New Orchid Taxa and Records in the Flora of Vietnam

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ABSTRACT: Paper presents descriptions of 1 new genus (*Theana*), 4 new species (*Theana vietnamica, Bulbophyllum salmoneum, Sarcoglyphis brevilabia, Schoenorchis scolopendria*), 1 new variety (*Dendrobium thyrsiflorum var. minutiflorum*) and provides data on 21 species of orchids (*Bulbophyllum bicolor, B. muscicola, B. nigrescens, B. putii, B. violaceolabellum, Calanthe mannii, C. whiteana, Coelogyne micrantha, Cymbidium cyperifolium, Dendrobium dixanthum, D. findlayanum, D. metrium, D. senile, Didymoplexiella ornata, Luisia thailandica, Monomeria gymnopus, Papilionanthe teres, Schoenorchis fragrans, Stereochilus brevirachis, S. erinaceus, Vanda brunnea*) newly recorded in the flora of Vietnam.

KEY WORDS: Nature protection, Orchidaceae, plant diversity, plant taxonomy, Vietnam.

INTRODUCTION

Paper contains results of modern field botanical explorations in eastern Indochina during last two years. It includes descriptions of 6 newly discovered taxa and data for 21 species discovered and recorded for Vietnam at first. Among them 1 new genus (Theana Aver.), 4 new species (*Theana vietnamica* Aver., *Bulbophyllum salmoneum* Aver. et J.J.Verm., *Sarcoglyphis brevilabia* Aver., *Schoenorchis scolopendria* Aver.), 1 new variety (Dendrobium *thyrsiflorum var. minutiflorum* Aver.) and 21 species discovered in Vietnam at first (*Bulbophyllum bicolor* Lindl., *B. muscicola* Rchb.f., *B. nigrescens* Rolfe, *B. putii* Seidenf., *B. violaceolabellum* Seidenf., *Calanthe mannii* Hook.f., *C. whiteana* King et Pantl., *Coelogyne micrantha* Lindl., *Cymbidium cyperifolium* Wall. ex Lindl., *Dendrobium dixanthum* Rchb.f., *D. findlayanum* C.S.P. Parish et Rchb.f., *D. metrium* Kraenzl., *D. senile* Parish et Rchb.f., *Didymoplexiella ornata* (Ridl.) Garay, *Luisia thailandica* Seidenf., *Monomeria gymnopus* (Hook.f.) Aver., *Papilionanthe teres* Schltr., *Schoenorchis fragrans* (C.S.P.Parish et Rchb.f.) Seidenf. et Smitinand, *Stereochilus brevirachis* Christenson, *S. erinaceus* (Rchb.f.) Garay, *Vanda brunnea* Rchb.f.). Mentioned taxa are listed below in alphabetical order. Each record is accompanied (when necessary) with main synonyms and description, as well as provides data on ecology, phenology, rarity, distribution, taxonomical notes and list of studied specimens. All recorded species are illustrated with original ink drawings and photographs.

TAXONOMIC TREATMENTS

Bulbophyllum bicolor Lindl., 1830, Gen. Sp. Orch. Pl.: 49. - *Cirrhopetalum bicolor* (Lindley) Rolfe, 1893, Journ. Linn. Soc. Bot. 36: 14. Fig. 1a.

Described from China ("Hab. in China…"). Type ("*Reeves drawing*") - K.

Ecology: Lithophyte on rocks and cliffs along streams at elevations 100-500 m a.s.l. (Hong Kong). Epiphyte in primary evergreen broad leaved forests on rocky limestone at elevations 400-700 m a.s.l. (Vietnam). Fl.: May - June. Very rare (DD).

Distribution: NW. Vietnam (Dien Bien province). SE. China (Hong Kong).

Notes: Surprising discovery of plant regarded earlier as local endemic of Hong Kong.

Studied specimens: NW. VIETNAM, Dien Bien prov., Dien Bien City area, May-Jun 2010, *P.K. Loc, CXC 5* (CPC Herbarium, LE).

Bulbophyllum muscicola Rchb.f., 1872, Flora 55: 275, non Schltr., 1913. - *Cirrhopetalum wallichii* Lindl., 1830, Gen. Sp. Orch. Pl.: 59, non Lindl., 1839. - *C. hookeri Duthie*, 1902, Journ. Asiat. Soc. Bengal 2, Nat. Hist. 71, 1: 38. - *Bulbophyllum hookeri* (Duthie) J.J. Sm., 1912, Bull. Jard. Bot. Buitenzorg ser. 2, 8: 25. - *B. wallichii* (Lindl.) Merrill et Metcalf, 1945, Lingnan Sci. Journ. 21, 1-4: 7, non Rchb.f., 1861. Fig. 2.

Described from NE. India ("E Himalaya, Assam…"). Type ("*Mann s.n.* Herb. no. *49454*") - W.

Ecology: Clustering branch epiphyte. Primary broad-leaved evergreen humid forests on rocky remnant mountains composed with highly eroded solid marble-like limestone at elevation 400-500 m a.s.l. Fl.: June -September. Very rare (DD).

Distribution: N. Vietnam (Phu Tho province). N. India, Nepal.

Notes: Vietnamese specimens differ from the type in much shorter inflorescence, smaller flowers, blunt (not acute), pure red sepals, in red lip and in white petals. These plants may be regarded as separate variety having long distant geographical isolation.

Studied specimens: VIETNAM, Phu Tho prov., Tan Son distr., Xuan Son municipality, Du village, around point 21°06'57"N 104°57'17"E, 16 Feb. 2009, *L. Averyanov, P.K. Loc, N.T. Vinh et al., HAL 12681c; HAL 12681f* (CPC Herbarium, LE); d-EXSICCATES OF VIETNAMESE FLORA *0166/HAL 12681f*, fig. 2.

Bulbophyllum nigrescens Rolfe, 1910, Bull. Misc. Inform. Kew (1910): 158. - *B. angusteellipticum* Seidenf., 1981, Nordic Journ. Bot. 1, 2: 209. Figs. 1b & c.

Described from N. Thailand ("Siam. Near Chiengmai"). Type ("*A. Kerr, 84*") - P.

Ecology: Creeping branch and trunk epiphyte. Primary and secondary evergreen broad-leaved forests on rocky remnant mountains composed with solid marble-like limestone at elevations 900-1500 m a.s.l. Fl.: March - May. Locally common (LR).

Distribution: NW. Vietnam (Dien Bien province). N. Thailand.

Notes: All previous records of this very rare species from Vietnam (Seidenfaden, 1992; Averyanov, 1994) were based on plants of uncertain origin cultivated in Dalat town on the south of the country. Occurrence of this species here remains doubtful. Reports of *B. nigrescens* from China are also based on wrongly identified specimens (Chen Xinqi, Vermeulen, 2009). As a result Chinese territory is excluded now from species distribution reported earlier. Species, probably, has restricted area, which comprises mainly northern Thailand. Our discovery of this extremely rare species in NW. Vietnam is actually first documented verified record for eastern Indochina.

Studied specimens: VIETNAM, Dien Bien prov., Tua Chua distr., Trung Thu municipality, Trung Thu village, around point 21°55'38"N 103°18'05"E, 10 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu et al., CPC 2137* (CPC Herbarium, LE); Dien Bien prov., Tua Chua distr., Tua Thang municipality, De Chu village, around point 21°53'22"N 103°24'56"E, 12 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu et al., CPC 2269* (CPC Herbarium, LE).

Bulbophyllum putii Seidenf., 1979, Dansk Bot. Ark. 33: 135. Figs. 1d & e.

Described from NW. Thailand ("Doi Nangka, Chiengmai"). Type ("*Put 3387*") - BK, C.

Ecology: Creeping epiphyte and lithophyte. Broad-leaved evergreen forests on rocky limestone at elevations about 100 m a.s.l. Fl.: December. Rare (DD).

Distribution: NE. Vietnam (Quang Ninh province). NW. Thailand.

Notes: Very surprising disjunctive finding distant on more than 1200 km from "locus classicus" of this species regarded earlier as local endemic of NW. Thailand.

Studied specimens: NE. VIETNAM, Quang Ninh prov., Mong Cai town, Luc Phu mt., 24 December 2010, *L. Averyanov, P.K. Loc, C.X. Canh CXC 21* (CPC Herbarium, LE).

Bulbophyllum salmoneum Aver. et J.J.Verm., ***sp. nov.*** Figs. 1f & g, Fig. 3.

Described from central Vietnam ("Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'31.7"N 105°54'48.2"E. Primary broad-leaved closed forest on very steep rocky slope of remnant mountain composed with highly eroded solid crystalline limestone at elevation 400-500 m a.s.l. Creeping epiphytic vine on tall tree. Lateral sepals light orange-pink, median sepal and petals white. Not rare").

Type: ("23 July 2011. N.*T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3657*") - CPC Herbarium (holotype), LE (isotype).

Epiphyte with creeping rhizome to 0.5 m long. Rhizome rigid, woody, dull brown, 1.5-2.5 mm in diam., with numerous flexuose wiry, thin roots at nodes, internodes naked (0.5) 1-1.5 (2) cm long. Pseudobulbs distant, 2-4 cm apart, erect, narrowly ovoid to almost cylindric, (1.5) 2-3 (3.5) cm tall, 0.5-1 (1.4) cm thick, green to yellow-green, young smooth, glossy, older longitudinally wrinkled, at the base often enveloped with dark gray to gray-whitish papyraceous, partially disintegrated sheath as long as pseudobulb or shorter. Leaves erect, shortly petiolate; petiole 2-5

mm long; leaf blade leathery, oblong to narrowly elliptic, obtuse, 5-8 (10) cm long, 1.5-2 (2.4) cm wide, uniformly brightly green. Inflorescence umbel; scape arising from base of pseudobulb, green to yellowish-green, erect, slender, 8-12 (15) cm long, with 2-3 loose, ovate, yellowish-green sterile bracts at the base; rachis shortened, 2-4 mm long, with (4) 5-8 (12) all faced, pendulous flowers. Floral bracts cuneate, acuminate, yellowish-green to scarious, 5-6 mm long, 1-2 mm wide. Pedicel and ovary yellow-green, 5-7 (10) mm long, about 1 mm in diam. Flowers odorless, drooping. Dorsal sepal white, occasionally with greenish tint, narrowly ovate, acute, concave, 7-8 mm long, 3-3.5 mm wide, forward directed. Lateral sepals orange to pink-orange (rarely light yellow-orange), drooping, narrowly ovate to obliquely elliptic, smooth, 2.5-3 cm long, 7-9 mm wide, at base adnate to column foot and twisted above it, their upper (abaxial) edges connate to each other forming concave or almost flat synsepalum notched at apex (commonly "inflated" synsepala of all flowers in inflorescence drooping and connivent each other giving characteristic superficial appearance of large single "flower" resembling Chinese lantern). Petals white with greenish tint, oblong spatulate, slightly curved, broadening from narrow base, 3.5-4 mm long, 2-2.5 mm wide, rounded at apex, irregularly denticulate along margin. Lip pink-red to red, strongly recurved, narrowly ovate, smooth to shallowly grooved, 2-2.5 mm long, gradually narrowed to indistinctly obtuse apex, at base attached to end of column foot by a mobile articulation, margin slightly decurved. Column stout, 1.5 mm tall and broad, with 2 insignificant narrow lateral wings; column foot curved, with free part about 1 mm long; stelidia triangular, obtuse, erect, about 0.5 mm tall; anther cap red, hemispheric, finely papillose, with straight margin. Pollinia 4, in two pairs, each composed with 2 unequal hemispherical body lacking caudicle, stipe and viscidia. Fruits unknown. Paratypes: Central Vietnam, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'36.7"N 105°54'55.7"E, 26 July 2011. *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3803* (CPC Herbarium); Central Vietnam, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'21.1"N 105°54'41.7"E, 28 July 2011. *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3854* (CPC Herbarium); Central Vietnam, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°40'03.6"N 105°55'08.5"E, 29 July 2011. *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3919* (CPC Herbarium); Central Vietnam, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, around point 17°41'14.3"N 105°53'28.9"E, 6 August 2011, *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh et al., CPC 4104* (CPC Herbarium).

