



## Four new species of orchids (Orchidaceae) in eastern Vietnam

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### Abstract

*Dendrobium thinkii* (D. sect. *Breviflores*), *Sarcoglyphis tichii*, *Taeniophyllum phitamii* (T. subgen. *Codonosepalum* Schltr.) and *Trichoglottis canhii* are described and illustrated as species new to science. All are local endemics of the area associated with Truong Son Range (Annamese Cordilleras) within territories of Dac Lak, Kon Tum and Lam Dong provinces of the southern Vietnam known in national geography as the Central Highlands or Tay Nguyen Plateau. All discovered plants are well-defined, taxonomically isolated species representing very strict plant endemism quite typical for the southern part of eastern Indochina.

**Key words:** plant taxonomy, plant diversity, plant endemism, nature protection

### Introduction

The paper contains new results of successive collaborative efforts of botanists and orchid enthusiasts in studies of the orchid diversity in areas associated with the Truong Son Range (Annamese Cordilleras) within territories of Dac Lak, Kon Tum and Lam Dong provinces of the southern Vietnam known in national geography as the Central Highlands or Tay Nguyen Plateau (Nguyen *et al.* 2010, Averyanov 2012a,b, 2013, Averyanov *et al.* 2012a,b, 2013, 2015a,b, Averyanov & Truong 2015, Choudhary *et al.* 2013, Duy & Averyanov 2015, Kumar *et al.* 2014, Nuraliev *et al.*, 2014, 2015, Schuiteman *et al.* 2013). It includes illustrations and descriptions of four new species discovered in this area. All discovered species are rare local endemics with very limited distribution. Valid name, species description, appropriate citation of the type, data on ecology, phenology, distribution, expected IUCN Red list status and notes on expected relations are provided for each species. When new data provided here are included, the known number of the orchids in Vietnam reaches 170 genera and 1186 species (Averyanov *et al.* 2015a,b). All mentioned species were discovered in April 2015 during botanical field investigations organized by botanists of the Tay Nguyen Institute for Scientific Research of Vietnam Academy of Science and Technology.

### Material and Methods

Specimens of the new species suitable for description were collected in 2015. Fresh flowers and inflorescences from living plants were fixed and stored in 70% ethanol. Measurements of the floral parts for the description were made on both herbarium and liquid-fixed materials. Fresh flowers and their fleshy parts shrink up to 15–20% in size during the drying process of making herbarium specimens. In describing quantitative characters, infrequent extreme values (i.e. rarely occurring minimal and maximal values) of a variation range are parenthesized respectively before and after the normal variation range.

### Taxonomic treatment

*Dendrobium* Swartz (1799: 82)

**Lectotype:**—*D. moniliforme* (L.) Swartz (1799: 85) (*Epidendrum moniliforme* Linnaeus 1753: 954)

About 1100 species in tropical and subtropical zone of Asia, Australia and islands of western Pacific.

In Vietnam 105–110 species in 15 sections (Averyanov 1994, Averyanov & Averyanova 2003).

***Dendrobium* sect. *Breviflores*** (Hooker 1890: 711)

**Type:**—*Dendrobium bicameratum* Lindley (1839: 59).

18–20 species in tropical zone of mainland Asia, Hainan and Indonesia. In Vietnam 10 species, 4 species (including species described here) are endemic.

***Dendrobium thinkii* Aver., sp. nov.**

Stems few, arising from short rhizome, simple, cylindrical to narrowly fusiform, 8–25 cm long, young leafy throughout, old leafless, glossy chestnut-brown. Leaves lanceolate to narrowly ovate, 3.5–10 cm long. Inflorescence short, lax (1)2–4-flowered raceme, arising from leafless stem. Flowers widely opening, 2.5–3 cm across, almost white, sepals and lip with violet margin, disk apically with yellow-brownish spot. Sepals narrowly ovate, 1.4–1.6 cm long, forming saccate mentum 2–3.5 mm long, 4.5–5 mm wide; petals narrowly ovate rhomboid, little smaller. Lip movable, recurved, 1–1.4 cm long, 7–10 mm wide, 3-lobed, at the base with hemispheric hollow 1–1.2 mm in diam.; median lobe triangular sparsely hairy; side lobes erect, semicircular; disc white-farinaceous, with glabrous green glossy callus at the center. Column erect, shortly cylindrical, without distinct rostellum and stielidia; column foot glossy olive-brownish, much longer than the column, 5.5–7.5 mm long, forward curved. Anther cap simple, conical hemispheric, finely verruculose, about 2 mm tall and wide.

**Type:**—VIETNAM. Kon Tum province: Ngoc Linh Mountains, mountain evergreen forest at elevation about 1700 m a.s.l., 28 April 2015, *D.P.Thinh, L.Averyanov, T.Maisak, N.V.Duy, AL 34* (holotype, LE!). **Fig. 1.**

Perennial clustering sympodial epiphytic herb. Rhizome very short, rigid, semi-woody, simple or few branching, 0.5–1(2) cm long, 1.5–2.5(3) mm in diam., with thin flexuose roots, in apical part covered by scarious, overlapping scales early disintegrating into papyraceous remnants, old part of rhizome almost naked, dark gray–brown, longitudinally irregularly wrinkled. Stems erect, many-noded, cylindrical to narrowly fusiform, narrowing to the base and apex, straight to slightly flexuose or arching, (8)10–20(25) cm long, (3)4–6(8) cm in diam. at a middle, with several leaves in upper half, young enveloped by yellowish to dull yellow-greenish tubular leaf sheaths, old naked, glossy chestnut-brown, irregularly wrinkled; internodes cylindrical or slightly swollen near the apex, (0.4)0.5–2.5(3) cm long. Leaves (5)6–8(10), distichous, sessile, sheathed; sheath tubular, as long as internode, distinctly veined, completely disintegrating or remaining in form of insignificant fibrous remnants on second-year stems; leaf blade suberect, rather thin, broadly lanceolate to narrowly ovate, (3.5)4–8(10) cm long, (0.6)0.8–1.4(1.6) cm wide, obtuse and shortly unequally bilobulate at apex. Inflorescence arising from the upper part of leafless second-year stem, suberect, short, lax (1)2–3(4)-flowered raceme; scape and rachis green to olive-brownish, zig-zag curved, (0.8)1–2(3) cm long, 0.8–1(1.2) mm in diam. Scape bracts and floral bracts, whitish, scarious, oblong ovate, straight, cymbiform, obtuse to blunt, (3)4–6(7) mm long, (0.5)1–1.8(2) mm wide. Pedicel and ovary light green, glossy, glabrous, (1.6)1.8–2.4(2.6) cm long, straight and bent down at apex; ovary obconic, longitudinally grooved, (1.5)2–2.2(2.5) mm long; 1–1.2 mm in diam. at apex. Flowers horizontally spreading or pendulous, widely opening, very fragrant, almost entirely white, sepals with violet margin and violet median vein; lip violet along margin, disk with large yellow-brownish spot and dull green callus; column and anther cap pure white; column at the base and column foot glossy olive-brownish. Sepals widely spreading, narrowly ovate, obtuse, 1.4–1.6 cm long, 5–6 mm wide, lateral sepals at the base oblique broadening to 7–8 mm wide, forming short broad almost globular saccate mentum (2)2.5–3(3.5) mm long, 4.5–5 mm wide. Petals more or less forward directed, narrowly ovate rhomboid, little shorter and narrower than sepals. Lip more or less movable, conduplicate-concave and strongly recurved, being flattened broadly rhomboid, (1)1.2–1.3(1.4) cm long, (7)8–9(10) mm wide, 3-lobed, at the base with distinct hemispheric nectary hollow 1–1.2 mm in diam.; median lobe concave, triangular, acute, (5)5.5–6(6.5) mm long and wide; side lobes erect, embracing column, semicircular, 2–2.5 mm tall, 3.5–4.5 mm broad; disc near the base of median lobe sparsely hairy with long hairs, at the middle with erect, large, glossy-glabrous, obovate callus 3–4 mm long, 1.8–2(2.2) mm wide; other adaxial lip surface and base of callus covered by thick deposits of pure white, farinaceous, snow-like granular pseudopollen. Column erect, stout, shortly cylindrical, (2)2.2–2.6(3) mm tall and wide, without distinct rostellum and stielidia, at front with large, concave stigma; column foot much longer than the column proper, thick, longitudinally concave, (5.5)6–7(7.5) mm long, 2.5–3(3.2) mm wide, forward curved. Anther cap simple, conical hemispheric, finely verruculose, about 2 mm tall and wide, at front with distinct longitudinal groove. Pollinia 4, in two pair, yellow, each pollinium oblong falcate, 1 mm long, 0.3 mm wide.

