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THE GENUS *CORYBAS* IN VIETNAM, WITH TWO NEW RECORDS

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ABSTRACT. An overview of the orchid genus *Corybas* in Vietnam is presented. It was known to be represented by a single species, *C. annamensis*. In this article, we report two new records, *C. himalaicus*, and *C. geminigibbus*. Detailed descriptions, synonyms, type data, information on ecology and phenology, distribution and color plates are provided for all three species along with the key to their identification.

KEY WORDS: *Corybas annamensis*, *Corybas geminigibbus*, *Corybas himalaicus*, Orchidaceae, Orchidoideae

The genus *Corybas* Salisb. (Salisbury 1807) comprises about 120 terrestrial and lithophytic orchid species, widely distributed in India, South China, Taiwan, Thailand, Vietnam, the Malesian region, Australia, New Zealand and the western Pacific (Pridgeon *et al.* 2001, Chung & Hsu 2008, Chantanaorrapint & Chantanaorrapint 2016, Govaerts *et al.* 2019). All species of this genus are small plants with underground tubers bearing single cordate leaf and a solitary flower with a pair of spurs at the base of the labellum.

This genus was first included in the orchid flora of Vietnam, in 2007 with the discovery of *Corybas annamensis* Aver. (Averyanov *et al.* 2007). Recently, from separate surveys in Fansipan Mountain and Chu

Mu Mountain, two more species of *Corybas* have been discovered. Based on available literature and consultation of herbarium specimens at K, P, LE, these two species were identified as *C. geminigibbus* J.J.Sm. and *C. himalaicus* (King & Pantl.) Schltr. and these are hitherto new records for the orchid flora of Vietnam. Detailed description, synonyms, type data, information on ecology and phenology, distribution and color photographs are provided for all three species along with the key to identification of these species. Voucher specimens were collected and preserved in 70% ethanol and stored at VNM. Photographs were taken with a Canon 600D fitted with an EF-S 60mm f/2.8 Macro USM lens. Terminology for the morphological description follows Beentje (2012).

KEY TO THE SPECIES OF *CORYBAS* IN VIETNAM

- 1' Spurs of labellum poorly developed or very short (<2 mm long); apical part of the labellum irregularly fimbriate *C. geminigibbus*
- 1" Spurs well developed (>3mm long), horn-shaped; labellum apex acute, straight or slightly curved 2
- 2' Margin of labellum ciliate in apical part and erose at base, without swollen callus at mouth of throat *C. annamensis*
- 2" Margin of labellum dentate in apical part and entire at the base, swollen callus at mouth of throat present *C. himalaicus*

TAXONOMIC TREATMENT

Corybas annamensis Aver. OrchideenJ. 14: 97. 2007 (Fig. 1).

TYPE: Vietnam. Lam Dong Province: Lac Duong District, Da Chais Municipality, elevation 1600 m, 19 October 2005, *T.T.T. Tram, T.V. Thao, N.T. Vinh*, HLF 5317 (LE01059678-Holotype!).

Small, terrestrial *herbs* with underground tubers. *Tubers* spherical, up to 7 mm in diameter, warty, covered with short hairs. *Stem* erect, terete, 2.5–4.5 mm long, 1.0–2.5 mm wide, tinged green to white; with a sheathing bract 0.8–1.2 cm long, 0.2–0.3 mm wide, finely haired at the base. *Leaf* solitary, sessile, cordate, surface slightly plicate, 1.5–3.5 cm long, 1.0–2.8 mm wide, membranous, dull greyish-green, irregularly wavy at the margin, apex acute. *Inflorescence* terminal, single flowered. *Flower* 1.2–1.6 cm in diameter, dorsal sepal dark crimson–red to purple, lateral sepals and petals white tinged with crimson towards the base, labellum white with red stripes and red margin. *Dorsal sepal* ovate or spatulate, emerging from the narrow base, strongly bend upwards, 2.0–2.5 cm long, 0.8–1.2 cm wide, with around 11 white stripes, sepals along with labellum forming a helmet like structure. *Lateral sepals* filiform, free, erect, 5.0–5.5 cm long, 0.8–1.0 mm wide. *Petals* similar to lateral sepals in shape, size. *Labellum* immobile, ovate, inconspicuously 3-lobed, 1.6–2.2 cm long, 1.4–1.8 cm wide, concave, arcuate, bent downwards, apex acute, surface finely warty, with hairs on the margin, surrounding the column towards the base, white with crimson–purple margin and 3–5 dark crimson-purple longitudinal bands on the lateral lobes and towards the margin, spur 0.4–0.6 cm long. *Column* short, 3–4 mm long, 2.0–2.5 mm wide, erect at the tip, with protruding round wings. *Pollinia* 4 in 2 pairs. *Pedicel* slender, gradually extending up to 12 cm during fruit maturity. *Capsule* ovate to cylindric, 1.0–1.5 cm long, 0.4–0.6 cm wide.