Distribution: Central Vietnam (Quang Binh province). Laos. Endemic of middle part of eastern Indochina.

Ecology: Bark and trunk creeping epiphyte growing in canopies of old tall trees. Primary evergreen broad-leaved humid submontane forests on rocky, highly eroded, solid crystalline karstic limestone at elevations 400-800 m a.s.l. Fl.: July - August. Locally very common (LR).

Etymology: Species name reflects salmon color of lateral sepals.

Notes: Described species superficially looks close to *Bulbophyllum forrestii* Seidenf., from which distinctly differs in broad lateral sepals newer forming tube, in shape of petals and in color of flowers. Our plant represents typical element of highly endemic local limestone floras found on rather isolated remnant mountain formations of central Vietnam and Laos along Vietnam-Laotian border and composed with highly eroded solid crystalline rocky limestone with typical

karstic topography. Most probably *B. salmoneum* has very limited distribution in Quang Binh province of central Vietnam and in allied areas of Laos. In its restricted area species is fairly common and sometimes is observed as dominant of epiphytic communities in canopies of tall old mossy trees of primary forest. Described plant has certain ornamental significance for it unusual attractive flowers. It is known in some European collections as "*Cirrhopetalum peach*" originated supposedly from Laos.

Bulbophyllum violaceolabellum Seidenf., 1981, Nord. Journ. Bot. 1, 2: 210, fig. 14. Fig. 4.

Described from N. Laos ("Laos: Muang Kassy S of Luang Prabang"). Type ("April *1957, GT 931*") - C.

Ecology: Creeping epiphyte and lithophyte. Primary and secondary closed evergreen broad-leaved forests on rocky crystalline marble-like rocky limestone at elevation 500-1100 m a.s.l. Fl.: March - May. Not common (VU).

Distribution: NW. Vietnam (Son La and Dien Bien provinces). Laos, S. China (S. Yunnan).

Notes: Our discovery fills properly a gap in distribution of the species reported from Laos and S. China. In NW. Vietnam this species was observed as locally very common species, particularly in low elevated limestone areas.

Studied specimens: NW. VIETNAM, Son La prov., Mai Son distr., Hat Lot town, around point 21°13'05"N 104°06'44"E, 21 December 2010, *L. Averyanov, P.K. Loc, P.V. The et al., CPC 1156a/4* (CPC Herbarium, LE); NW. Vietnam, Dien Bien prov., Dien Bien distr., Na U municipality, Hua Thanh village, around point 21°12'16"N 102°57'27"E, 9 April 2011, *P.V. The, CPC 2318* (CPC Herbarium, LE); d-EXSICCATES OF VIETNAMESE FLORA 0181/HAL 2318, fig. 4.

Calanthe mannii Hook.f., 1890, Fl. Brit. India 5: 850. - *C. pusilla* Finet, 1900, Bull. Soc. Bot. France 46: 436. - *C. brachychila* Gagnep., 1932, Bull. Soc. Bot. France 79: 162. Fig. 1h.

Described from N. India ("India, W. Himalaya, …", Khasia Hills, Mairang, …", E. Khasia Hills, …"). Syntypes (*"Duthie 5996", "Mann s.n.", "Clarke 49321"*) - K.

Ecology: Terrestrial rosulate herb. Open secondary evergreen broad-leaved forests, secondary shrubs and short tall grasslands on wet mossy ground on soils of any kind at elevations 1400-2000 m a.s.l. Fl.: March April. Very rare (DD).

Distribution: N. Vietnam (Lao Cai, Yen Bai and Cao Bang provinces). NE. India, Nepal, Myanmar, S. China.

Notes: Recent discoveries (HAL 12865 and CBL 1544) confirm occurrence of this very rare species reported earlier for Vietnam on the base of alone, rather questionable specimen (type of *Calanthe brachychila*).

Studied specimens: VIETNAM, Tonkin, Chapa, 2 octobre 1929, *M. Petelot* s. no (P); Yen Bai prov., Mu Cang Chai distr., Nam Co comm., Phinh Ngai vill., around point 21°54'04"N, 104°17'50"E, 6 April 2009, *N.T. Hiep, P.K. Loc, N.D. Canh et al., HAL 12865* (CPC Herbarium); N. VIETNAM, prov. Cao Bang, distr. Bao Lac, municipality Dinh Phung, Man Lung ridge (22°47'N, 105°49'E), 18 April 1999, *P.K. Loc, P.H. Hoang, Averyanov L., CBL 1544* (HN, LE).

Calanthe whiteana King et Pantl., 1896, Journ. Asiat. Soc. Bengal 2, Nat. Hist. 65, 2: 121. - *C. wardii* W.W. Sm., 1921, Not. Roy. Bot. Gard. Edinburgh 13: 194. Figs. 1i & j.

Described from NE. India ("India, Choongthang (Chunthang) …"). Type ("*Pantling 365*") - CAL (holotype), BM, K (isotypes).

Ecology: Terrestrial rosulate herb. Primary broad-leaved evergreen humid closed forests on shale and granite at elev. 1500-1800 m a.s.l. Fl.: May. Very rare (DD).

Distribution: Vietnam (Lao Cai province). NE. India, Bhutan, N. Myanmar, SW. China.

Notes: Extremely rare species known globally only on the base of few collections. It is considered as one of the most beautiful of all Calanthes and has certain potentials for cultivation as ornamental plant.

Studied specimens: N. VIETNAM, Lao Cai, Sa Pa, May 2011, *Khang s.n.* (CPC Herbarium, LE).

Coelogyne micrantha Lindl., 1855, Gard. Chron. (1855): 173. - *C. papagena* Rchb.f., 1862, Bot. Zeitung (Berlin) 20: 214. - *Pleione micrantha* (Lindl.) Kuntze, 1891, Revis. Gen. Pl. 2: 680. - *Coelogyne clarkei* Kraenzl., 1893, Gard. Chron. Ser. 3, 13: 740. Figs. 1k & l.

Described from NE. India ("the East Indies"). Type ("*Dick s.n.*") - K.

Ecology: Creeping and pendulous epiphyte and lithophyte on upper part of cliffs and on tops of ridges. Primary evergreen broad-leaved forests on rocky highly eroded crystalline limestone at elevations 1100-1300 m a.s.l. Fl.: December. Very rare (EN).

Distribution: NW. Vietnam (Dien Bien province). NE. India, S. Myanmar (Tenasserim). Notes. Extremely rare species known globally till now on the base of only few collections.

Studied specimens: NW. VIETNAM, Dien Bien prov., Muong Cha distr., Mua Ngai municipality, around point 21°52'19"N 103°10'01"E, 18 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 1077* (CPC Herbarium, LE).

Cymbidium cyperifolium Wall. ex Lindl., 1833, Gen. Sp. Orch. Pl.: 163. Fig. 5a.

Described from NE. Bangladesh ("Sylhet…"). Type ("*F. De Silva & H. Bruce, Wall. Cat. 7353*") - K-LINDL (holotype), K, K-W (isotypes).

Ecology: Terrestrial and lithophytic rosulate herb. Primary and secondary evergreen broad-leaved humid forests on rich soils on rocky slopes composed with highly eroded marble-like solid crystalline limestone at elevations 700-1000 m a.s.l. FL.: November -January. Rare (DD).

Distribution: NW. Vietnam (Son La and Hoa Binh provinces). NE. India, Nepal, Bhutan, Myanmar, S. China, Thailand, Cambodia, Philippines.

Notes: Species locally fairly common in limestone areas of NW. Vietnam allied to Laos border. Local people are extensively collecting it for sale as ornamental plant, desirable on local markets. Last times species become rare and certainly needs protection.

Studied specimens: NW. VIETNAM, Son La prov., Son La City, Chieng Co municipality, around point 21°18'24"N 103°52'53"E, 20 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 1140a* (LE - photo); NW. VIETNAM, Hoa Binh prov., Lac Son distr., Ngoc Son municipality, Khu Vill., Bua Coi Mt., around point 20°27'10"N 105°18'52"E, 29 March 2011, *N.Q. Hieu, L. Averyanov, N.T. Hiep et al., CPC 1734* (CPC Herbarium).

Dendrobium dixanthum Rchb. f., 1865, Gard. Chron. (1865): 674. Fig. 6.

Described from southern (peninsular) Myanmar ("Moulmein…"). Type ("*Parish 21*") - K.

Ecology: Epiphyte on tall trees. Primary and secondary closed evergreen broad-leaved forests on rocky crystalline marble-like rocky limestone at elevations 900-1000 m a.s.l. Fl.: March - April. Very rare (EN).

Distribution: NW. Vietnam (Dien Bien province). Myanmar, Thailand, Laos.

Notes: Species was found on the territory of Vietnam closely allied to Laotian border. Most probably it "comes" not far from the border inside country.

Studied specimens: VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°13'08"N 102°57'14"E, 4 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 1915* (CPC Herbarium, LE); d-EXSICCATES OF VIETNAMESE FLORA 0174/CPC 1915, fig. 6.

Dendrobium findlayanum C.S.P.Parish et Rchb.f., 1874, Trans. Linn. Soc. London 30: 149 ("*findleyanum*" -sphalm.). Figs. 5b-e.

Described from southern (peninsular) Myanmar ("…in the neighbourhood of Moulmein…"). Type ("Rev. *E.C. Parish*") - W.

Ecology: Epiphyte on old mossy trees. Primary evergreen broad-leaved humid mossy forests on rocky highly eroded crystalline limestone at elevations 900-1200 m a.s.l. Fl.: March - May. Not rare (VU).

Distribution: NW. Vietnam (Dien Bien province). Myanmar, SW. China (Yunnan), N. Thailand, N. Laos.

Notes: This endemic of NW. Indochina was observed in regions of NW. Vietnam allied to Laotian border as fairly common species widely collected as ornamental and medicinal plant. It is presented here by two color forms, with yellow and with dark brown-violet lip center (Figs. 5d & e).

Studied specimens: NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°13'08"N 102°57'14"E, 10 December 2010. *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 851a* (CPC Herbarium, LE); NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Hua Thanh village, around point 21°12'16"N 102°57'27"E, 9 April 2011, *P.V. The, CPC 2315* (CPC Herbarium); NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°12'51"N 102°57'20"E, 10 April 2011, *P.V. The, CPC 2374* (CPC Herbarium); NW. VIETNAM, Dien Bien prov., Dien Bien distr., wild collected plants on road market, 12 April 2011, *L. Averyanov, P.K. Loc, N.T. Vinh, CPC s.n.* (LE - photo).

Dendrobium metrium Kraenzl., 1910, Pflanzenr. Orch.- Dendrob. 4, 50, II B 21: 221. - *D. modestum* Ridl., 1898, Journ. Bot. 36: 211, non Rchb.f., 1855. - *D. sociale* J.J. Sm., 1912, Bull. Jard. Bot. Buitenzorg ser. 2, 3: 61. - *D. batakense* J.J. Sm., 1922, Bull. Jard. Bot. Buitenzorg Ser. 3, 5: 90. - *D. nhatrangense* Gagnep., 1930, Bull. Mus. Natl. Hist. Nat., Ser. 2, 2: 237. - *D. dalleizettii* Gagnep., 1949, Bull. Mus. Natl. Hist. Nat., Ser. 2, 21: 740. - *D. filicaule* Gagnep., 1950, Bull. Mus. Natl. Hist. Nat. Ser. 2, 21: 741. Fig. 5f.

Described from Malacca Penisula ("Sudwestmalayische Provinz: Malayische Halbinsel. Penang Hill"). Type ("*Ridley 7238*") - K.

Ecology: Terrestrial, lithophytic and occasionally epiphytic herb. Primary and secondary evergreen broad-leaved, mixed and coniferous humid forests on granite and shale at elevations 1000-1600 m a.s.l. Fl.: March - May. Rare (VU).

Distribution: Vietnam (Lai Chau, Lao Cai, Thua Thien - Hue, Lam Dong and Khanh Hoa provinces). Thailand, Malacca Peninsula, Sumatra.

Notes: There exist few doubts that all names mentioned here in synonymy belong to alone variable species. Nevertheless, its broad distribution this species everywhere is very rare hence, it is poorly presented in herbarium collections.