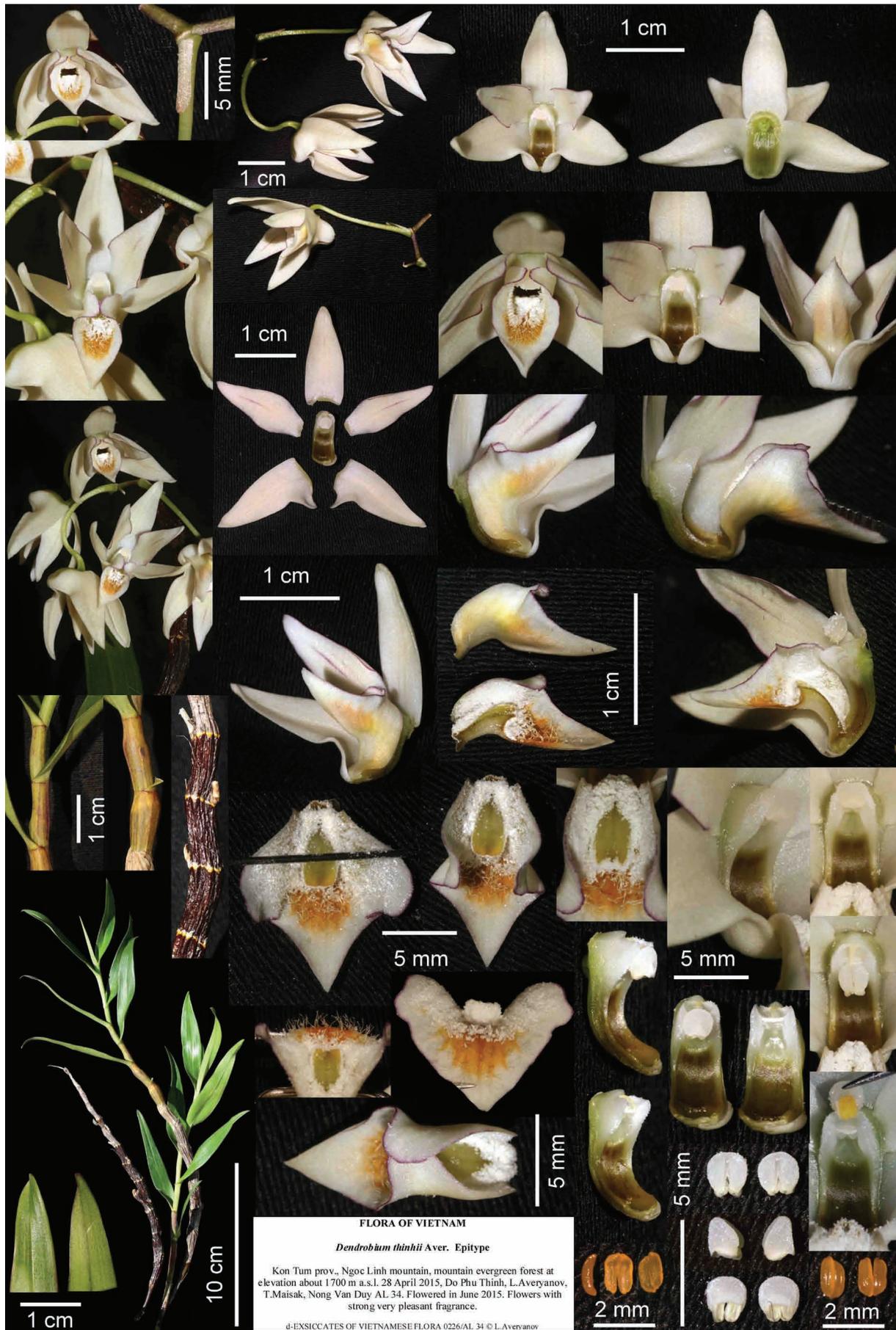


FIGURE 1. *Dendrobium thinhii* Aver. Digital epitype, D.P.Thinh, L.Averyanov, T.Maisak, N.V.Duy AL 34. [Photos, correction and design by L. Averyanov].

**Etymology:**—Species epithet refers to the name of its discoverer, orchid enthusiast—Mr. Do Phu Think.

**Habitat, phenology and conservation status:**—Miniature branch and trunk epiphyte. Primary submontane and montane evergreen, broad-leaved forests on granite. 1700 m. Fl. April–May. Very rare. Estimated IUCN Red List status—DD.

**Distribution:**—Vietnam: Kon Tum province (Ngoc Linh Mountains). Endemic.

**Notes:**—This new species belongs to distinct group of *Dendrobium* species historically known as a section *Breviflores* (Hooker 1890: 711), but it is totally different from all known species of this section, as well as from other its congeners. Snow-like pseudopollen deposits on the lip, large glabrous callus on the disc and other specific lip structures are the most obvious individual features of this remarkable novelty species. Flowers of this plant have a very pleasant, extremely strong fragrance when fresh and surprisingly remaining even in completely dried herbarium samples. Formation of pseudopollen in flowers of this species is evolutionarily expressed to a greater extent than in any other orchid species in Indochina. It is remarkable that this species grows in the region of *Dendrobium farinatum* Schildhauer & Schraut (2004: 374) and *D. unicum* Seidenfaden (1970: 332), two other local endemics of eastern Indochina forming pseudopollen. The formation of pseudopollen is a rather rare phenomenon and coexistence of these three species may indicate regional and specific traits of pollination evolution in their overlapping distribution area.

