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New orchids in the flora of Vietnam

Leonid V. Averyanov, Khang Sinh Nguyen, Nguyen Thien Tich, Phi Tam Nguyen, Van Duy Nong, Van Canh Nguyen & Canh Chu Xuan

Summary: This paper summarizes results of joint efforts of professional botanists and orchid enthusiasts on studies of Vietnamese native orchids during the last three years. It provides new original data about the discovery of 4 genera (*Brachypeza* Garay, *Drymoda* Lindl., *Macropodanthus* L.O. Williams, *Octarrhena* Thwaites) and 44 orchid species new for the flora of Vietnam. Valid name, main synonyms, data on type, ecology, phenology, estimated IUCN Red List status, distribution, studied specimens as well as brief taxonomic and biological notes are provided for each species. Twelve species (*Bulbophyllum blaoense*, *Cheirostylis glandulosa*, *Eria grandicaulis*, *E. praecox*, *Liparis caudata*, *L. longispica*, *Luisia parviflora*, *Oberonia janae*, *O. tatianae*, *Octarrhena minuscula*, *Odontochilus aureus* and *Vanda gracilis*) are described as new for science. An illustrated checklist of all studied species is arranged in alphabetical order. Including present data, the known orchid flora of Vietnam comprises currently at least 1180 documented species from 170 genera.

Keywords: Orchidaceae, new species, flora of Vietnam, Indochina, plant endemism, plant taxonomy, plant diversity, plant geography, nature protection

The orchid flora of Vietnam is probably the richest among all other regional floras of mainland Asia. Intensive orchid studies during last decades greatly expanded our knowledge and confirmed an outstanding orchid diversity within this region. Successive exploratory assessments and reviews of existing literature show the direct relationship between the consistent increase in the number of species and genera encountered and the intensity of scientific investigations. Published landmark inventories show the steadily increasing number of known orchid species in Vietnam from 411 species recorded in the year 1934 (Gagnepain & Guillaumin 1934) to 718 species in 1992–1994 (Seidenfaden 1992; Averyanov 1994), 897 species in 2003–2005 (Averyanov & Averyanova 2003; Nguyen Tien Ban et al. 2005), 1005 species in 2009 (Averyanov et al. 2009) and 1090 species figured in the last survey undertaken in 2011 (Averyanov 2011). Since this last inventory, 55 species and 6 genera have been newly discovered and documented for the flora of Vietnam (Averyanov 2012a, b, 2013; Averyanov et al. 2012a, b, 2013, 2015; Schuiteman et al. 2013; Choudhary et al. 2013, Kumar et al. 2014; Averyanov & Truong 2015; Duy & Averyanov 2015; Nuraliev et al. 2014, 2015). When the new data presented in this paper are included, the known orchid flora of Vietnam comprises at least 1180 documented species from 170 genera. Despite this exceptional diversity and focused work, the comprehensive inventory of the orchid flora of Vietnam remains far from complete, and each new botanical exploration, particularly in remote mountainous areas, reveals new discoveries. This paper summarizes the results of joint efforts of professional botanists and orchid enthusiasts on studies of Vietnamese native orchids during the last three years. It provides new original data about the discovery of 4 genera (*Brachypeza* Garay, *Drymoda* Lindl., *Macropodanthus* L.O. Williams and *Octarrhena* Thwaites) and 44 orchid species new for the flora of Vietnam (Table 1). Valid name, main synonyms, type, citations of most important taxonomic regional publications, data on ecology, phenology,

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Table 1. Discovered species and genera new for the flora of Vietnam (species described as new for science are marked by asterisk).

Acampe joiceyana (J.J. Sm.) Seidenf.,
Aerides flabellata Downie,
Aphyllorchis caudata Downie,
Brachypeza laotica (Seidenf.) Seidenf.,
Bromheadia aporoides Rchb. f.,
**Bulbophyllum blaoense* Tich & Diep ex Aver. & Tich,
Bulbophyllum dayanum Rchb. f.,
Bulbophyllum forrestii Seidenf.,
Bulbophyllum helenae (Kuntze) J.J. Sm.,
Bulbophyllum holttumii A.D. Hawkes,
Bulbophyllum repens Griff.,
**Cheirostylis glandulosa* Aver.,
Cheirostylis pusilla Lindl.,
Coelogyne leucantha W.W. Sm.,
Cymbidium kanran Makino,
Dendrobium hendersonii A.D. Hawkes & A.H. Heller,
Dendrobium sulcatum Lindl.,
Drymoda picta Lindl.,
Drymoda siamensis Schltr.,
**Eria grandicaulis* Aver.,
Eria javanica (Sw.) Blume,
**Eria praecox* Aver.,
Eria pudica Ridl.,
Gastrochilus distichus (Lindl.) Kuntze,
Holcoglossum flavescens (Schltr.) Z.H. Tsi,
**Liparis caudata* Aver. & K.S. Nguyen,
Liparis delicatula Hook. f.,
Liparis gamblei Hook. f.,
**Liparis longispica* Aver. & K.S. Nguyen,
**Luisia parviflora* Aver.,
Macropodanthus alatus (Holttum) Seidenf. & Garay,
**Oberonia janae* Aver.,
**Oberonia tatianae* Aver.,
**Octarrhena minuscula* Aver. & N.V. Duy,
**Odontochilus aureus* Aver.,
Pecteilis hawkesiana (King & Pantl.) C.S. Kumar,
Phalaenopsis finleyi Christenson,
Pleione hookeriana (Lindl.) Rollisson,
Saccolabiopsis pusilla (Lindl.) Seidenf. & Garay,
Sunipia bicolor Lindl.,
Staurochilus loratus (Downie) Seidenf.,
Trichoglottis orchidea (J. Koenig) Garay,
**Vanda gracilis* Aver.,
Vandopsis undulata (Lindl.) J.J. Sm.