Studied specimens: VIETNAM, Tonkin. Entre Lao Kai et Chapa. 28 April 1904, d'Alleizette, s. no. (P); Annam: nord de Ninhhoa, prov. de Nhatrang, 1600 m. 17 - 5 - 1923, *Poilane 6508* (P); Tonkin: San-tan-ngai Nord et Prov. de Lai Chau. 7 - 4 - 1936, *M. Poilane, 25606* (P); Annam: sommet du Nui Bach Ma, station d'altitude un peu au sud de Hue, 1400-1500 m., 8 - 9 - 1938, *Poilane 27674* (P); Annam: environs de Dalat, 1958, Tixier 54 Hort. Bot. Parisiensis anno 1962 (P); Annam: region de Fimnon, 1000 m., Avril 1964, Sigaldi 376 (P); S. VIETNAM, Lam Dong, Datala, Dalat, 12 April 1984, *L. Averyanov et al., LX-VN 1454 (HN, LE), LX-VN 1473* (HN, LE); S. VIETNAM, prov. Lam Dong, 8.5 km to S from Dalat city (11°54'N, 108°27'E). 13 March 1997, *L. Averyanov, N.Q. Binh, N.V.Duy, P.K. Loc, VH 2583* (HN, LE).

Dendrobium senile Parish et Rchb.f., 1865, Gard. Chron. (1865): 434. Fig. 5g.

Described from southern (peninsular) Myanmar ("Burma: Shway-gyen distr., Tenasserim…"). Type ("*Parish 135*") - K.

Ecology: Epiphyte on old mossy trees. Primary evergreen broad-leaved humid mossy forests on rocky highly eroded crystalline limestone at elevations 900-1200 m a.s.l. Fl.: March - May. Very rare (EN).

Distribution: NW. Vietnam (Dien Bien province). Myanmar, Thailand, Laos.

Notes: Very rare endangered species extensively collected by local people for sale as ornamental plant highly desirable on local orchid markets.

Studied specimens: NW. VIETNAM, Dien Bien province area, wild collected plants on market, Dec. 2010, *L. Averyanov, CPC s.n.* (LE - photo); NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°12'51"N 102°57'20"E, 10 April 2011, *P.V. The, CPC 2374a* (LE - photo); NW. VIETNAM, Dien Bien province area, wild collected plants on market, 12 Apr. 2011, *L. Averyanov, CPC -s.n.* (LE - photo).

Dendrobium thyrsiflorum Rchb.f. ex Andre var. ***minutiflorum*** Aver. ***var. nov.*** Fig. 7.

Described from NE. Laos ("Phongsali prov., Muong May distr., around point 21°12'32"N 102°53'44"E. Highly destroyed primary dry evergreen broad-leaved forest along tops of hill ridge composed with shale at elevations 1250-1400 m a.s.l. Epiphyte on old mossy tree").

Type: ("22 April 2011, *L. Averyanov, P.V. The, CPC 2428*") - CPC Herbarium (holotype), LE (isotype). EpiType: d-EXSICCATES OF VIETNAMESE FLORA 0180/CPC 2428, fig. 7.

Trunk or bark epiphyte with several stems clustering on short rhizome. Stems with several nodes, olive-green to yellowish-brown, glossy when young, pendent or ascending, cylindrical, stout, finely longitudinally ridged, to 40 cm long, 5-8 mm in diam., narrowing toward base into woody stalk. Leaves 2-6 on upper part of stem, distichous, narrowly ovate to elliptic, 8-10 (12) cm long, 2-2.5 (3) cm wide, leathery, sheathed at base, obtuse. Inflorescence arising laterally from apical part of previous years stem (commonly lacking leaves), pendulous, 8-12 cm long, densely many flowered; inflorescence stalk 1-2 cm long, enveloped with 2-3 (5) papyraceous, scarious, white to yellowish-brown broad sheaths; floral bracts white, later yellowish, obovate-rhomboid, 10-12 mm long, 3-5 (6) mm wide, narrowing toward base, papyraceous, scarious, with several distinct veins, convolute when dry, bluntly rounded or obtuse at apex. Pedicel and ovary cylindrical, white, 1-1.5 (2) cm long, 1-2 mm in diam. Flowers fragrant, widely opening, 2-2.5 cm in diam.; sepals and petals white, sometime dorsally at base with light purple-violet tint, lip brightly yellow, column and foot yellow, anther cap white. Sepals narrowly ovate, 1-1.2 (1.4) cm long, 5-6 (8) mm wide, obtuse; lateral sepals slightly oblique; mentum subglobose, 3-3.5 (4) mm long. Petals broadly elliptic to suborbicular, shortly clawed at base, as long as sepals, irregularly finely denticulate along margin, almost rounded at apex. Lip indistinctly triangular to suborbicular, shortly clawed, 1.2-1.6 (1.8) cm in diam. (when flattened), inside densely papillose pubescent, with 2 small lateral folds on the disc near base; claw 2.5-3 mm long, concave. Column short,

stout, 2-2.5 mm tall, 1.5-2 mm wide, with 2 prominent lateral stelidia at apex; column foot 3-4 mm, with round nectar cavity at base. Anther cap hemispheric, slightly longitudinally notched, compressed, conic. Fruit cylindric capsule to 5 cm long.

Paratypes: N. VIETNAM, Lao Cai prov., Sa Pa town, anno 1999, *Averyanov L. et al.* (LE - photo); N. VIETNAM, Ha Giang prov., Quang Ba village, HAL s. n., anno 2002, *Averyanov L. et al.* (LE - photo); N. VIETNAM, Lao Cai prov., Sa Pa distr., slopes of Hoang Lien Son Range in vicinities of Sa Pa town, 24 April 2007, *L. Averyanov, P.K. Loc, A. Averyanova, HAL 11133* (LE); N. VIETNAM, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'11.6"N 105°54'53"E, 25 July 2011, *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3753a* (LE).

Ecology: Bark and trunk epiphyte growing in canopies of old trees. Primary evergreen broad-leaved humid submontane and montane forests at elevations (500)1000-1800 m a.s.l. Fl.: April - July. Not rare (LR).

Distribution: N. Vietnam (Lao Cai, Ha Giang and Quang Binh provinces), NE. Laos (Phongsali province), China (SW. Yunnan).

Etymology: Variety name refers size of flowers distinctly smaller than type variety has.

Note: Distribution of *Dendrobium thyrsiflorum* comprises territories of NE. India, SE. Yunnan, N. Myanmar, N. Thailand, Laos and Vietnam (Seidenfaden, 1992; Averyanov, 1994; Averyanov, Averyanova, 2003; Zhu Guanghua *et al.*, 2009). Type variety described from peninsular Myanmar ("Tenasserim, *Parish, 190*") represents species on largest part of this broad area. It has relatively large, rather uniform-sized flowers, commonly 4-4.5 cm in diameter. Meanwhile, in northeastern part of species area small-flowered plants dominate. This geographical race distinctly differs from type variety in many flowered, rather dense inflorescence and in twice-smaller flowers, usually not more than 2.5 cm in diam. Main distribution of this geographical race, that we regard in varietal rank, comprise territories of NE. Laos and N. Vietnam. It is most probably that described variety also lonely represents species in China, where occurrence of type variety is questionable. Described variety become rarer to the south. Qang Binh province of Vietnam is probably southern limit of its distribution in eastern Indochina. In central and southern part of Vietnam only type "large-flowered" variety occurs. In this area, the plant is fairly common, particularly at low elevations and often collected as desirable ornamental plant for cultivation. Described here rather highland, "small-flowered" variety, contrarily, very rarely occurs in living orchid collections and gardens.

Didymoplexiella ornata (Ridl.) Garay, 1954, Arch. Jard. Bot. Rio de Janeiro 13: 33. - *Leucolena ornata* Ridl., 1891, Journ. Linn. Soc., Bot. 28, t. 43. - *Didymoplexis* 1891, Journ. Linn. Soc., Bot. 28, t. 43. - *Didymoplexis ornata* (Ridl.) J.J. Sm., 1920, Bull. Buitenz. 3 ser. 2: 20. Fig. 5h.

Described from Malacca Peninsula ("Bukit Sadanen, Malacca…"). Type ("*Derry* sine no.") - ?

Ecology: Terrestrial tuberiferous achlorophyllous herb. Primary and secondary evergreen, broad-leaved, rather open forests on sandy soil along sea shore. Fl.: April - June. Very rare (DD).

Distribution: N. Vietnam (Quang Ninh province). Southern (peninsular) Thailand, Malaysia, Borneo, Sumatra.

Notes: Surprising discovery of "Malesian" species in addition to recently described in Vietnam *D. denticulata* Aver. (Averyanov, 2010). Newly recorded plant distinctly differs from last species (rather widespread in eastern Indochina) in 3-lobed lip with straight (not denticulate) margin.

Studied specimens: NE. VIETNAM, Quang Ninh prov., Ha Long Bay, Cong Do Island, around point 20°52'371"N, 107°11'748"E, 9 May 2011, *N.T. Hiep, NTH 6271* (CPC Herbarium, LE).

Luisia thailandica Seidenf., 1971, Dansk Bot. Ark. 27, 4: 28. Fig. 5i.

Described from N. Thailand ("Phu Krading 1200 m"). Type ("GT 3725") - C.

Ecology: Bark and branch epiphyte on old mossy trees. Primary evergreen broad-leaved forests on rocky highly eroded crystalline limestone. Fl.: May - June. Rare (VU).

Distribution: NW. Vietnam (Dien Bien and Kon Tum provinces.). Myanmar, N. Thailand, Laos.

Notes: Species very close to widespread *L. psyche* Rchb. f. and may be regarded as its variety. Some specimens from Vietnam have morphological features somewhat intermediate between "true" *L. thailandica* and *L. psyche*. Present discovery confirms rather questionable earlier record of later species for Vietnam (Averyanov, Averyanova, 2002).

Studied specimens: NW. VIETNAM, Dien Bien prov., Dien Bien City, May - June 2010, *P.K. Loc CXC 8* (CPC Herbarium, LE).

Monomeria gymnopus (Hook.f.) Aver., 1994, Ident. Guide. Vietnam. Orch.: 285. - *Bulbophyllum gymnopus* Hook.f., 1890, Fl. Brit. India 5: 764. Fig. 8.

Described from Bhutan and NE. India ("Bhotan Himalaya, alt. 2200 ft., … Khasia Hills, …; at Joowye, alt. 3500 ft. …"). Syntypes ("*Griffith* (Kew Distrib. alt. 3500 ft. …"). Syntypes ("*Griffith* (Kew Distrib. 5133) … Griffith (K.D. 5134) … *Clarke*"). Lectotype ("*Griffith*, Kew distr. 5133") - K.

Ecology: Creeping epiphyte and lithophyte on upper part of cliffs and on tops of ridges. Primary evergreen broad-leaved forests on rocky highly eroded crystalline limestone at elevations 1000-1500 m a.s.l. Fl.: November - December. Not common (VU).

Distribution: NW. Vietnam (Dien Bien province). Bhutan, N. India, Thailand, Laos, SW. China (S. Yunnan).

Notes: Finding of this species in Vietnam essentially expands known area of this rather rare plant to the east.

Studied specimens: NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°13'08"N 102°57'14"E, 9 December 2010, L. Averyanov, P.K. Loc, P.V. The et al., CPC 848 (CPC Herbarium, LE); NW. VIETNAM, Dien Bien prov., Tua Chua distr., Sin Chai municipality, around point 22°03'38"N 103°19'56"E, 14 December 2010, L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh CPC 940 (CPC Herbarium, LE); NW. VIETNAM: d-EXSICCATES OF VIETNAMESE FLORA 0173/CPC 848, fig. 8.

Papilionanthe teres Schltr., 1915, Orchis 9: 78, t. 12. - *Dendrobium teres* Roxb., 1832, Fl. Ind. (1832) 3: 485. - *Vanda teres* (Roxb.) Lindl., 1833, Gen. Sp. Orch. Pl.: 217. Fig. 5j.

Described from Bangladesh ("Chittagong, …"). Syntypes ("*Roxburgh 152*") - BM, ("*Roxburgh 2355*") CAL, K.