*Sarcoglyphis* Garay (1972: 200)

**Type:**—*Sarcoglyphis mirabilis* (Rchb.f.) Garay (1972: 201) (*Sarcanthus mirabilis* Reichenbach 1878: 300).

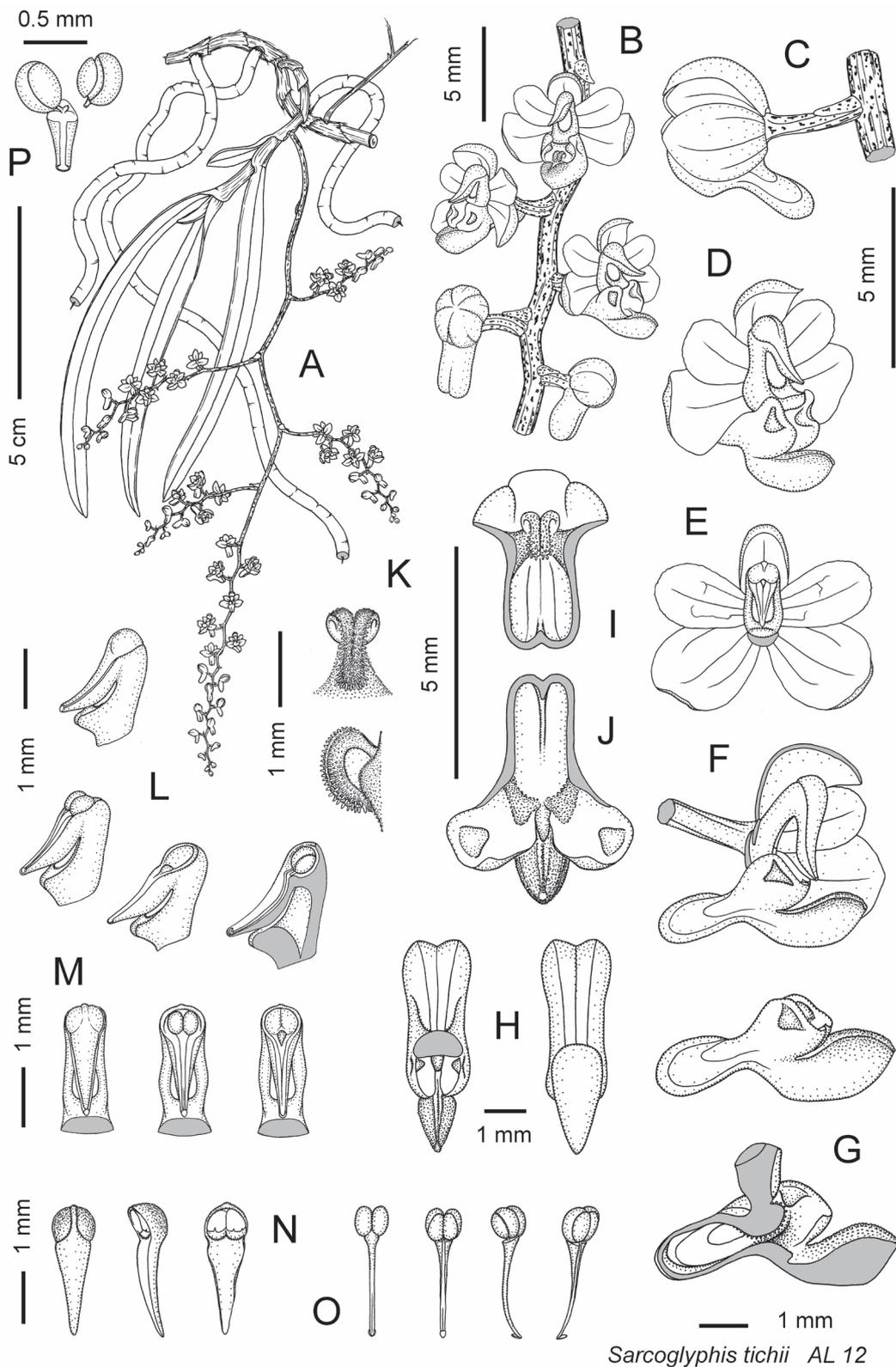
14 species in tropical zones of mainland Asia and Indonesia. In Vietnam 4 species, 2 species (including species described here) are endemic.

*Sarcoglyphis tichii* Aver., *sp. nov.*

Stem simple to few branched, slender, 3–10 cm long, leafy in apical half. Leaves narrowly lanceolate, 5–10 cm long. Inflorescence lateral, few branching, many-flowered panicle to 15 cm long. Flowers widely opening, 5–6 mm across; brownish purple, lip white. Dorsal sepal elliptic ovate, cucullate, 2–2.2 mm long; lateral sepals broadly obovate, 3–3.5 mm long; petals obovate, as long as sepals. Lip white, spurred, 3-lobed, 2.5–3 mm long, 3–3.8 mm wide; median lobe broadly conical, very fleshy, finely papillose, longitudinally furrowed; base of lip inside with short papillose keel and two lateral papillose callosities; side lobes semicircular, erect, with incurved frontal edge, outside with fovea appearing on adaxial surface as a broadly conical callus. Spur straight, cylindrical to clavate, 1.5–2.2 mm long, inside with low longitudinal keel. Back-wall callus, 0.5–0.6 mm tall, 0.8–1.2 mm long, semicircular, laterally flattened, densely covered by large glassy papills. Column erect, 1.2–1.5 mm high, with very large rostellum as long as column. Anther cap hemispherical, with narrowly cymbiform beak, 1.5–1.7 mm long. Tegula filiform, 1.6–2 mm long, broadening to the apex into small deltoid plate; caudicles insignificant; viscidium ovate, very small; pollinia 2, ovoid, each completely divided into 2 free portions.

