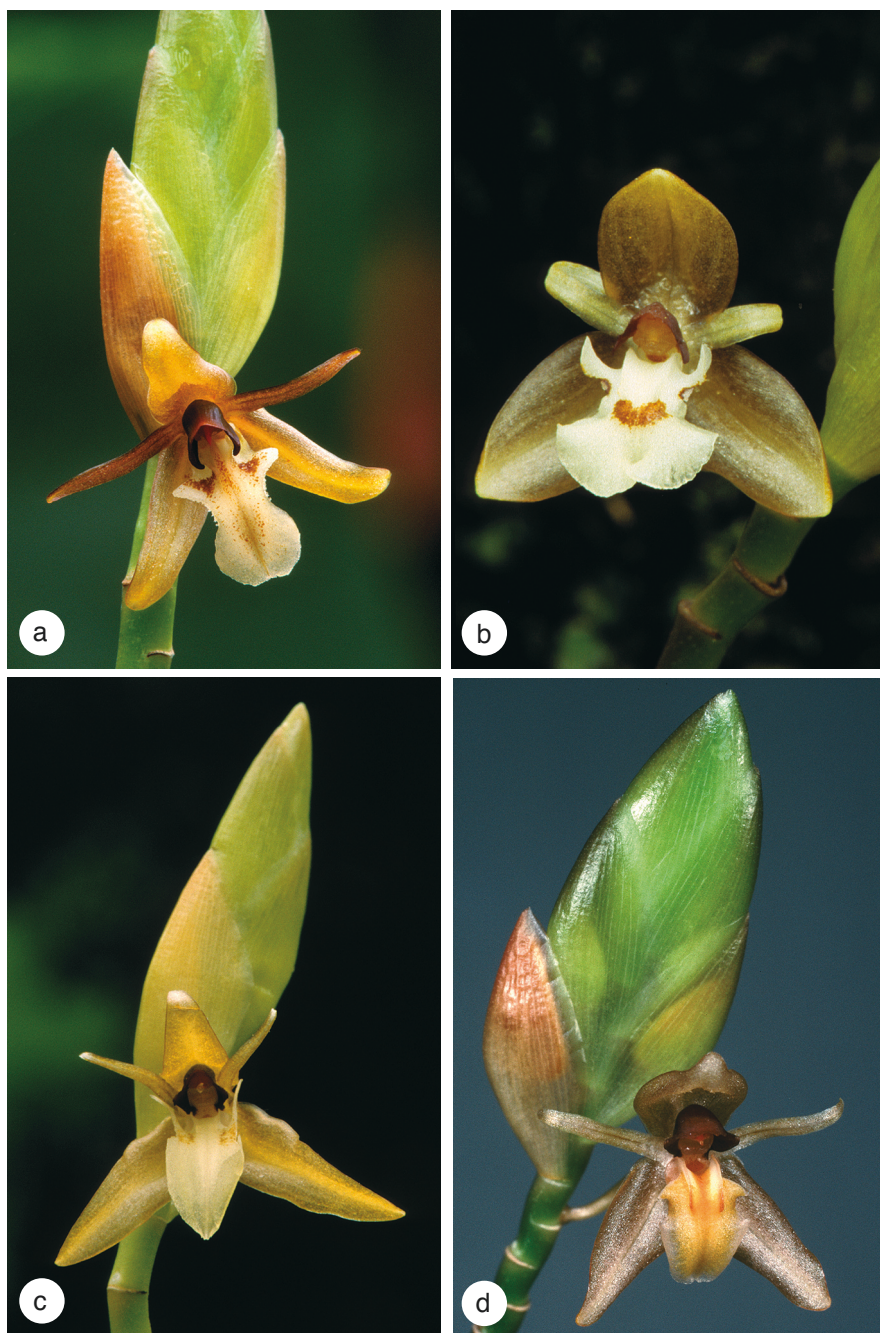


Plate 1. a. *Geesinkorchis alaticalloso* de Vogel (photograph J. Meijvogel); b. *G. phaiostele* (Ridl.) de Vogel (photograph Shih-Chung Hsu); c. *G. quadricarinata* Shih C. Hsu, Gravend. & de Vogel (photograph J. Meijvogel); d. *G. breviunguiculata* Shih C. Hsu, Gravend. & de Vogel (photograph L.Y.Th. Westra).