Ecology: Creeping epiphyte or occasionally lithophyte. Primary and secondary evergreen broad-leaved forests on rocky crystalline marble-like rocky limestone at elevations 900-1200 m a.s.l. Fl.: June - August. Very rare (EN).

Distribution: NW. Vietnam (Son La and Dien Bien provinces). NE. India, Nepal, Bhutan, Bangladesh, S. China, Andaman Islands, Myanmar, Thailand, Laos.

Notes: Rare endangered species widely collected as ornamental plant and needed protection.

Studied specimens: NW. VIETNAM, Dien Bien prov., Dien Bien distr., Na U municipality, Ca Hau village, around point 21°13'08"N 102°57'14"E, 4 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 1915a* (CPC Herbarium, LE).

Sarcoglyphis brevilabia Aver., ***sp. nov.*** Figs. 9 & 10.

Described from NW. Vietnam ("Dien Bien prov., Muong Cha distr., Hua Ngai municipality, Thien Pa Village, around point 21°52'27"N 103°09'45"E. Highly degraded primary evergreen broad-leaved humid forest on very steep slopes of remnant mountains composed with solid limestone at elevation 1100-1300 m a.s.l. Epiphyte on old tall tree").

Type: ("8 April 2011, L. Averyanov, *P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 2106*") - CPC Herbarium (holotype), LE (isotype). EpiType: d-EXSICCATES OF VIETNAMESE FLORA *0178/CPC 2106*, fig. 10.

Clustering monopodial epiphyte with several erect short stems. Stems 3-8 cm tall, densely leafy throughout, with numerous wiry roots at the base. Leaves 6-10 (12), distichous, oblong, broadly lanceolate to narrowly ovate, (3) 4-7 (8) cm long, 1.5-2.5 cm wide, straight, rigid, fleshy, distinctly conduplicate, broadly sheathed with articulation in middle part of sheath; leaf apex emarginate to unequally bilobed, with rounded to irregularly finely dentate, acute-triangular lobes, sometime with small median mucro. Inflorescences unbranched axillary raceme, commonly as long as leaves or shorter, erect, numerous, arising from axils of nearly all leaves throughout stem; inflorescence stalk rigid, straight to slightly flexuose, 1-2 (3) cm long, with numerous small triangular, acute sterile bracts; rachis straight to slightly arching, 2-4 (5) cm long, with many dense flowers. Floral bracts broadly triangular to broadly ovate, obtuse or acute,

about 1 mm long and wide. Pedicel and ovary cylindric, straight to slightly curved, light green to yellowish, 5-7 mm long, 0.6-1 mm in diam. Flowers widely opening, odorless, 8-9 mm across; rachis, floral bracts, pedicel, ovary, tepals and spur outside sparsely finely hairy with small adpressed scurfy light brownish hairs. Sepals and petals free, yellowish, almost white to the base, cymbiform, roundish or obtuse at apex; sepals subsimilar, narrowly ovate, 3.5-4 mm long, 1.5-2 mm wide; petals broadly lanceolate, 3-3.5 mm long, 0.8-1 mm wide, smaller than sepals. Lip adnate at base to column, spurred, 3-lobed; lateral lobes yellowish outside, purple-violet inside, erect, fleshy, oblique-rectangular, concave, about 1 mm tall and 1.5 mm wide; median lobe yellowish, fleshy, broadly triangular, with free lateral tips (sub-sagittate), about 1 mm long and 1.8 mm wide. Spur white, shortly cylindrical, slightly laterally flattened, 3-3.5 mm long, 1.5-1.6 mm in diam., with fleshy inflation of abaxial wall near entrance, densely hairy inside; back-wall callus shortly cylindrical, densely hairy, joined to the wall by narrow mesentery-like band (abaxial inflation and back wall keel actually form curious septum closed by dense hairiness of both structures). Column white, erect, back bent, stout, footless, about 1.8 mm tall and 1.5 mm wide, with round deep clinandrium. Stigma large concave; rostellum large, raised, apically cylindrical, fleshy, with median longitudinal furrow into which stipe and dorsally placed pollinia recline. Anther cap yellowish, subglobose,beaked, about 1.5 mm across. Pollinia 4, waxy, subglobose, slightly compressed, separate (grouped into 2 pair), each with a short caudicle, attached to long simple lanceolate-lamellate stipe terminated with small reclined ovate viscidium. Fruits unknown.

Ecology: Bark and branch epiphyte growing in canopies of old mossy trees, commonly on tops of remnant limestone formations. Primary evergreen broad-leaved humid forests on rocky, solid, highly eroded limestone at elevations 1100-1300 m a.s.l. Fl.: June - July. Very rare (VU).

Distribution: NW. Vietnam (Dien Bien province). Endemic of highland limestone regions of NW. Vietnam.

Etymology: Species name refers short lip of described plant that is distinctly shorter that lips of all known species of the genus.

Note: *Sarcoglyphis* Garay is small genus of about 14 rather rare species spreading from India and China to Indonesia. Two species were reported from Vietnam until now (Averyanov, Averyanova, 2003). Described species has no clear relations with other species of the genus and represents calcium dependent high-rank endemism of rather highland rocky limestone areas of NW. Vietnam. Plant was discovered in area actually adjoined to borders of Laos and China, hence novelty may be supposedly found in similar natural conditions in NE. Laos and in SE. Yunnan.

Schoenorchis fragrans (C.S.P.Parish et Rchb.f.) Seidenf. et Smitinand, 1963, Orch. Thail. (Prelim. List): 611; Pradhan, 1978, Amer. Orch. Soc. Bull. 47, 10: 912. - *Saccolabium fragrans* C.S.P.Parish et Rchb.f., 1874, Journ. Bot. 12: 197. - *Saccolabium tixieri* Guillaumin, 1958, Bull. Mus. Natl. Hist. Nat., Ser. 2, 30: 462. - Schoenorchis tixieri (Guillaumin) Seidenf., 1975, Contrib. Rev. Orch. Fl. Cambod. Laos,Viet.: 102. Fig. 11a.

Described from central Myanmar ("at Moulmein"). Type ("Rev. *C. Parish*") - W (Herbarium *Reichenbach* 19062).

Ecology: Bark and canopy epiphyte on upper part of cliffs and on tops of ridges. Primary evergreen broad-leaved forests on rocky, highly eroded, crystalline limestone at elevations 800-1100 m a.s.l. Fl.: May - July. Rare (VU).

Distribution: NW. Vietnam (Son La province). NE. India, Burma, Thailand, SW. China (S. Yunnan).

Notes: We find no essential differences of Vietnamese plants from *S. fragrans* desirable for separation of them as a separate species - *S. tixieri* regarded earlier as endemic of Vietnam and S. China.

Studied specimens: NW. VIETNAM, Son La prov., Thuan Chau distr., May -Jun 2010, P.K. Loc NP 150 (CPC Herbarium, LE); NW. VIETNAM, Son La prov., Son La City, Chieng Co municipality, around point 21°18'24"N 103°52'53"E, 20 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh CPC 1138a* (CPC Herbarium, LE); NW. VIETNAM, Son La prov., Thuan Chau distr., Muoi Noi municipality, Sang village, around point 21°18'28"N 103°48'33"E, 30 March 2011, *L. Averyanov, N.T. Hiep, T.B.Ngan, CPC 1817* (CPC Herbarium, LE).

Schoenorchis scolopendria Aver., ***sp. nov.*** Figs. 11b-d, 12.

Described from NW. Vietnam ("N. Vietnam, Thanh Hoa prov., Ba Thuoc distr., Co Lung municipality, territory of Pu Luong protected area, near Co Lung village (20°27'28"N, 105°12'18"E). Primary broad-leaved evergreen forest on tops of remnant highly eroded karst limestone ridge at elev. 550-600 m a.s.l.").

Type: ("17 April 2001, *N.T. Hiep, L. Averyanov, N.T. Vinh, D.T.Doan, HAL 1084*") -HN (holotype), LE (isotype).

Monopodial epiphyte with creeping, plagiotropic, usually unbranched stems densely adpressed to bark of host tree. Stem 3-6 cm long, densely covered throughout with overlapping distichus leaves, in lower part with few short thick flexuose roots arising ventrally from leaf axils. Leaves arranged in two rows, green to dull purple-violet, thick, succulent, narrowly ovoid, 5-8 mm long, 2-3 mm in diam., more or less distinctly canaliculate above, sometimes indistinctly keeled below, cordate in cross section, acute to obtuse, with finely alveolate-cancellate surface, broadening at the base into closed overlapping sheaths embracing stem; old leaves shrunken, conduplicate. Inflorescence arising from leaf axil, 2-4 mm long, bearing 1-2 short, ovate or triangular, obtuse sterile bracts and 1-4 (6) flowers. Floral bracts small, triangular to ovate, obtuse or acute, 0.5-1 mm long. Pedicel and ovary 3-5 mm long, curved,green to dull brown-purple, broadening toward the apex. Flowers odorless, resupinate, not widely opening, 3-4 mm across; light purple-violet, lateral sepals darker, petals sometime nearly white, all tepals thick and fleshy. Median sepal broadly ovate to almost orbicular, 1.5-2 mm long, 1.2-1.8 mm wide, round or shortly obtuse. Lateral sepals obpyriform, very oblique, broadening toward the apex, 2.5-3 mm long, 1.4-1.8 mm wide, shortly obtuse. Petals almost elliptic, 1.5-2 mm long, 1-1.2 mm wide, round or shortly obtuse. Lip not mobile, 3.5-4.5 mm long, 3-4 mm wide, 3-lobed, concave, with conical callus at the center, spurred at the base. Lip side lobes erect, half-orbicular to subquadrate, 1 mm tall. Median lip lobe elongate, 2.5-3 mm long, 1-1.5 mm wide, with finely

erose upward incurved subacute apex, at center with 2 large fleshy cushions separated by narrow cleft. Spur white with purple-violet tint, at a right angle to the lip, 2.5-3 mm long, 1-1.2 mm wide, broadening and slightly bifid at the apex; on lower surface (opposite column) near opening with fleshy subquadrate callus, and with low longitudinal septum inside, just near apex. Column white with violet tint, shortly cylindric, about 1 mm tall and broad, truncate, with almost flat clinandrium and large triangular acute forward directed lateral wings, at front at the base with round concave stigma. Operculum brightly yellow, hemispheric, about 1 mm in diam., with elongate, obtuse, shortly recurved beak. Pollinarium consists of 4 pollinia, caudicles, stipe and viscidium. Pollinia solid, yellow, hemispherical, arranged into 2 almost spherical pairs. Caudicles very small, insignificant. Stipe in form of simple triangular lamina attached by broad base to central part of viscidium. Viscidium in form of thin flat narrowly ovate plate, very large, as long as column or longer. Fruit dry, grey to grey-brown obovoid capsule, 5-6 mm long, 2.5-3.5 mm in diam.

Paratypes: NW. VIETNAM, Son La prov., Quynh Nhai distr., Muong Chien community, Muong Chien village, 600-900 m, around point 21°50'50"N, 103°32'10"E, 30 November. 2007, *P.K. Loc, N.T. Vinh, HAL 11292* (HN, LE - photo); NW. VIETNAM, Son La prov., May-Jun. 2010, P.*K. Loc, NMD 101* (CPC Herbarium, LE); NW. VIETNAM, Son La prov., Son La City, Chieng Co municipality, around point 21°18'24"N 103°52'53"E, 20 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 1139* (CPC Herbarium, LE); NW. VIETNAM, Hoa Binh prov., Lac Son distr., Tu Do municipality, Mon village, around point 20°24'52"N 105°19'41"E, 23 March 2011, *N.Q. Hieu, L. Averyanov, N.T. Hiep et al., CPC 1387* (CPC Herbarium, LE); NW. Vietnam, Son La prov., Thuan Chau distr., Muoi Noi municipality, Sang village, around point 21°18'28"N 103°48'33"E, 30 March 2011, *L. Averyanov, N.T. Hiep, T.B.Ngan, CPC 1818* (CPC Herbarium, LE).

Ecology: Creeping bark and branch epiphyte on old trees (often on *Pistacia veinmanniifolia* and *Anogeissus acuminata*). Primary and secondary broad-leaved evergreen forests on slopes and on tops of rocky remnant limestone mountains composed with solid, crystalline, marble-like highly eroded limestone at elevations 300-1100 m a.s.l. Fl:. May - July, fruits November. Very rare (EN).