distribution, studied specimens, estimated IUCN Red List status as well as brief taxonomic and biological notes are provided for each species. Twelve species (*Bulbophyllum blaoense*, *Cheirostylis glandulosa*, *Eria grandicaulis*, *E. praecox*, *Liparis caudata*, *L. longispica*, *Luisia parviflora*, *Oberonia janae*, *O. tatianae*, *Octarrhena minuscula*, *Odontochilus aureus* and *Vanda gracilis*) are described as new for science. An illustrated checklist of all studied species arranged in alphabetical order is presented below.

Materials and methods

Materials suitable for studies were collected mainly during 2012–2014. Some previously gathered specimens and living collections also provided significant additional information of the current investigation. Fresh flowers and inflorescences from living plants were fixed and stored in 70% ethanol. Measurements of the floral parts for descriptions were taken on both herbarium and liquid-fixed materials. Fresh flowers and their fleshy parts shrank up to 10–15% in size during the drying process when making herbarium specimens. In describing quantitative characters, infrequent extreme values (i.e. rarely occurring minimal and maximal values) of a variation range are parenthesized before and after the normal variation range. Taxa distribution in Vietnam is indicated in the text by mentioning concerned provinces according to the official administrative country division (Viet Nam. Administrative Atlas 2007). Online version of the IUCN Red List of Threatened Species (2014) was used for estimation of preliminary species conservation status. Along the accepted herbaria acronyms, abbreviation 'CPC Herbarium' is used for the herbarium of the Center for Plant Conservation, a non-government organization established under the Vietnam Union of Science and Technology Associations (Hanoi, Vietnam), the official registration of which has not been completed yet.

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Annotated checklist of new orchids in the flora of Vietnam

***Acampe joiceyana* (J.J. Sm.) Seidenf.** (Fig. 1A, B)

Nord. J. Bot. 22: 532 (2003). – *Trichoglottis joiceyana* J.J. Sm., Repert. Spec. Nov. Regni Veg. 26: 166 (1929). – *Staurochilus joiceyanus* (J.J. Sm.) Seidenf., Opera Bot. 95: 96, fig. 56 (1988). – *Acampe thailandica* Seidenf., Contrib. Orch. Fl. Thailand 13: 49, fig. 11 (1997).

Described presumably from Peninsular Myanmar ("commercial import of uncertain origin" – fide Seidenfaden, 1988: 96). **Type.** *Sanders s.n.* [L].

Habitat, phenology and conservation status. Trunk and branch epiphyte. Primary broad-leaved evergreen mountain forests. 1500 m. Fl. November–January. Rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Lam Dong (Duc Trong). NW Thailand, Peninsular Myanmar.

Studied specimens. S Vietnam, Lam Dong province, Duc Trong district, 7 December 2014, *L. Averyanov, N.T. Hiep, N.P. Tam, CPC 7702* [LE].

Notes. This is a very rare species with disjunctive distribution. Many samples of this remarkable plant are occasionally observed in local orchid markets around Dalat City in Lam Dong province of southern Vietnam. Meanwhile the plant has become very rare in the whole area of its distribution and special attention has to be paid to its protection.

***Aerides flabellata* Downie** (Fig. 1C)

Bull. Misc. Inform. Kew 1925: 387 (1925); Seidenf., Opera Bot. 95: 248, fig. 156, pl. 27c (1988); id., Opera Bot. 114: 428 (1992); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 252 (2007); Chen Xinqi, J.J. Wood, Fl. China 25: 486 (2009). – *Vanda flabellata* (Downie) Christenson, Indian Orchid J. 1: 156 (1985); Schuit. et al., Nord. J. Bot. 26: 314 (2008).

Described from NW Thailand ("Doi Sutep, 360 m., on trees in eng jungle …") **Type.** *Kerr 275* [K].

Habitat, phenology and conservation status. Trunk and branch epiphyte. Lowland broad-leaved evergreen and semi-deciduous forests on shale, sandstone and granite. 200–1000 m. Fl. April–May. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Son La (Son La City area), Dak Lak? Myanmar, China (Yunnan), Thailand, Laos.

Studied specimens. N Vietnam, Son La prov., Son La City area, evergreen forest on non-limestone mountains, 2010, *Bui Quoc Viet s.n.*, flowered and herbarized in 30 April 2015, *L. Averyanov, T. Maisak AL 48* [LE]. S Vietnam, market plant originated from areas of southern Vietnam adjacent to Laos border, presumably from Dak Lak province, 2014, *N.V. Canh s.n.* [LE – photo].