**Type:**—VIETNAM. Lam Dong province: Duc Trong district, about 30 km to the east of Dalat City, 24 April 2015, *N.P.Tam, AL 12* (holotype, LE!). **Figs 2, 5A–D.**

Perennial monopodial miniature epiphytic herb. Stem simple or few branched, slender, greenish, ribbed, usually pendulous, (3)4–6(10) cm long, 2–3(3.5) mm in diam., with (2)3–4(6) distant leaves in apical half; internodes 6–10(12) mm long. Roots few, thick, light gray to almost white, wiry, flexuose, arising from leafless basal part of the stem. Leaves sessile, articulated at the base, fleshy, elongate narrowly lanceolate, (5)6–8(10) cm long, (5)6–9(11) mm wide, slightly curved and oblique, with prominent 5–7 veins and indistinctly bilobed, acute apex; leaf sheaths 8–10(12) mm long, strongly veined. Inflorescence lateral, arising from leafless basal part of the stem, many flowered pendulous panicle to 15 cm long, with 1–4 arching branches, each branch (1)2–6(7) cm long with (3)5–15(20) spirally arranged flowers; scape and rachis greenish, marked with irregular dirty purple spots; inflorescence and floral bracts persistent, triangular ovate, concave, acute, subperpendicular to the rachis, dull greenish, speckled with dirty purple, (0.5)1–2(2.2) mm long, (0.4)0.5–0.8(1) mm wide. Scape 3–4(5) cm long, rather rigid, inflorescence axis and rachis of branches slightly zig-zag curved. Pedicel and ovary perpendicular to the rachis, cylindrical, straight or slightly upward curved, longitudinally ridged, 2–3(3.2) mm long, 0.5–0.7 mm in diam., greenish, flushed with dirty-purple. Flowers widely opening, 5–6 mm across; sepals and petals uniform brownish purple; lip pure white with light purple tint on side lobes inside; column and operculum white, with light purple at apex; pollinia light dull yellow. Dorsal sepal elliptic ovate, strongly concave, cucullate, obtuse, 2–2.2 mm long, 1–1.2 mm wide, hanging above column. Lateral sepals spreading, broadly obovate, slightly oblique, blunt to round at apex, 3–3.2(3.5) mm long, 2–2.2 mm wide. Petals spreading, obovate, as long as sepals, round, entire or finely



**FIGURE 2.** *Sarcoglyphis tichii*. **A.** Flowering plant. **B.** Portion of inflorescence. **C.** Opening flower, side view. **D.** Flower, side view. **E.** Flattened flower with lip removed, frontal view. **F.** Flower with lateral sepal, petal and half median sepal removed, side view. **G.** Intact lip and lip sagittal section, side view. **H.** Lip, views from above and from below. **I.** Tangential lip section, adaxial half. **J.** Tangential lip section, abaxial half. **K.** Back-wall callus, frontal and side view. **L.** Intact column, column with operculum removed, column with operculum and pollinarium removed and sagittal section with operculum removed, all side views. **M.** Intact column, column with operculum removed and column with operculum and pollinarium removed, all frontal views. **N.** Operculum, view from above, side view and view from below. **O.** Pollinarium, view from above, view from below and side views. **P.** Stipe apex and pollinia, adaxial view. [All drawn from the type specimen—*N.P.Tam* AL 12 by L.Averyanov and T.Maisak].

irregularly denticulate at the apex. Lip firmly attached to the column, spurred, 5-nerved, 3-lobed, 2.5–2.8(3) mm long (from the base to the apex of median lobe), 3–3.5(3.8) mm wide (when flattened); median lobe broadly conical, very fleshy, 1.2–1.4 mm long, 0.8–1 mm in diam., above finely papillose and longitudinally furrowed; base of lip inside with prominent fleshy short papillose keel and two lateral papillose callosities coming to base of side lobes; side lobes semicircular, erect, 1–1.2 mm tall and broad, with incurved frontal edge, outside at the center near the apex with prominent fovea appearing on adaxial surface as a broadly conical callus. Spur straight, cylindric to slightly clavate, 1.5–2(2.2) mm long, 1–1.4(1.6) mm wide, slightly dorsoventrally flattened and dorsally strongly concave at the base, truncate or shallowly bilobed at apex, inside near the apex on abaxial surface with low longitudinal keel. Back-wall callus large, 0.5–0.6 mm tall, (0.8)1–1.2 mm long, semicircular, laterally flattened, bilobulate at apex, raising longitudinally from base of lip on back-wall of the spur, longitudinally grooved, densely covered by large glassy papillae. Column erect, cylindric, broadening to the base, slightly forward curved, 1.2–1.5 mm high, 0.5–0.6(0.7) mm in diam., with very large down directed, conical, furrowed rostellum as long as column or slightly longer, with small callus at front of clinandrium. Anther cap hemispherical, 0.6–0.8 mm in diam., with very large narrowly triangular, slightly recurved, acuminate, cymbiform beak, 1.5–1.7 mm long, at least three times longer than operculum. Stipe (tegula) 1.6–1.8(2) mm long, broadening at apex into small deltoid plate with incurved margins (embracing frontal callus of clinandrium); caudicles insignificant; viscidium ovate, very small, 0.06–0.1 mm in diam. Pollinia 2, each completely divided into 2 free densely appressed unequal hemispheric portions, 0.4–0.5 mm across. Fruits unknown.

**Etymology:**—Species name refers to the name of eminent botanist, orchid expert and lecturer at the Ho Chi Minh City University of Science—Mr. Nguyen Thien Tich.

**Habitat, phenology and conservation status:**—Miniature branch epiphyte. Primary and mature secondary broad-leaved evergreen humid submontane forests on granite. 1,000–1,200 m. Fl. March–April. Very rare. Estimated IUCN Red List status—DD.

**Distribution:**—Vietnam: Lam Dong province (Duc Trong district). Endemic.

**Notes:**—The genus *Sarcoglyphis* includes 14 species distributed in tropical zones of mainland Asia and Sunda Isles. The newly discovered species differs from all its known congeners in having smaller, half-sized flowers and peculiar concavities on the side lobes appearing inside as a prominent broadly conical protuberances. This species appears fairly morphologically isolated and has a slight superficial resemblance to the relatively small-flowering, *S. thailandica* Seidenfaden (1988: 127), but which distinctly differs in having a very long rostellum (almost as long as column), a very long beak of the operculum, a narrow conical median lip lobe and a short septum inside the spur. The rostellum protuberance raised up at the front of the clinandrium observed in most species of the genus is reduced in the new taxa into a small ovoid callus. This feature provides similarity with some species of *Cleisostoma* Blume (1825: 362).

*Taeniophyllum* Blume (1825: 354, 355, fig. 70)

**Lectotype:**—*Taeniophyllum obtusum* Blume (1825: 357), chosen by Garay (1972: 205).

120–180 species in tropical zone of Africa, Asia, Australia and the islands of Pacific with highest diversity in New Guinea. In Vietnam there are 7 species.