ECOLOGY AND PHENOLOGY: This species was found growing at around 1400–1600 m in elevation in primary humid broad-leaved evergreen montane forest. Very rare.

FLOWERING: June–July.

DISTRIBUTION: Endemic to Vietnam (Bi Doup-Nui Ba National Park).

SPECIMEN EXAMINED: Bidoup National Park, Da Chais Commune, Lac Duong District, Lam Dong Province, *Truong Ba Vuong, Truong Quang Cuong*, 2 August 2018, *BV 382 (VNM 00023640)* (VNM!).

Corybas himalaicus (King & Pantl.) Schltr., Repert. Spec. Nov. Regni Veg. 19: 19. 1923; Pearce & Cribb, Orch. Bhutan 118–120. 2002. ≡ *Corysanthes himalaica* King & Pantl., J. Asiatic Soc. Bengal, Pt. 2, Nat. Hist. 65: 128. 1896. ≡ *Calcearia himalaica* (King & Pantl.) M.A.Clem. & D.L.Jones, Orchadian 13: 444. 2002. (Fig. 2).

TYPE: India. Sikkim: *Pantling 385* (CAL-Holotype); *K000859038, K000859039, K000859040* (K-Isotypes!); *P00372553* (P-Isotypes!); (*BM000958057, BM000032565* (BM-Isotypes!)).

Small, terrestrial or lithophyte *herbs* with underground tubers. *Tuber* ovoid, *ca.* 2–5 mm in diameter. *Stem* erect, terete, *ca.* 5–40 mm long, divided into 2 parts, separate by a node covered by a sheath *ca.* 2.5 mm long, tubular, basal part of stem with white papillose hairs, stem glabrous above the sheath. *Leaf* sessile, cordate, *ca.* 72–12 mm long, 8–11 mm wide, apex mucronate. *Inflorescence* terminal, single flowered, floral bract 4–5 mm long, 1.0–1.4 mm wide, apex acuminate, as long as or slightly longer than ovary and pedicel; pedicel (with ovary) *ca.* 4.7–5.0 mm long. *Flower* dorsal sepal reddish-white at base, petals and lateral sepals reddish-white at base, labellum white with red to dark red spots. *Dorsal sepal* hooded, oblanceolate, *ca.* 1.0–1.5 cm long 0.4–0.5 mm wide, clasping the basal part of labellum, margin entire. *Lateral sepals* filiform, connate at base *ca.* 5 mm long. *Petals* similar to lateral sepals, slightly longer than lateral sepals, *ca.* 6 mm long, connate with lateral sepals at base. *Labellum* margin inrolled forming a tubular basal, curving downward, *ca.* 4 mm long; apical part extended, 3.2–3.5 mm long, *ca.* 7 mm wide, orbicular (flattened) in outline shape; disc with reddish white callus, in front of callus dark crimson papillose; margin erose, irregular dentate only at apical part, basal two spurs at base of labellum, *ca.* 2.2 mm long, 1 mm wide, apex obtuse, pointing forward. *Column* winged at apex *ca.* 2.5 mm long. *Pollinia* 4 in 2 pairs. *Capsule* not seen.



FIGURE 1. *Corybas annamensis* Aver. A–D. Plants in habitat showing morphological characters. Photographs by Nguyen Van Canh.