Distribution: N. Vietnam (Son La, Hoa Binh and Thanh Hoa provinces). NE. Laos. Species is probably local endemic of limestone areas of NW. Vietnam and allied territories of Laos. Some discovered localities were found very near to Laotian border, hence there exist few doubts that species may be found on the territory of Laos in similar natural condition near to the border between countries.

Etymology: Species name refers habit of the plant that resembles a small centipede hiding in bark folds on shady old trees.

Notes: Firstly the plant described here was discovered more than ten years ago, but since then it was wrongly recorded in orchid flora of Vietnam as *Schoenorchis seidenfadenii* Pradhan (Averyanov, Averyanova, 2003) due to resemblance of the lip, bearing 2 fat calluses on mid-lobe characteristic for both species. However, additional study exhibits bright clear difference of our plant from all known species of the genus in elongate creeping plagiotropic stem, acute alveolate leaves and internal structure of the flower. Nevertheless, its plagiotropic creeping stem unusual

for the genus, our species undoubtedly belongs to *Schoenorchis* Sect. *Pumila* Aver. (Averyanov, 1994) together with such well known species as *S. brevirachis* Seidenf., *S. fragrans* (C.S.P. Parish et Rchb. f.) Seidenf. et Smitinand, *S. manipurensis* Pradhan, *S. seidenfadenii* Pradhan and still very obscure species - *S. tixieri* (Guillaumin) Seidenf. Like all these species, our novelty is desirable for cultivation as miniature ornamental plant with quite attractive flowers and unusual habit. In its native area *S. scolopendria* grows in very similar natural, environmental and climate conditions, which were described in details for *Paphiopedilum barbigerum var. coccineum* in our early publications (Averyanov et al., 2003, 2004). It is noticeable that this species sometime grows just together with *S. fragrans*, which is similarly very rare in Vietnam.

Stereochilus brevirachis Christenson, 1998, Orchid Digest 62, 3: 123. Fig. 5k.

Described from China ("China, without precise locality"). Type ("June 1997, Hort. *M. Turkel s.n.*") - K.

Ecology: Miniature bark and canopy monopodial epiphyte. Primary evergreen, broad-leaved, mixed and coniferous humid forests on rocky slopes of remnant mountain composed with highly eroded solid limestone at elevations 1000-1200 m a.s.l. Fl.: May -June. Very rare (CR).

Distribution: NW. Vietnam (Lam Dong? and Son La provinces). S. China.

Notes: All available earlier records of *S. brevirachis* for S. Vietnam and S. China (Christenson, 1998; Averyanov, Averyanova, 2005; Chen Xinqi, Wood, 2009) were based exclusively on cultivated plants of uncertain origin. Present record indicates native area of this extremely rare species and provides original data on its ecology at first.

Studied specimens: NW. VIETNAM, Son La prov., Yen Chau distr., Muong Lum municipality, Na Hat village around point 21°00'35"N 104°29'06"E, 1 April 2011, L. Averyanov, N.T. Hiep, T.B.Ngan, CPC 1853a (CPC Herbarium, LE).

Stereochilus erinaceus (Rchb.f.) Garay, 1972, Bot. Mus. Leafl. 23, 4: 205. -Sarcanthus erinaceus Rchb., 1864, Bot. Zeitung (Berlin) 22: 298. -S. stowellianus Bateman, 1867, Bot. Mag. 93, t. 5630. Fig. 11e.

Described from southern (peninsular) Myanmar ("Aus Moulmeyne von Herrn Low eingefuehrt und von Herrn Bullen cultivirt"). Type - K.

Ecology: Miniature canopy epiphyte growing in canopies of tall trees. Primary broad-leaved evergreen forests on remnant mountains composed with solid, crystalline, highly eroded rocky limestone at elevations 500-700 m a.s.l. Fl.: June -August. Very rare (DD).

Distribution: NW. Vietnam (Hoa Binh province). SW. Myanmar, W. Thailand.

Notes: This is surprising discovery distant over than 1000 km from its main distribution in southwest of Myanmar and Thailand. Our specimens differ from Burmese and Thailandian plants in narrower and longer leaves, in very short inflorescence, in larger flowers (sepals 5-6 mm long) and in broader, irregularly denticulate or erose petals. They may certainly represent

separate, geographically isolated variety endemic for eastern Indochina.

Studied specimens: NW. VIETNAM, Hoa Binh prov., Lac Son distr., Tu Do municipality, Mon village, around point 20°25'29"N 105°19'36"E, 25 March 2011, *N.Q. Hieu, L. Averyanov, N.T. Hiep et al., CPC 1592a* (CPC Herbarium, LE).

Theana Aver., **gen. nov.**

Miniature dwarf monopodial canopy epiphyte settled down on small mossy branches in marginal tree canopy zone. Stems regularly unbranched, straight, pendulous or ascending, 0.5-1.5 cm long, 2-3 mm wide, with 2-4 (5) leaves at apex; in lower part covered by distichous, imbricate, dirty gray-brownish, partially disintegrated leaf sheaths penetrated by numerous thick, flexuose, greenish, fasciculate, terete roots. Leaves distichous, oblong, broadly lanceolate to narrowly ovate, (1) 1.5-3 (4) cm long, (4) 5-8 (10) mm wide, leathery, straight or curved, conduplicate to almost flat, sheathed, with articulation at base of leaf blade; leaf apex 3-dentate, with oblique-triangular, acute lateral lobes and subulate median acute mucro. Inflorescences unbranched axillary raceme, normally as long as leaves or little shorter, erect; inflorescence stalk filiform, rigid, straight to ascending, thickening upward, 1-2 cm long, with (1) 2-3 small triangular, acute, sterile bracts at base and with 1 broad acute, tubular bract at the middle; rachis at wide angle to stalk, short, straight, distinctly swollen, 5-8 mm long, 2-3 mm in diam. (when fresh), with many dense flowers opening in succession. Floral bracts triangular to broadly-triangular, concave, fleshy, dorsally with thick low median keel, obtuse to acute, 1-2 mm long, 1 mm wide. Pedicel and ovary cylindric, straight to slightly ascending, distinctly ridged, light green, 2-4 mm long, 0.6-0.8 mm in diam. Flowers not resupinate, odorless, hardly opening, 3-4 mm across, glabrous, lasting 1-2 days. Sepals and petals free, yellowish-green, turning yellowish during anthesis, fleshy, dorsally carinate, concave, obtuse to acute; sepals subsimilar, narrowly ovate, 2.5-3 mm long, 0.8-1 mm wide, lateral sepals slightly oblique; petals broadly lanceolate, slightly smaller than sepals. Lip yellowish-white, firmly adnate to column base, spurred, almost entire, straight, cymbiform, forward directed, 2.5-3 mm long, 0.8-1 mm wide, with acute, upward turned apex; lateral sides and apical part of lip fleshy, disc hollowed at center near opening to spur. Spur placed at straight angle to ovary and lip, slightly transversely flattened, without any septum, yellowish-green to yellowish, broadly conical, about 1 mm long and broad at base, with broadly ligulate, fleshy, glabrous, forwardly directed protuberance rising from back-wall near to column base. Column footless, yellowish-white to almost white, erect, short, stout, slightly broadening to the apex, about 1 mm tall and 0.8 mm wide, with round shallow clinandrium and with short, distinctly raised, laterally compressed, furrowed longitudinally rostellum, slightly projected at front. Stigma large, concave. Anther cap yellowish-white to almost white, helmet-like, 3-4 mm in diam., shallowly notched at apex, shortly beaked at front; beak short, oblong, straight, shortly recurved at apex. Pollinia 4, in two pair, waxy, light yellow; each pair consist of 2 completely separated, very unequal pollinia densely adpressed each other (giving superficial impression of entire ovoid structure); all four pollinia attached to common short, simple, linear stipe with spoon-like broadening at the base, terminated with small reclined narrowly ovate viscidium. Fruits unknown.

Type: T. vietnamica Aver. Monotype genus.

Distribution: One species endemic of NW. Vietnam.

T. vietnamica Aver., **sp. nov.** Figs. 11f & g, 13.

Described from northwestern Vietnam ("Hoa Binh prov., Lac Son distr., Tu Do municipality, Mon village, around point 20°25'29"N 105°19'36"E, primary broad-leaved forest on steep rocky slopes of remnant mountain composed with solid crystalline highly eroded limestone at elevation about 500-700 m a.s.l., canopy epiphyte on tall tree on rocky slope").

Type: ("25 March 2011, *L. Averyanov, P.V. The, N.T. Vinh et al., CPC 1592*") - CPC Herbarium (holotype), LE (isotype).

Ecology: Rare dwarf canopy epiphyte growing in marginal zone of canopies of old mossy trees, commonly in humid depressions between tops of remnant limestone formations. Primary evergreen broad-leaved closed forests on rocky, solid, highly eroded limestone at elevations 500-700 m a.s.l. Fl.: March - April. Very rare (DD).

Distribution: NW. Vietnam (Hoa Binh province). Endemic of limestone regions of NW. Vietnam.

Etymology: Genus named after its discoverer, Vietnamese botanist - Pham Van The, species name refers its native country.

Note: Discovered plant belongs to weakly studied group of small miniature inconspicuous monopodial canopy epiphytes segregated in southeastern Asia among such genera as *Ascochilopsis* Carr, *Ascochilus* Ridl., *Biermannia* King et Pantl., *Bogoria* J.J. Sm., *Chamaeanthus* Schltr., *Chroniochilus* J.J. Sm., *Saccolabiopsis* J.J. Sm., *Sarcoglyphis* Garay, *Stereochilus* Lindl. and *Tuberolabium* Yamamoto. Though large number of established genera with various combinations of morphological features our plant do not fits with any one of them in its specific morphology (Table 1). Such significant diagnostic features as swollen rachis, entire lip, firmly adnate to the base of footless column, ligulate back-wall callus in spur, raised furrowed ridge at frontal part of clinandrium and 4 completely separated pollinia provide to newly described genus distinct, very recognizable character. Discovered plant, probably, has closest relation with two known species of *Ascochilus*, which also have swollen rachis, footless column and firmly attached lip. However, our plant distinctly differs from mentioned genus in 4 completely separated pollinia, entire lip, in raising furrowed longitudinal ridge in frontal part of clinandrium and in characteristic prominent ligulate back-wall callus placed in spur near column base.

Vanda brunnea Rchb.f., 1868, Xenia Orchid. 2: 138. - *Vanda henryi* Schltr., 1921, Repert. Spec. Nov. Regni Veg. 17: 71. Figs. 11h-l.

Described from southern (peninsular) Myanmar ("Burma: Ta-ok Thoung, Tenasserim"). Lectotype ("*Parish 177* anno 1864" - Seidenf., 1988: 201) - K.

Ecology: Humus and bark epiphyte, commonly on tall mossy trees. Primary and old secondary evergreen broad-leaved humid mountain forests on any kind of soils, but preferably on rocky limestone at elevations 1000-1500 m a.s.l. Fl.: November - May. Locally common (VU).

Distribution: NW. Vietnam (Son La, Dien Bien and Lao Cai provinces). Myanmar, Thailand, S. China (S. Yunnan).

Notes: This rare species, firstly recorded for Vietnam, was observed as surprisingly common plant in a number of localities in northwestern part of the country allied to Laotian border. Here species exhibits great variation in size, shape and particularly in coloration of flowers (Fig. 11i-l). In its incredibly wide variation some forms approximate to V. concolor Blume (Fig. 11i), while others somewhat resemble V. liouvillei Finet (Fig. 11j). Abundance of such forms gives certain, though indirect, evidence of possible introgressive hybridization of mentioned species at least in the past. All forms produce chocolate fragrant flowers of outstanding beauty lasting 3-4 month, therefore they are widely collected by local people for sale as ornamental plants highly demanded on local orchid markets. Last times species become rare due to wide commercial collecting and needs effective protection.