Notes. Ornamental plant widely collected for sale throughout the whole area of its distribution and special attention has to be paid to its protection. Modern tentative molecular studies indicate that this species is closer related to the genus *Vanda* R. Br. rather than to *Aerides* Lour.

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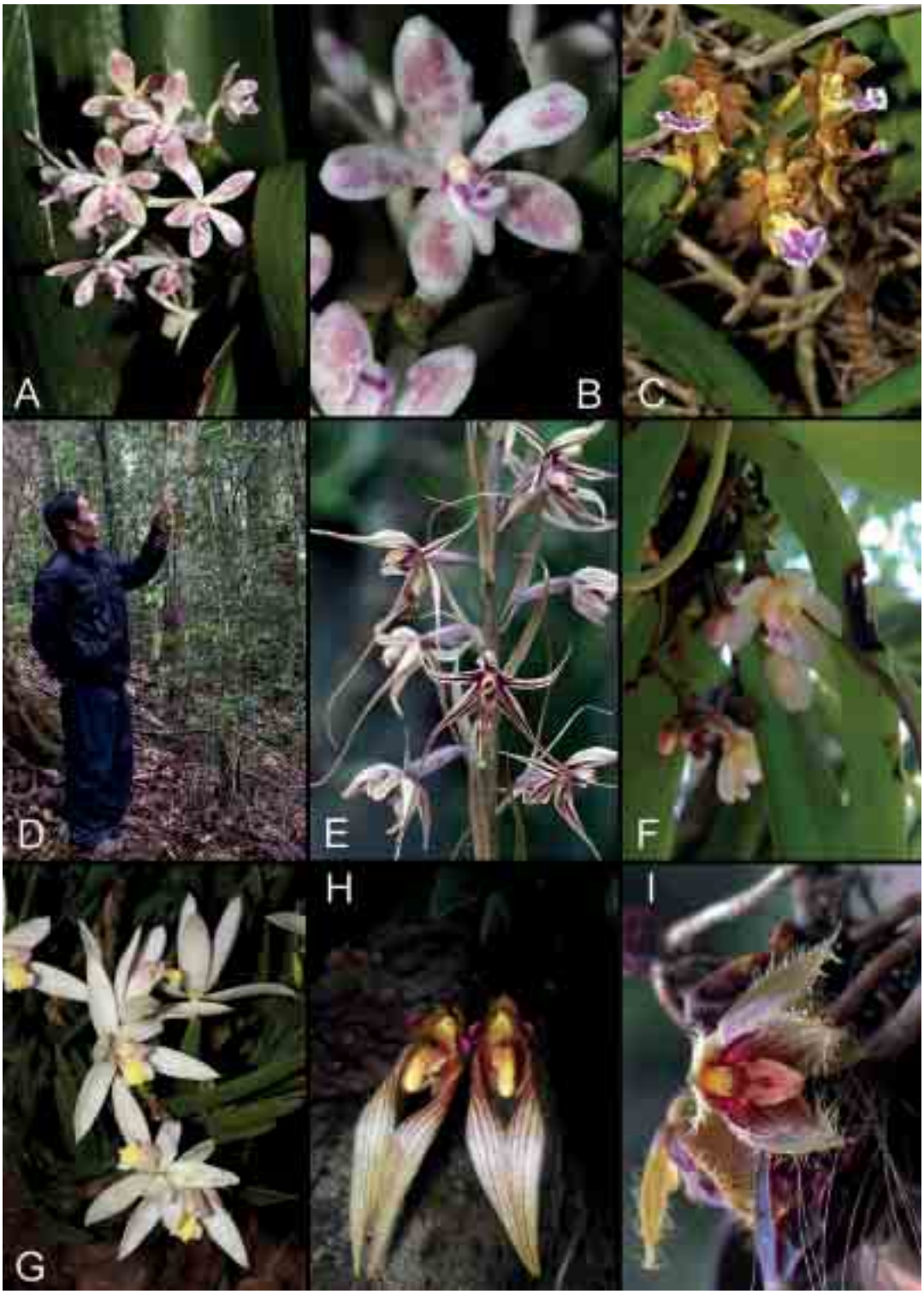

Figure 1. New orchids in the flora of Vietnam. A, B – *Acampe joiceyana* (*L.Averyanov* et al., *CPC 7702*). C – *Aerides flabellata* (*L. Averyanov, T. Maisak, AL 48*). D, E – *Aphyllorchis caudata* (*V.D. Quang, s.n.*). F – *Brachypeza laotica* (*N.V. Canh, s.n.*). G – *Bromheadia aporoides* (*L. Averyanov, T. Maisak, AL 10*). H – *Bulbophyllum blaoense* (*M. Nuraliev, 789*). I – *B. dayanum* (*N.M. Duc, s.n.*). Photos by L. Averyanov (A, B), N.V. Canh (C, F, G), V.D. Quang (D, E), M. Nuraliev (H) and N.M. Duc (I).