**T. subgen. *Codonosepalum*** Schlechter (1913: 1009)

**Type** not designated.

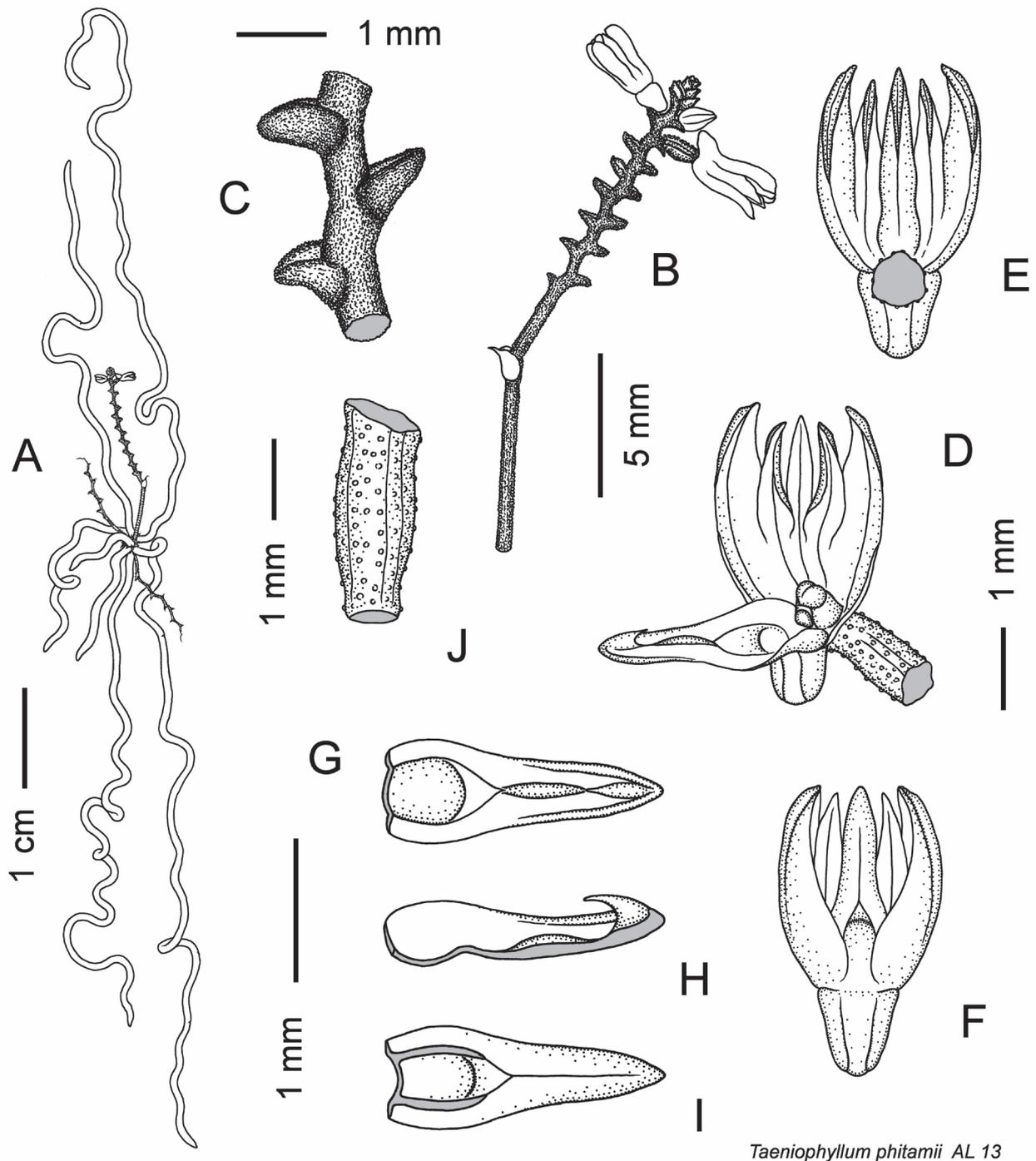
100–120 species in tropical zones of Africa, Asia, Australia and the islands of Pacific with the highest diversity in New Guinea. In Vietnam there are 6 species, with 4 species (including species described here) being endemic.

*Taeniophyllum phitamii* Aver., *sp. nov.*

Leafless miniature herb with stem 0.5–1.5 mm tall; roots radiate, terete, flexuose, greenish, to 6 cm long. Inflorescence filiform, to 2 cm tall, brownish-red, densely rugose-glandulose. Rachis 2–15 mm long, with 4–22 persistent, triangular floral bracts in two rows. Flowers one or two at a time, not widely opening, 0.8–1 mm across and 2–2.5 mm long, bright red to red-brownish. Pedicel and ovary perpendicular, terete, 1.2–2.2 mm long, glandular verruculose. Sepals and petals lanceolate, joined to the middle forming narrow tube 1–1.2 mm long, free apical parts 0.8–1.2 mm long, each with broad keels abaxially. Lip spurred, joined dorsally to lateral sepals;

blade simple, narrowly ovate, 2.2–2.6 mm long, with low fleshy keel, apically fleshy, with inflexed, hook-like acute bristle. Spur broadly conical to subglobose, 0.5–0.8 mm long and wide. Column 0.4 mm tall and wide, operculum hemispheric, with insignificant beak. Pollinia 4.

**Type:**—VIETNAM. Lam Dong province: Don Duong district, in vicinities of Tu Tra village, 24 April 2015, *N.P.Tam, L.Averyanov, T.Maisak, AL 13* (holotype, LE!). **Figs 3, 5E, F.**



*Taeniophyllum phitamii* AL 13

**FIGURE 3.** *Taeniophyllum phitamii* Aver. **A.** Flowering plant. **B.** Inflorescence. **C.** Portion of rachis with flowers removed. **D.** Dissected and flattened flower, half-side view. **E.** Flattened sepals and petals, view from behind. **F.** Intact flower, view from below. **G.** Lip, view from above. **H.** Lip, side view. **I.** Lip, view from below. **J.** Pedicel and ovary, side view. [All drawn from the type specimen—*N.P.Tam, L.Averyanov, T.Maisak AL 13* by *L.Averyanov and T.Maisak*].

Perennial monopodial epiphytic leafless miniature herb with erect abbreviated stem 0.5–1(1.5) mm tall bearing few spirally arranged roots. Roots (3)4–7(10), radiate, terete to slightly flattened, light dull gray-greenish to light dull olive-brownish, long-spreading, to 4(6) cm long, (0.5)0.6–0.8(1) mm in diam. (when fresh), flexuose, creeping and