Studied specimens: NW. VIETNAM, Lao Cai prov., Sa Pa distr., vicinities of Sa Pa town, 24 Nov. 2005, *L. Averyanov, P.K. Loc, HAL 8312* (HN, LE); NW. VIETNAM, Dien Bien prov., Tua Chua distr., Sin Chai municipality, around point 22°03'38"N 103°18'56"E, 13 Dec. 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 891* (CPC Herbarium); NW. VIETNAM, Son La prov., Son La City, Chieng Co municipality, around point 21°18'24"N 103°52'53"E, 20 Dec. 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 1140a* (LE - photo); NW. VIETNAM, Dien Bien prov., Muong Cha distr., Hua Ngai municipality, Ha La Chu village, around point 21°53'46"N 103°10'17"E, 7 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 1945* (CPC Herbarium, LE); NW. VIETNAM, Dien Bien prov., Tua Chua distr., Trung Thu municipality, Trung Thu village, around point 21°55'38"N 103°18'05"E, 10 April 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 2124* (CPC Herbarium, LE); NW. VIETNAM, Dien Bien prov., Dien Bien City area, wild collected plant on road market, 12 April 2011, L. *Averyanov et al., CPC s.n.* (LE - photo).

ACKNOWLEDGEMENTS

Table 1. Comparative diagnostic morphological characters of Theana and related genera

DIAGNOSTIC DISCRIMINATIVE FEATURES	GENERA COMPARED										
	Ascochilopsis	*Ascochilus*	*Biermannia*	*Begoria*	*Chamaeanthus*	*Chromochilus*	*Saccolabiopsis*	*Sarcoglyphis*	*Stereochilus*	*Tuberculabium*	*Thecata*
Rachis distinctly swollen, fleshy + / Rachis not swollen or hardly swollen -	+	-	-	-	-	-	-	-	-	-	+
Column foot present + / Column footless -	-	+	+	+	+	+	-	-	-	-	-
Lip firmly adnate to column base + / Lip more or less movable -	+	-	-	-	-	-	+	+	+	+	+
Spur present + / Spur absent -	+	+	±	+	-	-	+	+	+	+	+
Lip entire + / Lip 3-lobed -	-	-	±	-	±	-	±	-	-	-	+
Back-wall callus present + / Back-wall callus absent -	-	-	-	-	-	-	±	±	+	-	+
Longitudinal septum in spur present + / No longitudinal septum in spur -	-	-	-	-	-	-	-	±	+	-	-
Pollinia 2 + / Pollinia 4 -	+	+	+	-	+	+	-	-	-	+	-
Clinandrium at front with raised furrowed longitudinal ridge + / Clinandrium without raised callosities -	-	-	-	-	-	-	-	+	-	-	+
Rostellum projection long + / Rostellum projection of medium size or insignificant -	+	-	-	-	-	-	-	+	+	-	-
Stipe linear, hardly widening at base + / Stipe not linear -	+	+	+	?	±	±	+	+	+	+	+

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越南植物誌蘭科之新分類群與新紀錄種

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摘要：本篇研究針對越南的蘭科植物描述了一個新屬 (*Theana*)，四個新種 (*Theana vietnamica, Bulbophyllum salmoneum, Sarcoglyphis brevilabia, Schoenorchis scolopendria*，*一個新變種* (*Dendrobium thyrsiflorum var. minutiflorum*)
並提供了越南植物誌新增的二十一個蘭科新紀錄種 (*Bulbophyllum bicolor, B. muscicola, B. nigrescens, B. putii, B. violaceolabellum, Calanthe mannii, C. whiteana, Coelogyne micrantha, Cymbidium cyperifolium, Dendrobium dixanthum, D. findlayanum, D. metrium, D. senile,*

Didymoplexiella ornata, Luisia thailandica, Monomeria gymnopus, Papilionanthe teres, Schoenorchis fragrans, Stereochilus brevirachis, S. erinaceus, Vanda brunnea) 之相關資料。

關鍵詞：天然保護，蘭科，植物多樣性，植物分類學，越南。

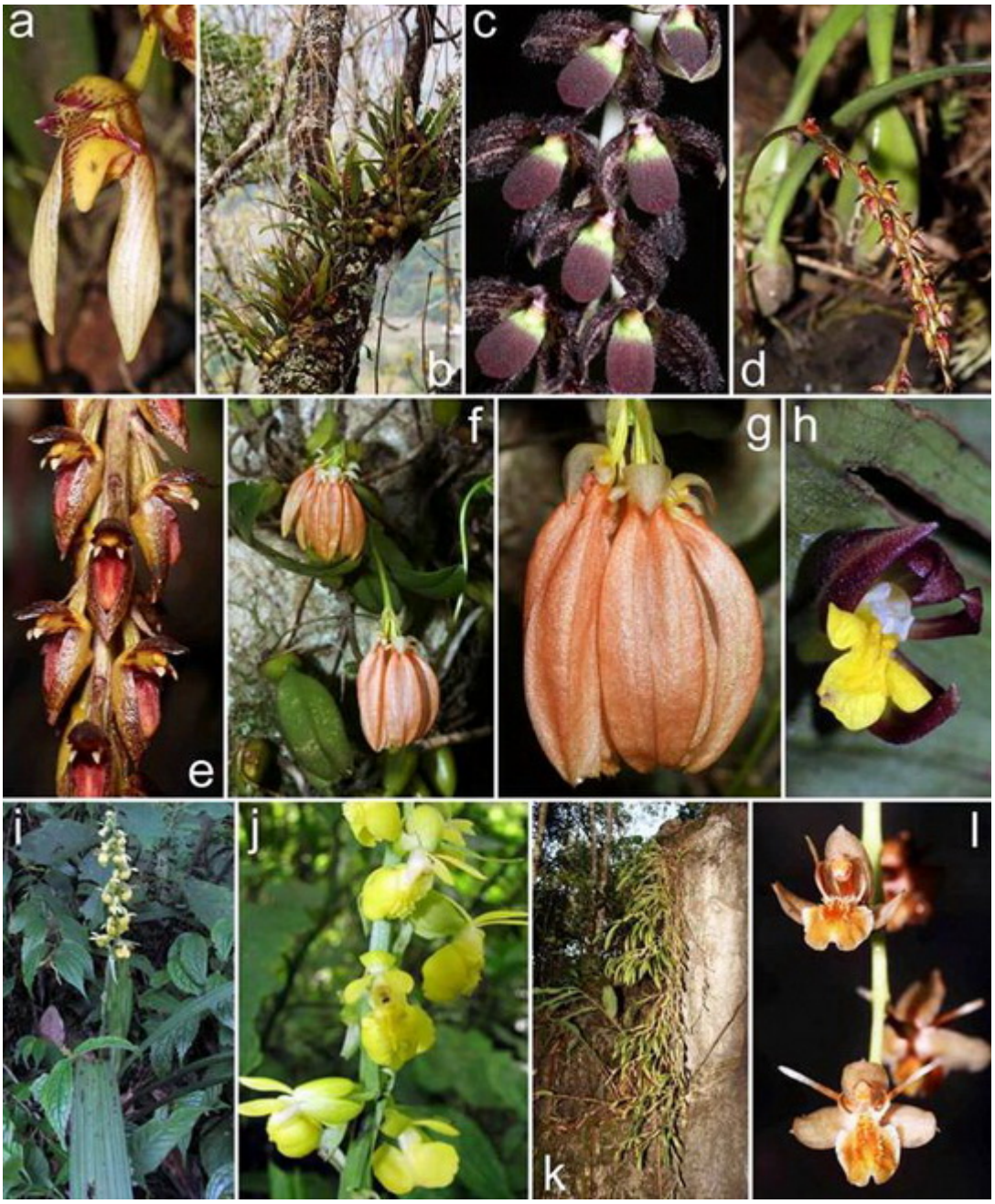

Fig. 1. a: *Bulbophyllum bicolor (P.K. Loc, CXC 5)*. **b, c**: *B. nigrescens (Averyanov et al., CPC 2269)*. **d, e**: *B. putii (Averyanov et al., CXC 21)*. **f, g**: *B. salmoneum (type, N.T. Hiep et al., CPC 3657)*. **h**: *Calanthe mannii (N.T. Hiep et al., HAL 12865)*. **i, j**: *C. whiteana (May 2011, Khang s.n.)*. **k, l**: *Coelogyne micrantha (Averyanov et al., CPC 1077)*. Photos by P.K. Loc (a), L. Averyanov (b-g, k, l), N.Q. Hieu (h) and N.S. Khang (i, j).

Fig. 2. *Bulbophyllum muscicola* Rchb.f. Digital herbarium specimen: d-EXSICCATES OF VIETNAMESE FLORA *0166/HAL 12681f* (all photos and design by L. Averyanov).

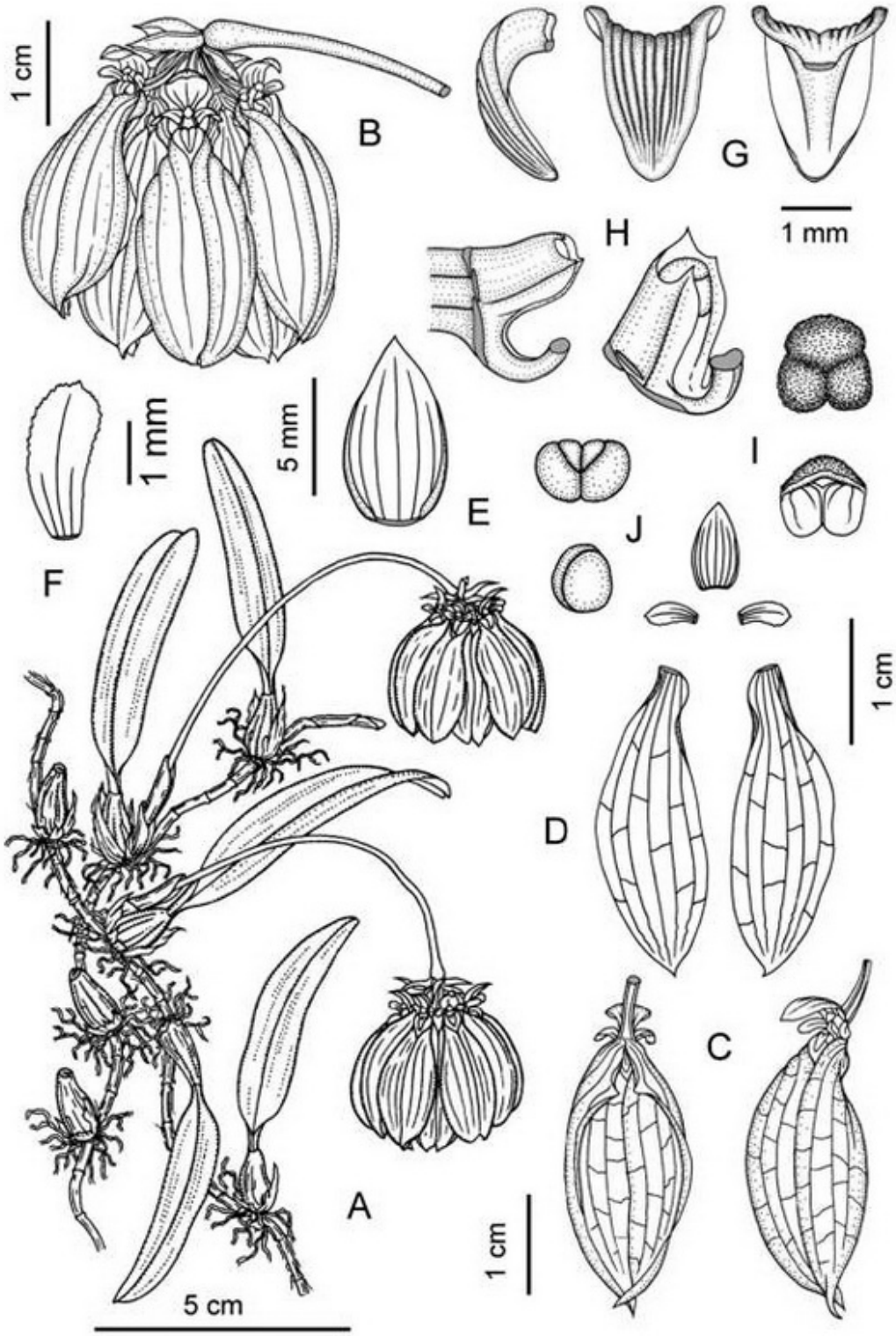

Fig. 3. *Bulbophyllum salmoneum* Aver. et J.J. Verm. **a**: flowering plant. **b**: inflorescence. **c**: flowers, frontal view and view from behind. **d**: flattened sepals and petals. **e**: median sepal. **f**: petal. **g**: lip, frontal view, view from behind and side view. **h**: column, half-side and side view. **i**: operculum (anther cap). **j**: pollinia. All drawn from the type - *CPC 3657* by L. Averyanov, T. Maisak and J. Vermeulen.