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***Aphyllorchis caudata* Downie** (Fig. 1D, E)

Bull. Misc. Inform. Kew 1925: 415 (1925); Seidenf., Dansk Bot. Ark. 32, 2: 118, fig. 72 (1978); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 253 (2007); Schuit. et al., Nord. J. Bot. 26: 315 (2008); Chen Xinqi, Gale, Fl. China 25: 178 (2009).

Described from NW Thailand ("Doi Sutep, 1050 m., on humus in evergreen jungle, …"). **Type.** *Kerr 316* [BK, K].

Habitat, phenology and conservation status. Terrestrial achlorophyllous herb. Primary broad-leaved, evergreen, humid forests on rich soils. 1000–1500 m. Fl. December. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lam Dong (Dalat). S China (Yunnan), Thailand.

Studied specimens. S Vietnam, Lam Dong, Dalat City area, December 2014, *V.D. Quang s.n.* [LE – photo].

Notes. Very rare species typical for primary forests which is endagered of extinction very fast in the course of forest logging. Close to *Aphyllorchis annamensis* Aver., from which it differs in lip structure and smaller flowers.

***Brachypeza* Garay**

Bot. Mus. Leafl. 23: 163 (1972); Seidenf., Bot. Tidsskr. 68: 66 (1973); id., Opera Bot. 95: 258–259 (1988); id., ibid. 114: 430 (1992); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 680–681 (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 350 (1994); J.B. Comber, Orch. Sumatra: 846–848 (2001); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 254 (2007); Schuit. et al., Nord. J. Bot. 26: 266 (2008).

Type. *B. archytas* (Ridl.) Garay (*Saccolabium archytas* Ridl.).

7 species. Thailand, Laos, Vietnam, Indonesia, Philippines, New Guinea, Pacific islands. New generic record in the flora of Vietnam.

***Brachypeza laotica* (Seidenf.) Seidenf.** (Fig. 1F)

Bot. Tidsskr. 68: 66 (1973); id., Opera Bot. 95: 258, fig. 164, pl. 29b (1988); id., ibid. 114: 430 (1992); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 254 (2007); Schuit. et al., Nord. J. Bot. 26: 266 (2008). – *Pteroceras laoticum* Seidenf., Nat. Hist. Bull. Siam Soc. 21: 65 (1966).

Described from N Laos, Phongsali province, Phu Den Din nature protection area ("Loc.: COL Den Din"). **Type.** "*GT 994*" [C, K].

Habitat, phenology and conservation status. Branch epiphyte. Broad-leaved, evergreen lowland forests, particularly gallery woods along river valleys. 200–400 m. Fl. May–July. Occasional. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dak Lak (sine loc.). Thailand, Laos.

Studied specimens. S Vietnam, Dak Lak province, sine loc., 2014, *N.V. Canh, s.n.* [LE – photo].

Notes. Discovery of this species in Vietnam is not surprising as the species is not rare in lowland areas of Laos adjacent to the Vietnamese border. The presented record complementary confirms earlier questionable reports of this species for Vietnam (Seidenfaden 1992; Schuiteman et al.

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2008) based on an unlabelled Simond drawing (*no 172b*) housed at Paris herbarium [P] and some additional records not based on voucher materials (Tran Hop 1998: 78).

***Bromheadia aporoides* Rchb. f.** (Fig. 1G)

Otia Bot. Hamburg. 44 (1878); Seidenf., Opera Bot. 72: 13, fig. 4, pl. 1a (1983); id., Opera Bot. 114: 322, fig. 215 (1992); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 529, fig. 238b–d, pl. 37a (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 110 (1994); Kruizinga, Vogel, Orch. Monogr. 8: 98, fig. 37 (1997); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 254 (2007); Schuit. et al., Nord. J. Bot. 26: 266 (2008).

Described from peninsular Myanmar ("Moulmein"). **Type.** "*Parish 346,* Aprili 20 1874" [W (holotype), K (isotype)].

Habitat, phenology and conservation status. Branch clustering epiphyte. Lowland and submontane, dry dipterocarp forests. 200–700(1600) m. Fl. March–July. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Khanh Hoa (sine loc.), Ninh Thuan (sine loc.), Dak Lak (sine loc.). Myanmar, Thailand, Laos, Singapore?

Studied specimens. S Vietnam, border area of Khanh Hoa and Ninh Thuan provinces, dry dipterocarp forest, 2009, *Nguyen Phong s.n.*, flowers fixed and herbarized in 23 April 2015, *L. Averyanov, T. Maisak, P.K. Loc, AL 10* [LE]. S Vietnam, Dak Lak province, sine loc., 2014, *N.V. Canh, s.n.* [LE – photo].

Notes. The species is a rare element of old dry lowland dipterocarp forests. An early observation which was not confirmed by voucher material recorded the occurrence of this species in Dak Lak province (Tran Hop 1998: 79).

***Bulbophyllum blaoense* Tich & Diep ex Aver. & Tich, sp. nov.** (Figs 1H, 2)

Tich, Diep, Hoa Canh 8: 12 (2000); Tich, C.K. Le, Abstr. 1 Sympos. Fl. Cambod. Laos Viet.: 40 (2008), nom. invalid.