densely appressed to substratum. Inflorescence slender erect raceme, to 1.5(2) cm tall, peduncle, rachis and bracts brownish-red, densely rugose-glandulose. Peduncle filiform, (3)4–5(6) mm long, straight or slightly bent at apex, with few insignificant brownish scales at the base. Rachis straight or slightly flexuose, indistinctly zig-zag, (2)3–12(15) mm long, bearing (4)6–17(22) distant floral bracts alternating in two rows. Floral bracts persistent, alternate, triangular, obtuse, recurved, concave conduplicate, 0.6–0.8(1) mm long, 0.5–0.6 mm broad. Flowers appearing in succession near rachis apex, one or two at a time, lasting only one or two days, not opening widely, about 0.8–1 mm across and 2–2.5 mm long, bright red to red-brownish. Pedicel and ovary perpendicular to the rachis, terete, indistinctly ridged, slightly broadening at the middle, (1.2)1.6–2(2.2) mm long, 0.6–0.8(1) mm in diam., sparsely glandular verruculose. Sepals and petals 1-veined, acute, joined to the middle forming narrow tube about 1–1.2 mm long, their apical parts free, 0.8–1(1.2) mm long, straight to hardly recurved, rather fleshy, each with broad keels abaxially. Sepals broadly lanceolate, acute, 2–2.5 mm long, 0.8 mm wide, median sepal slightly shorter and narrower. Petals lanceolate, acute, slightly shorter than lateral sepals, with recurved margin in free part. Lip spurred, joined dorsally to lateral sepals on one third of its length, with two veins confluent near the middle, blade simple, triangular narrowly ovate, navicular, 2.2–2.5(2.6) mm long, 0.6–0.8(1) mm wide near the base, with low fleshy longitudinal keel on the disc, in apical part with fleshy margin and erect, prominent, inflexed, hook-like acute bristle. Spur broadly conical to subglobose, 0.5–0.6(0.8) mm long and wide. Column very small, about 0.4 mm tall and wide, operculum hemispheric as wide as column, with insignificant beak. Pollinia 4, stipe and viscidium very small, hardly visible.

**Etymology:**—Species is named after its discoverer and orchid enthusiast—Mr. Nguyen Phi Tam.

**Habitat, phenology and conservation status:**—Miniature canopy and branch epiphyte. Submontane broad-leaved evergreen forests on granite, often found on steep mountain slopes. 1200–1300 m. Fl. March–May. Very rare. Estimated IUCN Red List status—DD.

**Distribution:**—Vietnam: Lam Dong province (Dalat City area). Endemic.

**Notes:**—Species may be close to *T. rubrum* Ridley (1896: 364) known from Kalimantan and Malacca Peninsula, having similar reddish inflorescence, floral bracts and flowers. Meanwhile, the new taxon differs in having much smaller, bright red, hardly opening flowers, many flowered inflorescences, a densely glandular verruculose rachis, floral bract and ovary, as well as containing fleshy, keeled, acute sepals and petals. Discovered species is a lone red-flowering member of the genus in mainland Asia. It was found in association with *Chiloschista exuperi* (Guillaumin 1957: 346) Garay (1972: 166), another endemic of southern Indochina.

*Trichoglottis* Blume (1825: 359, fig. 6).

**Type:**—*Trichoglottis retusa* Blume (1825: 360, fig. 8).

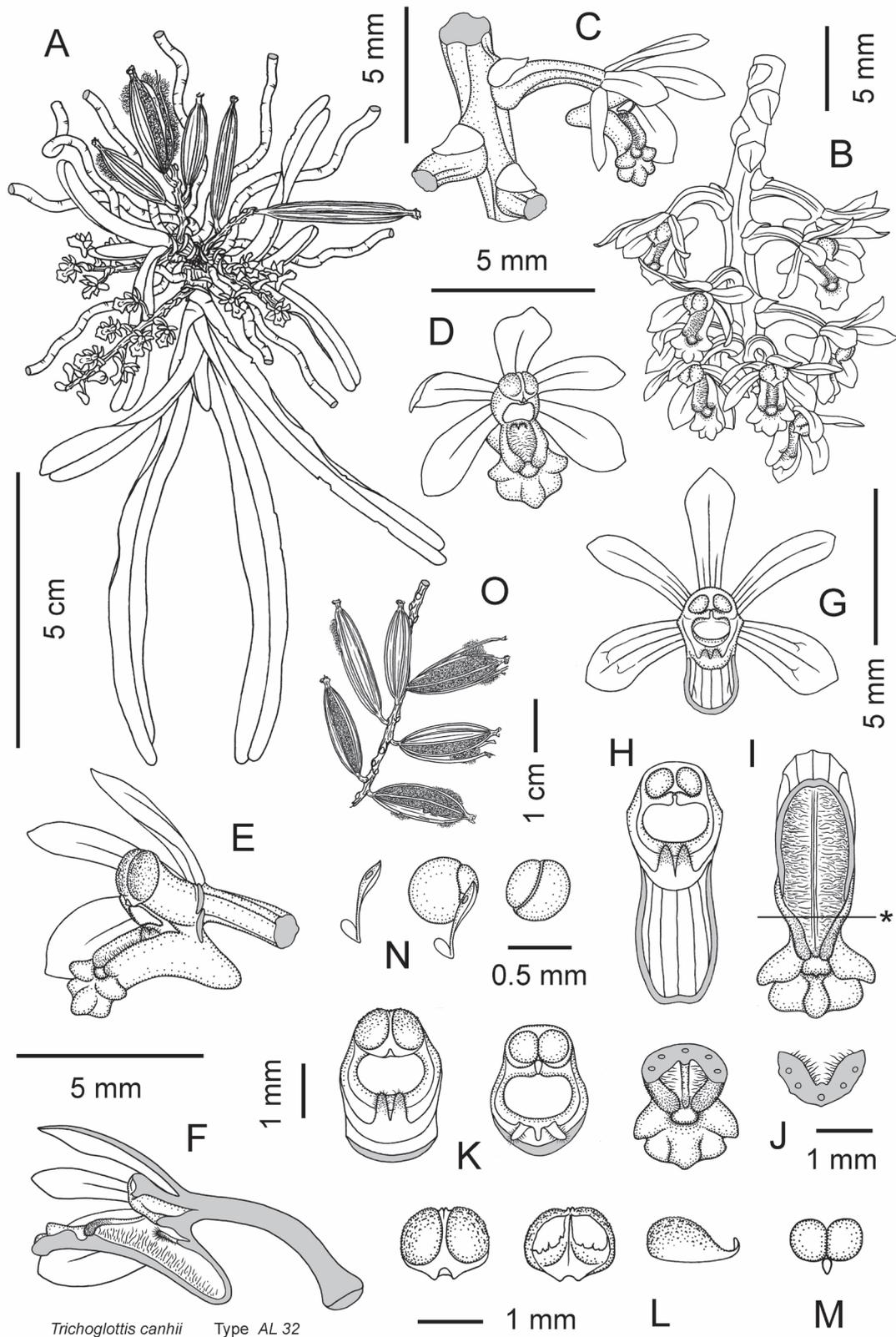
55–60 species in tropical zones of Asia, Australia and the islands of Pacific with the highest diversity in Indonesia and the Philippines. In Vietnam there are 6 species, with 1 species (described here) endemic.