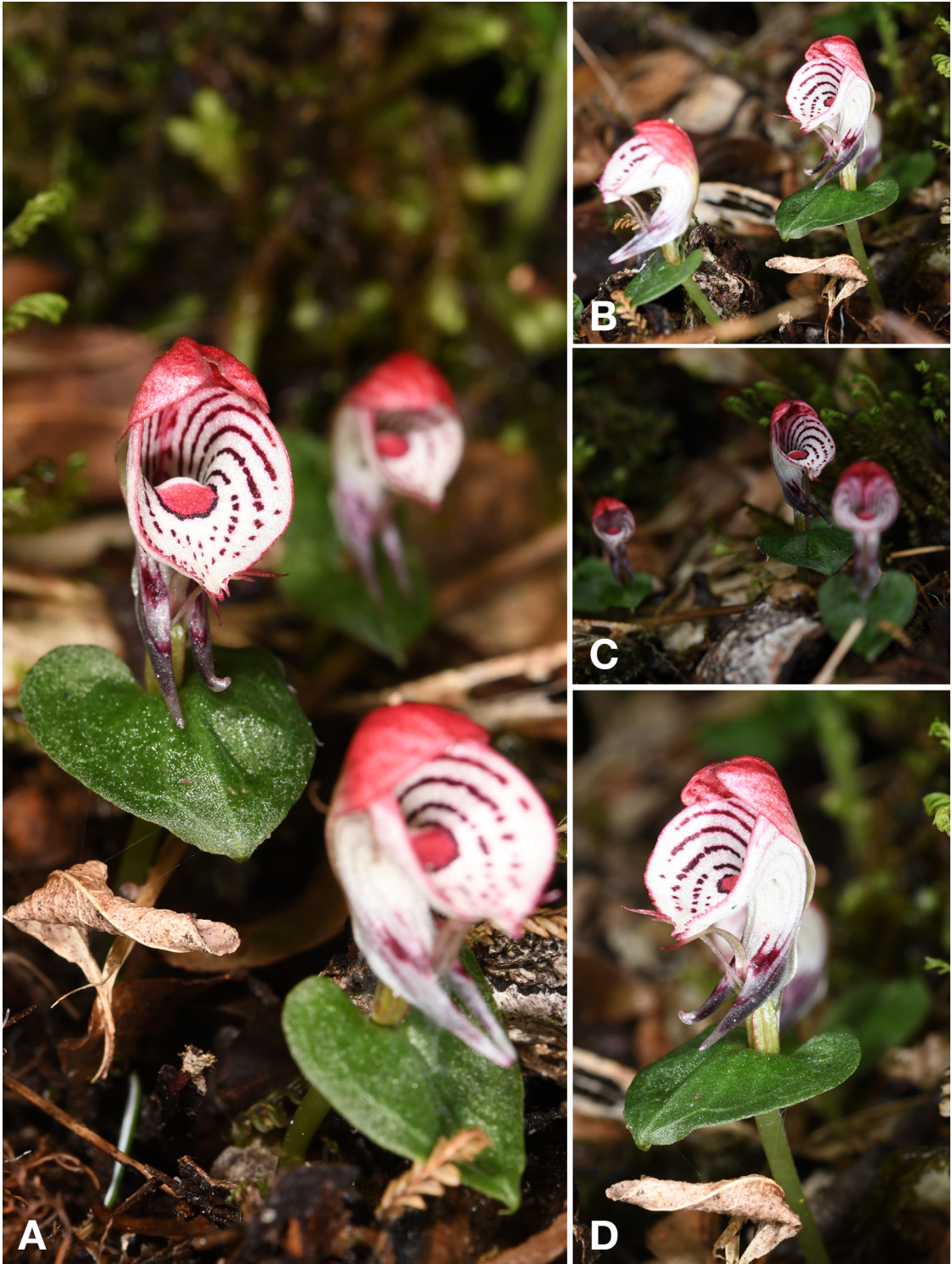


FIGURE 2. *Corybas himalaicus* (King & Pantl.) Schltr. A–D. Plants in habitat showing morphological floral characters. Photographs by Nguyen Thanh Luan.