Described from S Vietnam, Lam Dong province ("Blao"). **Type.** "4/2000 *Tich 00.04.00*" – Herbarium of Department of Botany and Ecology, National University of Vietnam in Ho Chi Minh City (holotype).

Description. Perennial creeping sympodial epiphytic herb. Rhizome stout, rigid, semi-woody, simple or occasional branching, 5–10(12) cm long, (2)2.5–3(3.5) mm in diam., with numerous thin flexuose, many-branching roots, in apical part covered by scarious, overlapping scales early disintegrating into papyraceous remnants, old part of rhizome almost naked, dull yellowish-brown, longitudinally wrinkled. Pseudobulbs suberect, distant from each other (1)1.5–2.5(3) cm, 1-leaved, broadly ovoid to almost globular or slightly oblate, pale green to dull yellowish-green, (4.5)5–7(8) mm tall and wide, sometimes slightly oblique, young enveloped by tubular, brownish scarious sheaths up to 1.5–2 cm long and 4–5 mm in diam. Leaves sub-sessile, erect to slightly arching, thick, rigid, broadly lanceolate to narrowly ovate, (5)6–12(14) cm long, (1.2)1.4–2.5(2.8) cm wide, acute to shortly unequally bilobulate at apex, narrowing into a cylindric, channeled, petiole-like base 1–2(2.5) cm long, 2–3(4) mm in diam. Inflorescence few-flowered umbel; scape arising from the base of pseudobulb, dark to light green, in apical part

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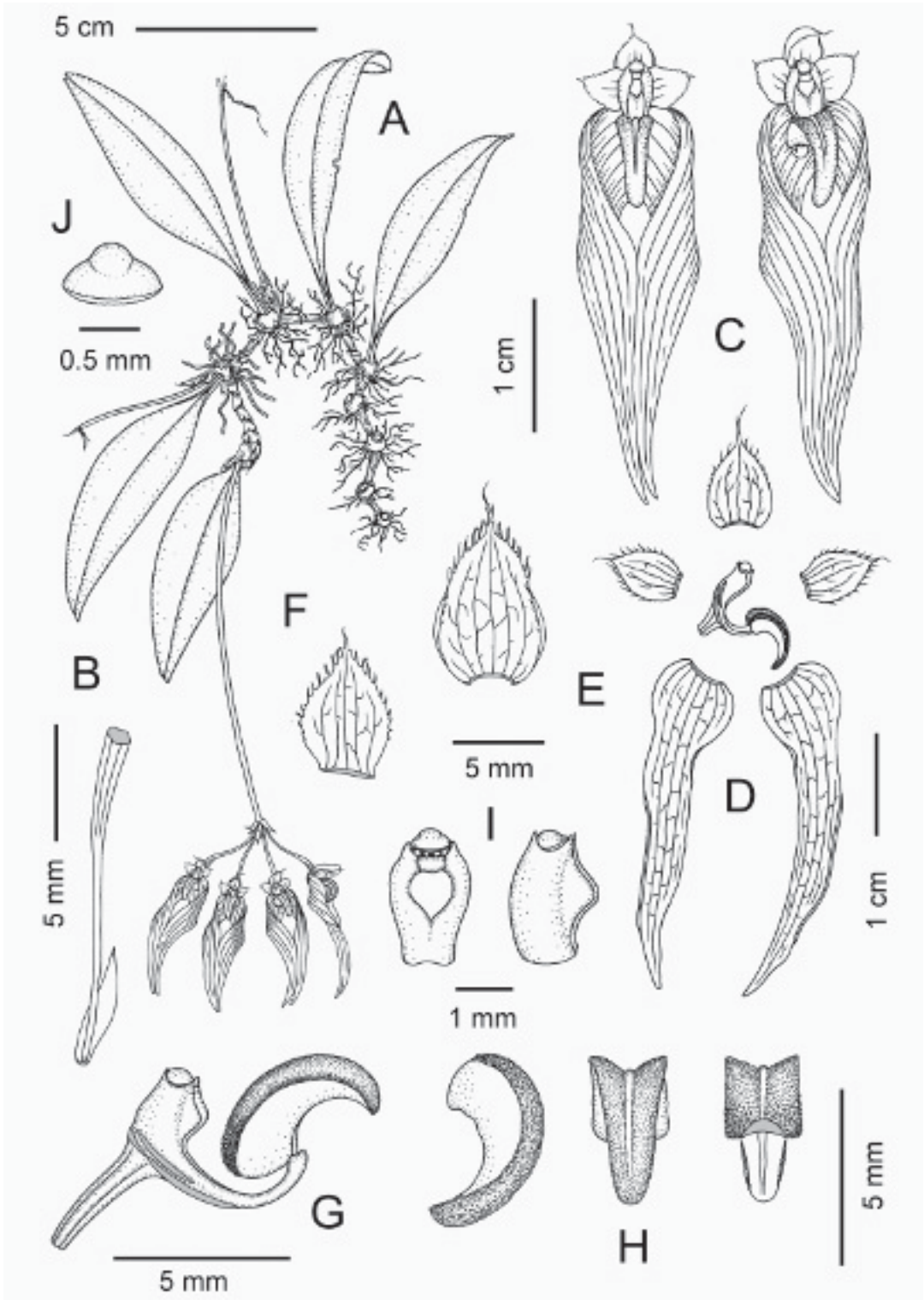