*Trichoglottis canhii* Aver., *sp. nov.*

Miniature epiphyte; stem simple 0.5–5 cm long, with 2–5 leaves; roots numerous, thick. Leaves leathery, keeled and wavy along edges, 2.5–12 cm long, 6–14 mm wide, arching, apex with unequal rounded lobes. Inflorescence lateral, rigid, from leafless basal part of the stem, 0.4–4 cm long. Scape 2–10 mm long, with 2–6 persistent, triangular sterile bracts 1–2 mm long. Rachis ridged, bearing 3–14 spirally arranged flowers. Floral bracts persistent, triangular, 0.8–1.6 mm long. Pedicel and ovary perpendicular, cylindrical, 3.5–4.5 mm long. Flowers widely opening, 7–10 mm across; yellowish or brown; lip white, often with yellowish side lobes. Sepals and petals oblanceolate, 3.4–4.2 mm long, 1.4–1.6 mm wide. Lip firmly attached to the column, spurred, 3.6–4.2 mm long, 1.5–2 mm wide, with indistinct fleshy side lobes and large median lobe; disc long hairy inside; median lobe glabrous, fleshy, obcordate, indistinctly 5-lobulate, at the base with hollow; side lobes in form of oblong, papillose parallel cushions. Spur short, broadly conical, 1.2–2 mm long, shortly hairy inside. Back-wall callus in form of thin, erect, hairy ligula, 0.4–0.8 mm long and wide, usually divided from the base into two twin halves. Column short, cylindrical, 1.4–2 mm tall, 1.5–1.6 mm broad; rostellum very small, anther cap hemispherical, 1–1.2 mm across, finely verruculose, with small, triangular, up curved beak. Tegula 0.5–0.7 mm long, broadening to the apex; caudicles insignificant; viscidium ovate, about 0.2 mm long. Pollinia 2, globular, each completely divided into 2 free portions.

**Type:**—VIETNAM. Dak Lak province: Ea H'leo district, Ea Wy municipality, epiphyte on relic trees in remnants of dry Dipterocarp forest, 500 m a.s.l., around point 13°14'39"N 108°08'38"E, 27 April 2015, *N.V.Canh, L.Averyanov, T.Maisak, AL 32* (holotype, LE!).

**Figs 4, 5G–J.**



**FIGURE 4.** *Trichoglottis canhii* Aver. **A.** Flowering plant. **B.** Inflorescence. **C.** Flower and portion of the rachis, side view. **D.** Flower, half-side view. **E.** Flower, side view. **F.** Flower, sagittal section, with removed operculum and pollinarium. **G.** Flattened flower with removed operculum, pollinarium and lip. **H.** Tangential lip section (adaxial half) and column with removed operculum and pollinarium. **I.** Tangential lip section, abaxial half. **J.** Transversal lip section along line designated on figure I by an asterisk. **K.** Frontal view of intact column and column with removed operculum and artificially recurved ligula. **L.** Operculum, view from above, from below and side view. **M.** Pollinarium, frontal view. **N.** Pollinarium stipe and pollinia. **O.** Ripe fruits. [All drawn from the type specimen—*N.V.Canh, L.Averyanov, T.Maisak AL 32* by L.Averyanov and T.Maisak].

Perennial monopodial miniature epiphytic herb. Stem orthotropic, simple, rarely few branching near the base, stout, rigid, (0.5)1–3(5) cm long, (3)4–5(6) mm in diam., with (2)3–5(6) leaves approximated at the apex; leaf sheaths distichous, overlapping; internodes (1.5)2–3(4) mm long. Roots numerous, thick, gray, wiry, flexuose, arising from leafless basal part of the stem. Leaves sessile, with articulation at the base, leathery, lanceolate to strap-shaped, strongly conduplicate, keeled and wavy along edges, (2.5)3–8(12) cm long, (6)8–12(14) mm wide, arching, at the apex with unequal rounded lobes. Inflorescence lateral, arising from leafless basal part of the stem, few- to many-flowered erect (directed to the stem apex) raceme (0.4)0.5–3(4) cm long; scape and rachis straight, or slightly arching, stout, rigid, uniformly dull green; scape 2–10 mm long, 1–2 mm in diam., with 2–5(6) persistent, triangular obtuse sterile bracts (1)1.5–2 mm long and wide, densely appressed to peduncle; rachis irregularly angled in cross section, 1.5–2(2.2) mm in diam., bearing (3)5–12(14) distant, spirally arranged flowers. Floral bracts persistent, triangular, concave, obtuse, subperpendicular to the rachis, dull greenish to light brown, (0.8)1–1.5(1.6) mm long and wide. Pedicel and ovary perpendicular to the rachis, cylindric, distinctly inflated at the base, straight to up curved, longitudinally ridged, (3)3.5–4(4.5) mm long, 0.8–1(1.2) mm in diam., uniform light greenish. Flowers widely opening, (7)8–10 mm across; sepals and petals yellowish speckled with brown to uniform light brown; lip and spur pure white, often with yellowish side lobes; column and operculum light dull yellowish to almost white; pollinia yellow. Sepals and petals spreading, oblanceolate, broadening to the apex, obtuse, (3.4)3.5–4(4.2) mm long, 1.4–1.5(1.6) mm wide; lateral sepals and petals slightly oblique-falcate; petals slightly shorter and narrower. Lip firmly attached to the column, spurred, 5-nerved, cymbiform, (3.6)3.8–4(4.2) mm long (from the base to the apex of median lobe), (1.5)1.8–2 mm wide, with indistinct elongate fleshy side lobes and large median lobe; disc densely hairy inside with long soft hairs and low, narrow longitudinal hairless keel coming from lip hollow to the spur; median lobe glabrous, fleshy, obcordate to almost circular or transversely broadly elliptic, (2)2.2–2.4(2.5) mm long and wide, indistinctly 5-lobulate, with obtuse to blunt slightly swollen low lobules, at the base with prominent hollow (on ventral surface); side lobes in form of fleshy elongate cylindric papillose parallel cushions placed along lip margin and incurved abaxially above lip hollow. Spur short, broadly conical, (1.2)1.4–1.8(2) mm long, 1.2–1.5 mm wide near base, roundish at apex, shortly hairy inside on front-wall surface. Back-wall callus in form of thin, erect, directed parallel to column base, hairy abaxially, ovate or rectangular ligula, (0.4)0.5–0.7(0.8) mm tall and wide, usually divided from the base into two twin halves. Column short, stout, erect, broadly cylindric, (1.4)1.5–1.8(2) mm tall, 1.5–1.6 mm broad, rostellum very small, in form of insignificant protuberance at front of clinandrium. Anther cap hemispherical, 1–1.2 mm in diam., finely verruculose, with small, triangular, up curved beak, 0.2–0.3 mm long. Stipe (tegula) 0.5–0.7 mm long, broadening at apex into lanceolate conduplicate, acute plate; caudicles insignificant; viscidium ovate, about 0.2 mm long. Pollinia 2, each completely divided into 2 free densely appressed subequal hemispheric portions, 0.5 mm in diam. Fruits usually down directed, narrowly ellipsoid to cylindric, dull brown, (1.6)2–2.5(3) cm long, (4)5–6(7) mm in diam., inside with well-developed light dull yellow-brownish capillitium.