ECOLOGY AND PHENOLOGY: This species was found growing as a lithophyte among mosses around 2500 m a.s.l. in primary evergreen mixed broadleaved–coniferous forest, with *Abies delavayi* subsp. *fansipanensis* (Q.P.Xiang, L.K.Fu & Nan Li) Rushforth as the dominant tree species. Very rare.

FLOWERING: June.

DISTRIBUTION: Vietnam (Fansipan Mountain), Bhutan, India (Sikkim) and China (Taiwan).

SPECIMEN EXAMINED: Lao Cai Province, Sapa District, Fansipan Mountain, *Truong Ba Vuong, Nguyen Thanh Luan*, 22 June 2019, *BV 381 (VNM 00023641)* (VNM!); Lao Cai Province, Sapa District, Fansipan Mountain, *Truong Ba Vuong, Nguyen Thanh Luan*, 23 June 2019, *LE 01066674 (LE!)*, *LE 01061397 (LE!)*

NOTE: The Vietnamese specimens slightly differ from the type in somewhat shorter lateral sepals and petals.

Corybas geminigibbus J.J.Sm., Mitt. Inst. Bot. Hamburg 7: 13. 1927; Dransfield *et al.*: 593. 1986; Seidenfaden & Wood: 121. 1992. (Fig. 3).

TYPE: Indonesia. Borneo: West Kalimantan, Mt Mulu, *Winkler 496 (HBG500940)* (HBG–Holotype).

Small, terrestrial or lithophyte *herbs* with underground tubers. *Tuber* ovoid, *ca.* 2–5 mm in diameter. *Stem* short, erect, pale green, *ca.* 6 mm, basal part covered by a tubular sheath with acuminate apex clasping the stem, *ca.* 3 mm long, with white papillose hairs at base. *Leaf* single, green with white markings on adaxial surface, green to pale red on abaxial, sessile, broadly ovate to cordate, *ca.* 10–12 mm long, 7 mm wide (at widest part), apex shortly acuminate. *Inflorescence* terminal, single flowered, floral bract pale green *ca.* 3–4 mm long, apex acuminate; pedicel (with ovary) *ca.* 3 mm long. *Flower* *ca.* 6 mm in

diameter, dorsal sepal white at base and dark purple in apical part, lateral sepals and petals whitish with dark purple, labellum white with dark purple marks towards margin. *Dorsal sepal* hooded, strongly curved downward, oblanceolate, *ca.* 8.0–8.5 mm long, 3 mm wide, apex mucronate. *Lateral sepals* free, filiform, *ca.* 15–17 mm long. *Petals* similar to lateral sepals but shorter, *ca.* 11 mm long. *Labellum* margin inrolled forming a tubular basal part, curving downward *ca.* 4 mm long; apical part expended *ca.* 7 mm long, 6 mm wide (at the widest point), margin irregularly fimbriate-ciliate; apex acute or retuse; spur 2, small, *ca.* 1.5–2.0 mm long, poorly developed, broad, apex rounded. *Column* short, *ca.* 1 mm long, shortly winged at apical part. *Pollinia* 4, in 2 pairs. *Capsule* ellipsoid, *ca.* 6 mm long.

ECOLOGY AND PHENOLOGY: Lithophyte, associated with mosses, at around 1800–1900 m a.s.l. in Chu Mu mountain, and at 1400–1500 m a.s.l. in Bidoup–Nui Ba National Park. Very rare.

FLOWERING: July.

DISTRIBUTION: Vietnam (Vong Phu and Bidoup–Nui Ba National Park), Thailand (Nakhon Si Thammarat–Khao Ramrom Mountain), Peninsular Malaysia (Kedah), Indonesia (Borneo), Philippines (Palawan).

SPECIMENS EXAMINED: Dak Lak province, M’Drak District, Cu Mroa Commune, Chu Mu Mountain, *Truong Ba Vuong, Nguyen Thanh Luan*, 22 June 2019, *BV 381 (VNM 00023642)* (VNM!).

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FIGURE 3. *Corybas geminigibbus* J.J.Sm. A–D. Plants in habitat showing morphological characters. Photographs by Nguyen Van Canh (A, C, D), and Truong Quang Cuong (B).

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