Figure 2. New orchids in the flora of Vietnam. *Bulbophyllum blaoense*. A – flowering plant. B – ovary, pedicel and floral bract. C – flowers, frontal and half-side views. D – flattened sepals, petals and side view of column and lip. E – median sepal. F – petal. G – column and lip, side view. H – lip, side view, frontal view and view from behind. I – column, frontal and side views. J – anther cap, frontal view. All drawn from *M. Nuraliev 789* by L. Averyanov.

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sometimes mottled with dirty purple, ascending and erect, naked, (7)8–10(12) cm long; rachis 2–4 mm long with (1)2–4(5) flowers. Floral bracts whitish, scarious, straight, cuneate, slightly concave, acuminate, (2.5)3–4(5) mm long, 1–1.5 mm wide. Pedicel and ovary olive-green flushed with purple, 1–1.5 cm long, naked, glossy; ovary obconic, longitudinally grooved, 3–4 mm long; 1.5–2(2.5) mm in diam. at apex. Flowers horizontally spreading or slightly pendulous; dorsal sepal and petals dull pale yellow marked with purple-brown, purple-violet at apex; lateral sepals almost white striped with dull purple along nerves; lip adaxially light dull yellowish, little flushed with purple at the base, almost white spotted with light purple at abaxial surface; column and anther cap yellowish to yellowish-green; column at the base and column foot heavily spotted with purple. Median sepal free, oblong ovate, shortly attenuate, concave, (8)9–10(11) mm long, (4.5)5–6(6.5) mm wide, finely denticulate and ciliate along margin. Lateral sepals narrowly triangular, elongate, oblique, twisted and connivent along upper apical half, (2.5)2.6–3(3.2) cm long, 5–6 mm wide at the base, straight along margin. Petals straight, ovate to broadly ovate, slightly oblique, triangular acute at apex, shortly acuminate, (5.5)6–7.5(8) mm long, (3.5)4–5(5.5) mm wide, finely denticulate and ciliate along margin. Lip oblong ovate, triangular, blunt, strongly recurved, conduplicate in basal half, simple, without distinct ears at base, densely papillose on adaxial surface, (5)5.5–6.5(7.5) mm long, (1.5)2–2.5 mm wide, joined with column foot apex by a movable articulation. Column erect, stout, broadening at the apex, 2.5–3.2 mm tall, 2–2.2 mm wide, with small conical stelidia and broad triangular wings protruding forward; column foot 5–6(7) mm long, up curved. Anther cap hemispheric, 1–1.2 mm in diam., beak very short, broad, truncate. Pollinia 4, yellow, half-globular.

Diagnosis. Species belongs to sect. *Cirrhopetalum* (Lindl.) Rchb. f. and is close to the poorly known *B. chinense* (Lindl.) Rchb. f. described from China, from which it differs in small, highly reduced pseudobulbs, a few-flowered inflorescence, smaller and much longer lateral sepals, column broadening at the apex and short, insignificant, dent-like (not long, subulate) stelidia. It is also related to *B. longiflorum* Thouars (= *B. eberhardtii* (Gagnep.) Seidenf.) common in S Vietnam, but it distinctly differs in many characters including dwarf habit, few-flowered umbel, reduced pseudobulbs, small flowers, non-aristate median sepal, simple lip (without distinct ears) and simple, insignificant stelidia.

Etymology. From the Blao forest area, where the type specimen was collected.

Habitat, phenology and conservation status. Creeping branch epiphyte. Primary and old secondary broad-leaved, evergreen, submontane forests on shale, sandstone and granite. 800–900 m. Fl. March–April. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lam Dong (Bao Lam, Bao Loc), Dak Nong (Dak Song). Endemic.

Studied specimens (paratypes). S Vietnam, Lam Dong province, Bao Lam district, Loc Bac municipality, 14 km WNW from Loc Thang town, 11°43'42"N 107°41'49"E, 900 m, 7 April 2013, *A.N. Kuznetsov, S.P. Kuznetsova, M.S. Nuraliev, 789* [LE, MW]. S Vietnam., Dak Nong prov., Dak Song distr., evergreen forest at elev. about 800 m a.s.l., 2014, *Nguyen Van Canh s.n.*, flowers fixed and herbarized in 26 April 2015, *L. Averyanov, T. Maisak, AL 26* [LE].

Notes. This rare species has a very limited distribution in low mountains of the densely populated western part of Lam Dong province in southern Vietnam and special attention has to be paid to its protection.

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***Bulbophyllum dayanum* Rchb. f.** (Fig. 1I)

Gard. Chron. 1865: 434 (1865); Seidenf., Dansk. Bot Ark. 33, 3: 25, fig. 8 (1979); id., Opera Bot. 114: 267 (1992); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 435, fig. 197g–i, pl. 31a (1992). – *Bulbophyllum dyphoniae* Tixier, Bull. Mus. Natl. Hist. Nat. 2, 39: 1238, fig. 5–9 (1968).