Fig. 4. *Bulbophyllum violaceolabellum* Seidenf. Digital herbarium specimen: d-EXSICCATES OF VIETNAMESE FLORA *0181/CPC 2318* (all photos and design by L. Averyanov).

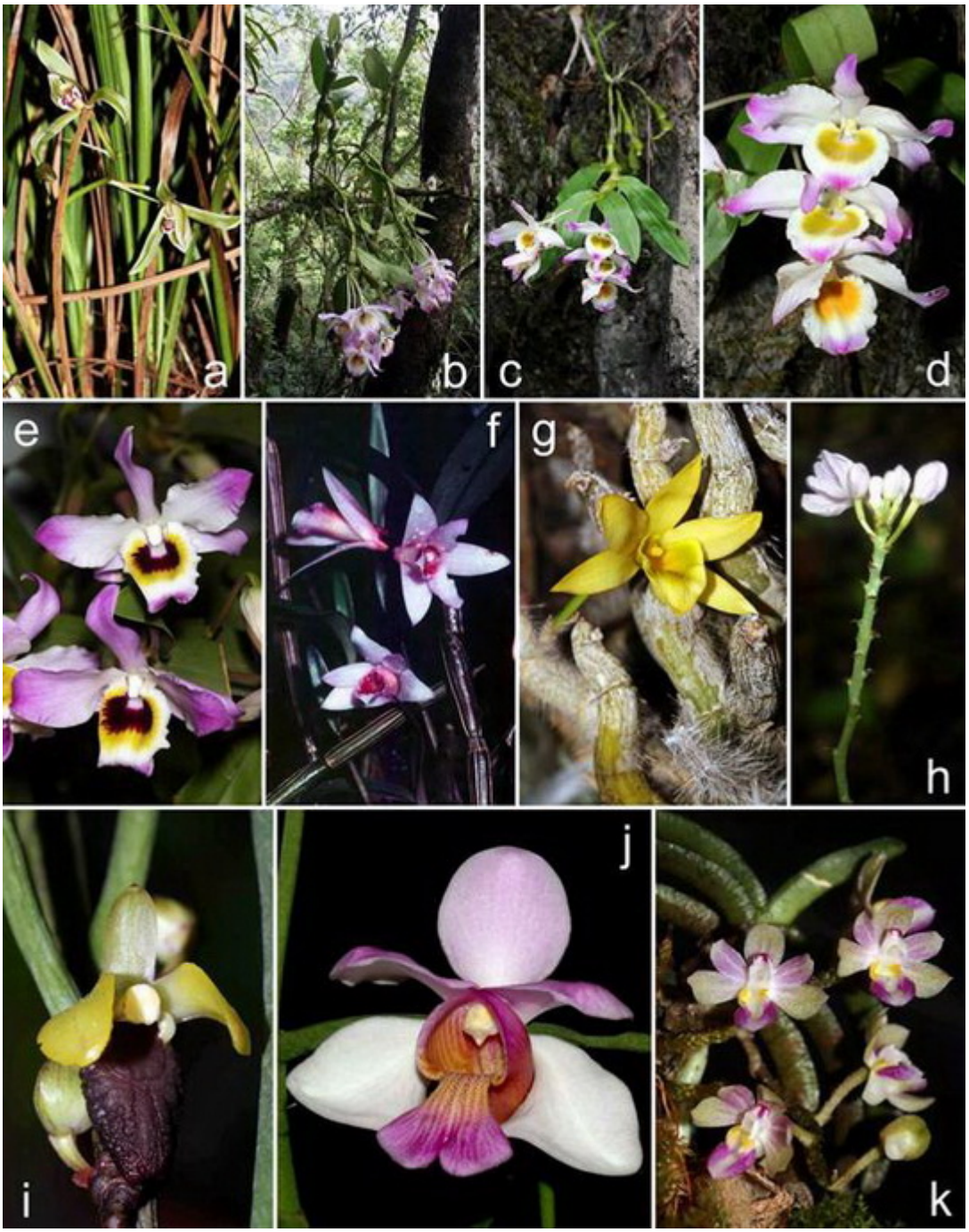

Fig. 5. a: *Cymbidium cyperifolium* (Averyanov at al., *CPC 1140a*). **b-e**: *Dendrobium findlayanum* (b - *P.V. The, CPC 2374*, **c, d**- *P.V. The, CPC 2315*, **e**: - 12 April 2011, *Averyanov et al., CPC s.n.*). **f**: *D. metrium* (*Averyanov et al., VH 2583*). **g**: *D. senile* (12 Apr. 2011, *Averyanov et al., CPC s.n.*). **h**: *Didymoplexiella ornata* (*N.T. Hiep, NTH 6271*). **i**: - *Luisia thailandica* (*P.K. Loc CXC 8*). *j*: *Papilionanthe teres* (*Averyanov et al., CPC 1915a*). *k*: *Stereochilus brevirachis* (*Averyanov et al., CPC 1853a*). Photos by L. Averyanov (a, e-g, k), P.V. The (b-d, j), N.T. Hiep (h) and P.K. Loc (i).

Fig. 6. *Dendrobium dixanthum* Rchb.f. Digital herbarium specimen: d-EXSICCATES OF VIETNAMESE FLORA *0174/CPC 1915* (all photos and design by L. Averyanov).

Fig. 7. *Dendrobium thyrsiflorum* Rchb. f. ex Andre var. minutiflorum Aver. Digital epiType: d-EXSICCATES OF VIETNAMESE FLORA *0180/HAL 2428* (all photos and design by L. Averyanov).

Fig. 8. *Monomeria gymnopus* (Hook.f.) Aver. Digital herbarium specimen: d-EXSICCATES OF VIETNAMESE FLORA *0173/CPC 848* (all photos and design by L. Averyanov).

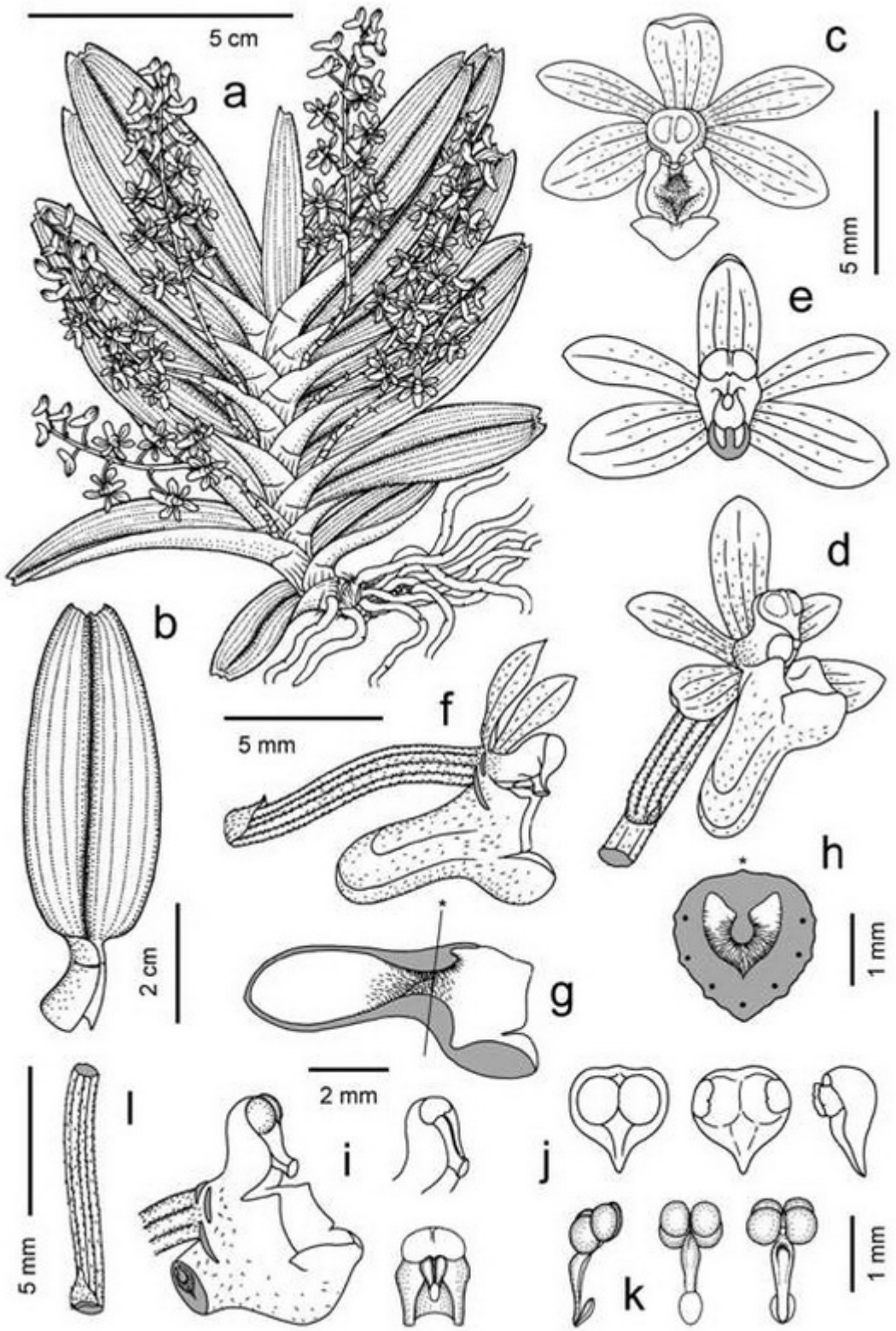

Fig. 9. *Sarcoglyphis brevilabia* Aver. **a**: flowering plant. b: leaf. **c, d**: flower, frontal and half-side views. **e**: flattened flower with removed lip, frontal view. **f**: flowers with removed lateral sepal and petal, side view. **g**: lip sagittal section. **h**: transversal spur section (along line marked

on sketch g with asterisk). **i**: column with and without operculum, half-side and frontal views. **j**: operculum (anther cap). **k**: pollinarium. **l**: floral bract, pedicel and ovary. All drawn from the type -*CPC 2106* by L. Averyanov and T. Maisak.

Fig. 10. *Sarcoglyphis brevilabia* Aver. Digital epitype: d-EXSICCATES OF VIETNAMESE FLORA *0178/CPC 2106* (all photos and design by L. Averyanov).