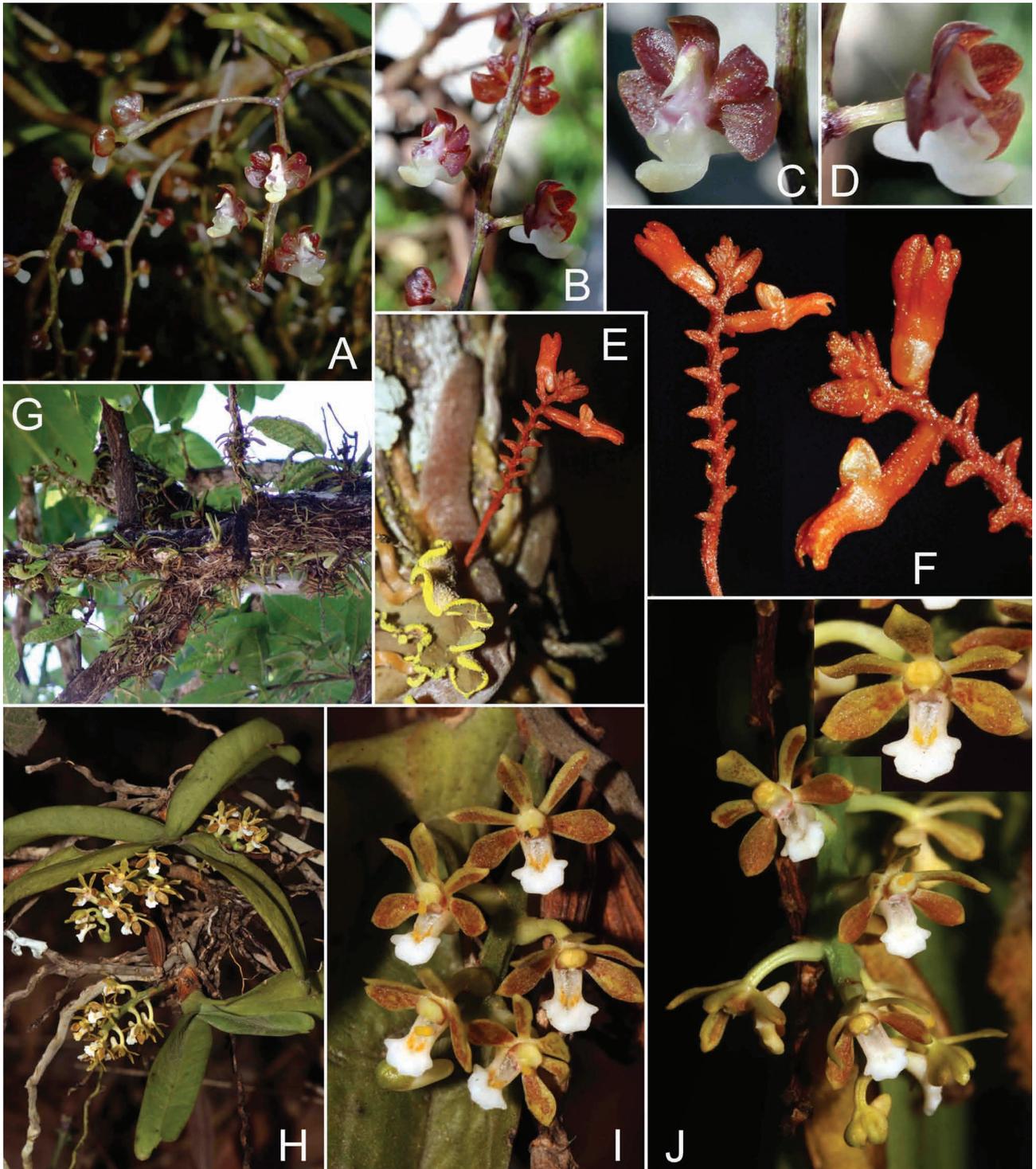
**Etymology:**—Species is named after the outstanding Vietnamese orchid enthusiast and excellent wild-orchid grower—Mr. Nguyen Van Canh.

**Habitat, phenology and conservation status:**—Miniature branch epiphyte. Lowland dry open semideciduous and deciduous Dipterocarp forests and woodlands, usually on ferrallitic soils. 500 m. Fl. March–May. Very rare. Estimated IUCN Red List status—DD.

**Distribution:**—Vietnam: Dak Lak province (Ea H'leo and Ea Sup districts). Endemic.

**Studied specimens** (paratypes):—VIETNAM. Dak Lak province: Ea Sup district, Yok Don national park, dry Dipterocarp forest, 2015, *Hiep & N.Phong, AL 9* (LE!). Ea H'leo district, Ea Wy municipality, epiphyte on relictual trees in remnants of dry Dipterocarp forest at elev. about 500 m a.s.l., around point 13°14'39"N 108°08'38"E, 26 April 2015, *N.V.Canh, L.Averyanov, T.Maisak, AL 15a* (LE!).

**Notes:**—The new species is somewhat related to relation to *Trichoglottis lorata* (Rolfe ex Downie 1925: 407) Schuiteman (2007: 62) (*Staurochilus loratus* (Rolfe ex Downie 1925: 407) Seidenfaden 1988: 95) and *Trichoglottis ramosa* (Lindley 1833–1840: 224) Senghas (1988: 1315) (*Staurochilus ramosus* (Lindley 1833: 224) (Seidenfaden 1988: 95), but differs distinctly in having short, always simple, dense inflorescences, smaller flowers, much shorter and broad spur and a dissected back-wall lamella. The plant discovered also resembles *Trichoglottis triflora* (Guillaumin 1956: 239) Garay & Seidenfaden (Garay 1972: 209) on its miniature habit, short inflorescences and small flowers. In this connection, it may represent an intermediate phylogenetic “link” between the above mentioned species strongly supporting the idea of the merging of the genera *Trichoglottis* Blume (1825: 359) and *Staurochilus* Ridley ex Pfitzer in Engler & Prantl (1900: 16) (Schuiteman & Vogel, 2007).



**FIGURE 5.** *Sarcoglyphis tichii* Aver. **A.** Inflorescence. **B.** Portion of inflorescence, **C–D.** Flower, frontal and side views (Type specimen *N.P.Tam AL 12*). *Taeniophyllum phitamii* Aver. **E.** Flowering plant in natural habitat. **F.** Inflorescence and flowers (Type specimen *N.P.Tam, L.Averyanov, T.Maisak AL 13*). *Trichoglottis canhii* Aver. **G.** Flowering and fruiting plants in natural habitat. **H.** Flowering plants. **I.** Inflorescence. **J.** Inflorescence and flower, frontal view (Type specimens *N.V.Canh, L.Averyanov, T.Maisak AL 32*). [Photos of Nguyen Phi Tam and L. Averyanov, correction and design by L. Averyanov].

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