Described supposedly from Myanmar. **Type** ("… imported by Messrs Low") – ?

Habitat, phenology and conservation status. Creeping branch epiphyte. Primary and old secondary lowland, broad-leaved, evergreen and deciduous forests. 500–1000 m. Fl. April–May. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dak Lak? Myanmar, Cambodia, Peninsular Thailand, Malaya.

Studied specimens. S Vietnam, market plant originated from areas of southern Vietnam adjacent to the Laos border, presumably from Dak Lak province, 2014, *N.M. Duc, N.V. Canh, s.n.* [LE – photo].

Notes. Species is widely collected in the whole area of its distribution as ornamental plant and special attention has to be paid to its protection. In the past, it was tentatively recorded for Tay Nguyen Plateau of southern Vietnam without precise locality and any voucher material (Tran Hop 1998: 91).

***Bulbophyllum forrestii* Seidenf.** (Fig. 3A, B)

Dansk Bot. Ark. 29, 1: 120, fig. 60 (1973); id., Dansk Bot. Ark. 33, 3: 165, fig. 113 (1979); N. Pearce, P.J. Cribb, Orch. Bhutan: 469 (2002); Chen Xinqi, J.J. Verm., Fl. China 25: 429 (2009). – *Cirrhopetalum aemulum* W.W. Sm., Notes Roy. Bot. Gard. Edinb. 13: 195 (1921); non *Bulbophyllum aemulum* Schltr. (1905).

Described from SW China ("Yunnan: Shweli Valley 24°40' n. lat. 5–6000' "). **Type** ("*Forrest 8130*") – [E].

Habitat, phenology and conservation status. Trunk and branch clustering or creeping epiphyte or lithophyte on mossy exposed rocks on mountain tops. Primary evergreen, broad-leaved, mixed and coniferous forest on granite and limestone. 500–2000 m. Fl. April–May, January. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Nghe An (Ky Son). Myanmar, S China (Yunnan), Thailand, Laos.

Studied specimens. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng mountain system around point 19°13'37.5"N 104°06'11.8"E, clustering epiphyte on mossy tree, 20 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, CPC 6025a/1* [CPC Herbarium, LE].

Notes. Miniature ornamental plant. Flowers of Vietnamese specimens differ from the type in uniform pure yellow flowers lacking any purple markings. Record for Laos is based on following collection: Central Laos, Vientiane province, Vang Vieng district, Na Po village, about 12 km to the W of Vang Vieng town, Pa Nang Oua mt., around point 18°55'44.9"N 102°20'20.1"E, 17 March 2013, *N.T. Hiep, L. Averyanov, K. Chantthavongsa, N.S. Khang, P.V. The, S. Lorphengsy, LA–VN 516* [CPC Herbarium, HNL, FOF, LE]. Leaves of Laotian plants are dull violet on abaxial

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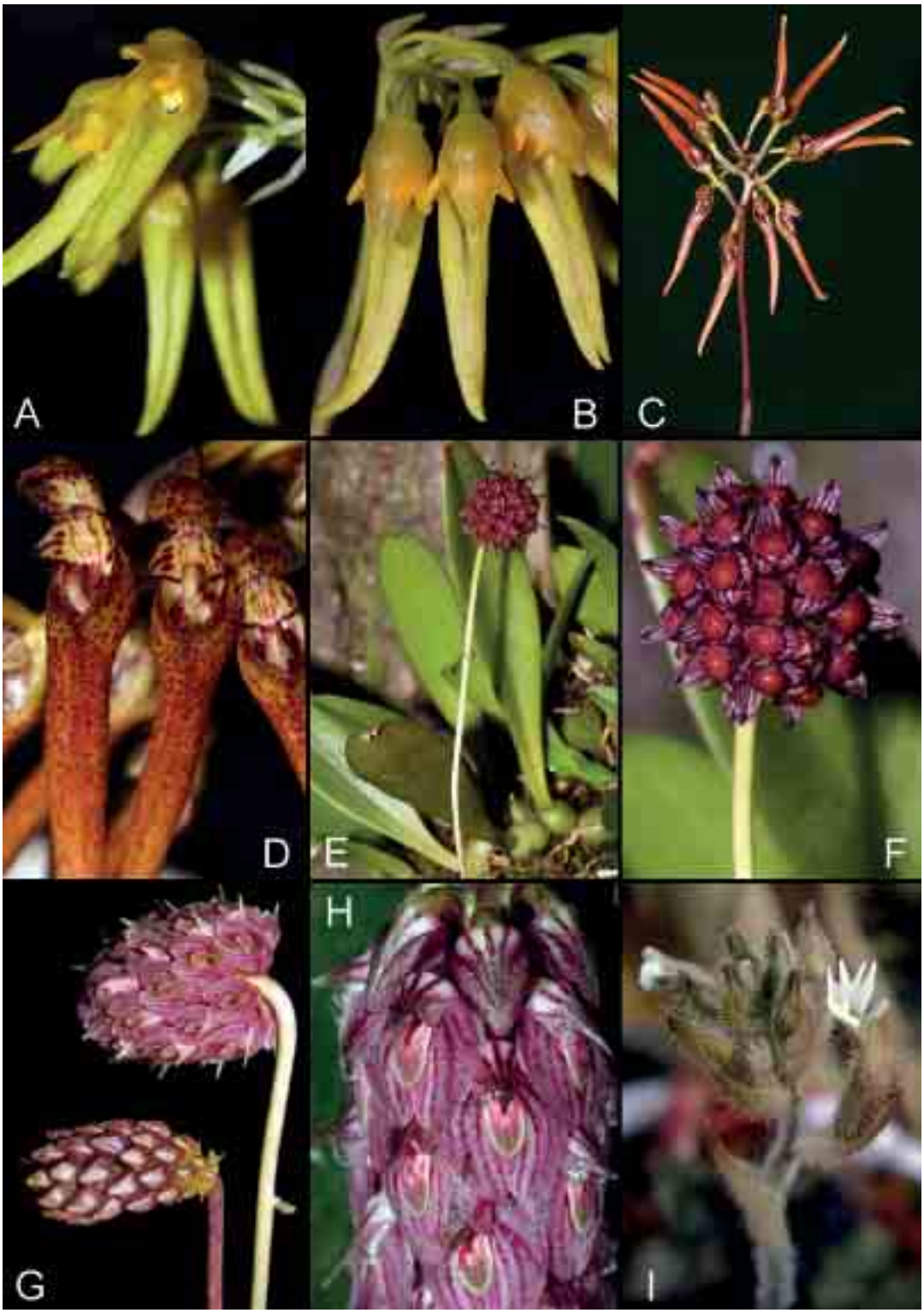