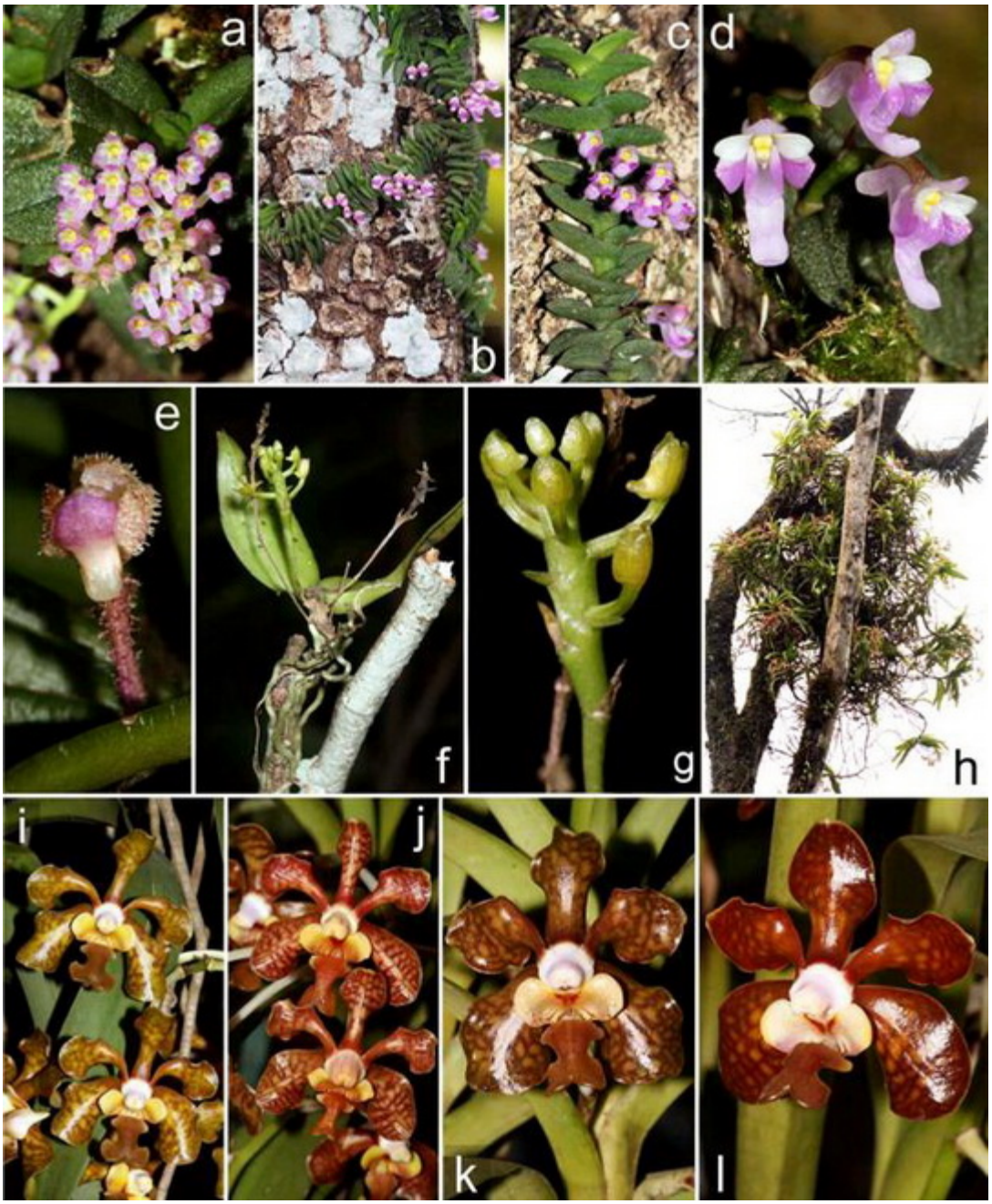

Fig. 11. a: *Schoenorchis fragrans* (C.S.P. Parish et Rchb.f.) Seidenf. et Smitinand (*Averyanov et al*., *CPC 1817). S. scolopendria* (**b, c**- *P.K. Loc HAL 11292*, **d**- *Averyanov et al*., *CPC 1818*). **e**: *Stereochilus erinaceus* (*Averyanov et al*., *CPC 1592a*). **f, g**: *Theana vietnamica* (*Averyanov et al*., *CPC 1592*). **h-l**: *Vanda brunnea* (h, k - *Averyanov et al*., *CPC 1945*, i – 12 April 2011, *L. Averyanov et al*., *CPC s.n.*, l - *Averyanov et al., CPC 2124*). Photos by L. Averyanov (a, d-l) and P.K. Loc (b, c).

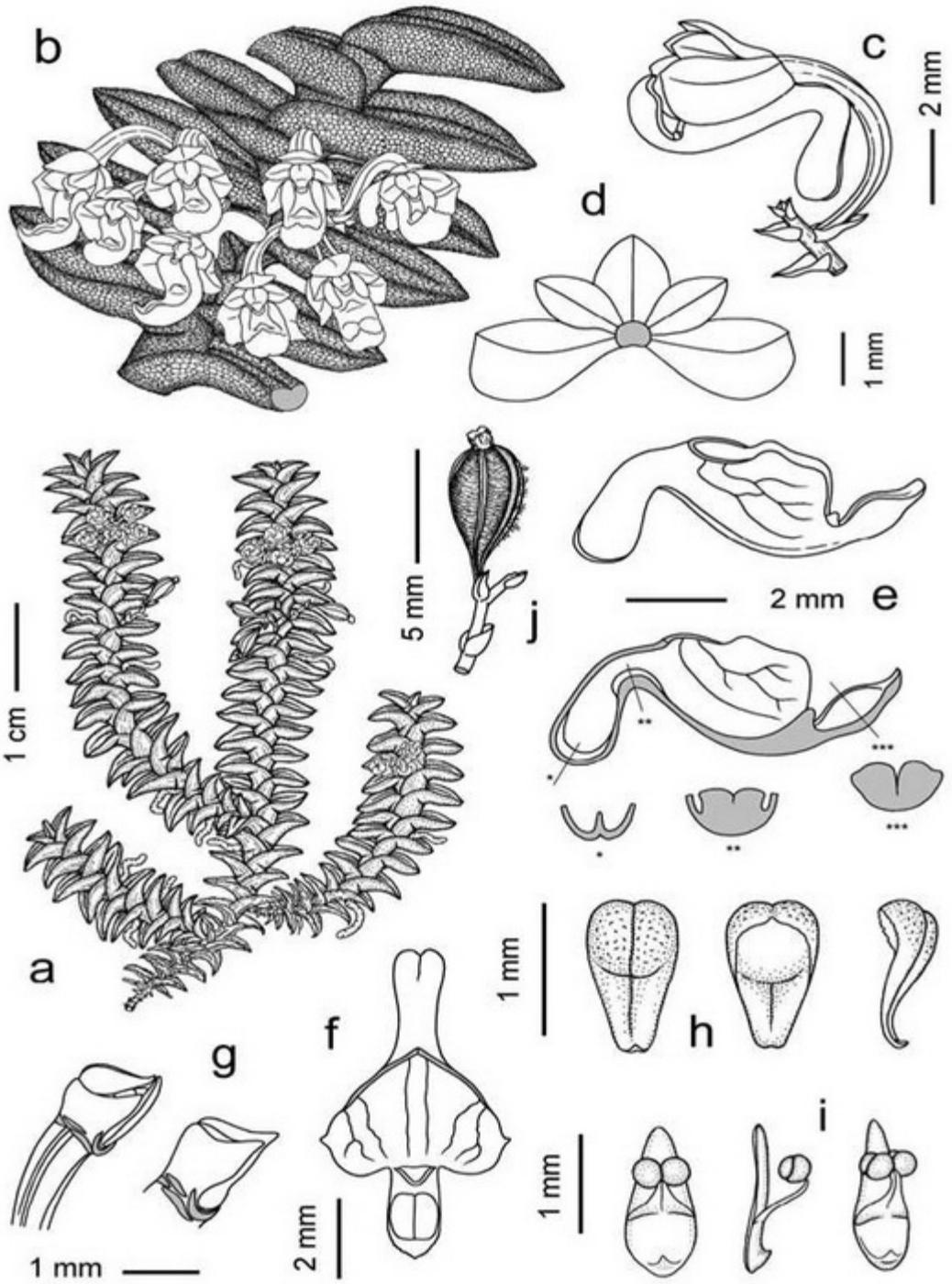

Fig. 12. *Schoenorchis scolopendria* Aver. **a**: flowering plant. **b**: portion of stem with inflorescences. **c**: flower, side view. **d**: flattened sepals and petals. **e**: lip, side view and sagittal section; asterisks indicate respectively cross lip sections made along black lines. **f**: flattened lip with partially dissected spur. **g**: column with and without operculum, side view. **h**: operculum (anther cap), view from above, from below and side view. **i**: pollinarium, adaxial, side and half-side views. **j**: ripe capsule. All drawn from the type - *HAL 1084* by L. Averyanov and T. Maisak.

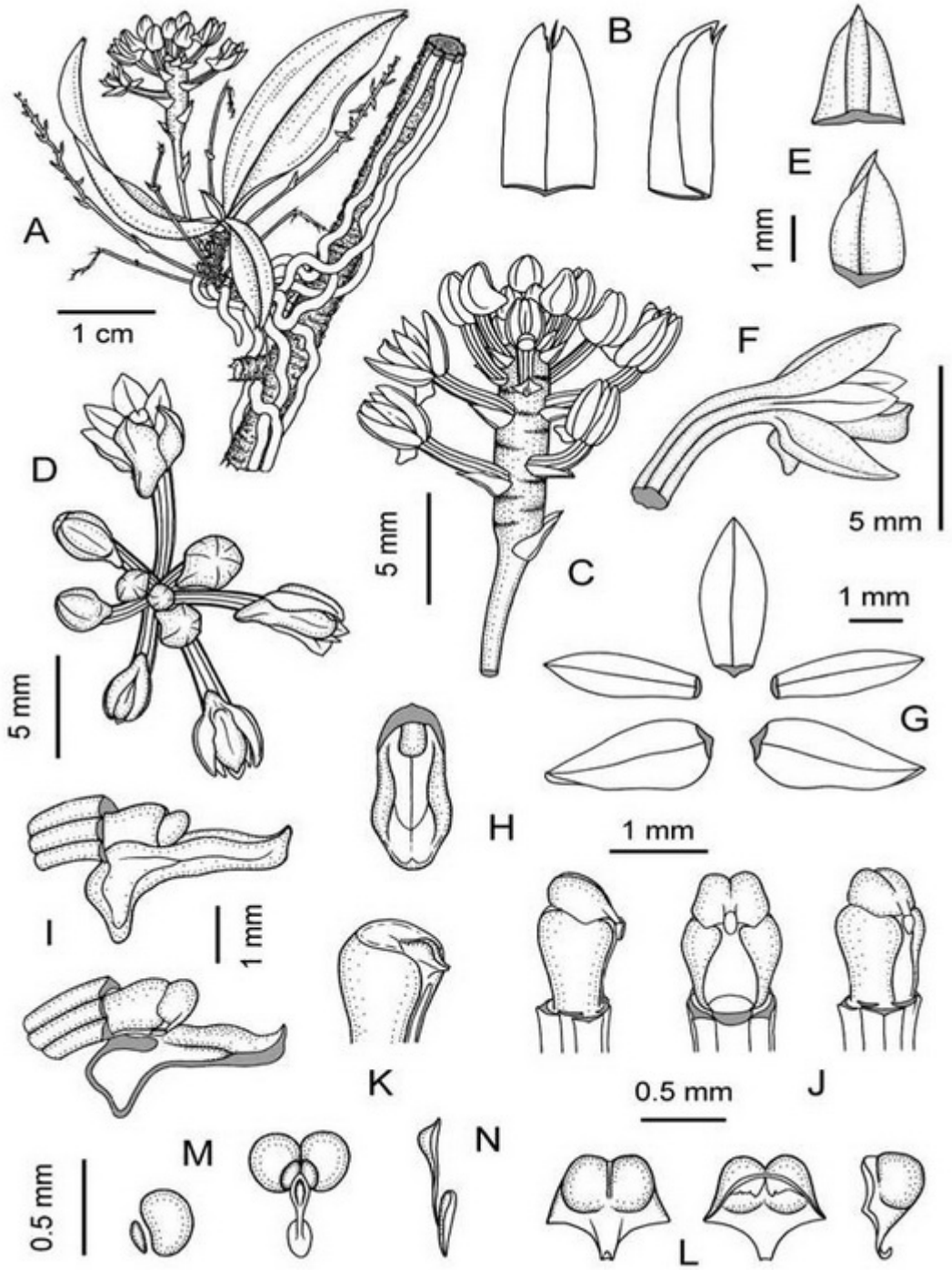

Fig. 13. *Theana vietnamica* Aver. **a**: flowering plant. **b**: leaf apex. **c, d**: inflorescence, side view and view from the top. **e**: floral bracts. **f**: flower, side view. **g**: flattened sepals and petals. **h**: lip, view from above. **i**: lip, side view and lip sagittal section. **j**: column, frontal, side and half-side views. **k**: column apex without operculum. **l**: operculum (anther cap), view from above, from below and side view. **m**: pollinarium and pollinia. **n**: pollinarium stipe. All drawn from the type - *CPC 1592* by L. Averyanov.

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