Figure 3. New orchids in the flora of Vietnam. A, B – *Bulbophyllum forrestii* (*L. Averyanov et al.*, *CPC 6025a/1*). C, D – *B. helenae* (*L. Averyanov et al.*, *CPC 982a/3*). E, F – *B. holttumii* (*L. Averyanov et al.*, *CPC 982a/9*). G, H – *B. repens* (G – *P.M. Trung, s.n.;* H – *P.K. Loc et al., HAL 8793*). I – *Cheirostylis glandulosa (Q.V. Hoi et al., CPC 7686*). Photos by L. Averyanov (A–F), P.M. Trung (G), P.K. Loc (H) and N.V. Canh (I).

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surface, flowers have a strong unpleasant smell, tepals brightly rich yellow, sepals at base with purple punctuation along nerves, petals with dark purple margin ciliation, lip and operculum light dull yellow. Species is very close to *B. helenae* (Kuntze) J.J. Sm., from which it differs in smaller, yellow flowers and straight (non-denticulate or ciliate) margin of median sepal.

***Bulbophyllum helenae* (Kuntze) J.J. Sm.** (Fig. 3C, D)

Bull. Jard. Bot. Buitenzorg 2, 8: 24 (1912); Seidenf., Dansk Bot. Ark. 29, 1: 71, fig. 28 (1973); id., Dansk Bot. Ark. 33, 3: 157, fig. 108 (1979); N. Pearce, P.J. Cribb, Orch. Bhutan: 468, pl. 25 (2002); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 255 (2007); Schuit. et al., Nord. J. Bot. 26: 267 (2008); Chen Xinqi, J.J. Verm., Fl. China 25: 430 (2009). – *Phyllorchis helenae* Kuntze, Revis. Gen. Pl. 2: 676 (1891).

Described from NE India ("Khasia, Nungclow"). **Type** ("*Gibson s.n.*") – [K-LINDL].

Habitat, phenology and conservation status. Trunk and branch clustering or creeping epiphyte. Primary humid, evergreen, broad-leaved montane forests on limestone. (600)1000–1500(2000) m. Fl. August–September. Locally common. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dien Bien (Tua Chua). N India, Nepal, Bhutan, Myanmar, Thailand, Laos.

Studied specimens. N Vietnam, Dien Bien Prov., Tua Chua Distr., Sin Chai Municipality, around point 22°03'38"N 103°19'56"E, at elevation 1350–1500 m a.s.l., epiphyte, occasional, 14 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 982a/3* [LE].

Notes. Flowers of Vietnamese plants have a strong unpleasant smell, their color scheme was described as follows: median sepal and petals dull yellow with dark purple-brown margin and small spots, lateral sepals orange-brown with dark orange-brown marks, lip light yellow with many small purple marks, column yellow with purple-brown stripes, anther pink to light dirty purple. Small-flowered forms of this species have certain similarity with *B. forrestii* and may be easily mixed up in herbaria collections.

***Bulbophyllum holttumii* A.D. Hawkes** (Fig. 3E, F)

Lloydia 19: 92 (1956); Seidenf., Contrib. Orch. Fl. Thailand 13: 44, pl. 6b (1997); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 499, fig. 226 o–r (1992). – *B. apiferum* Carr, Gard. Bull. Straits Settlem. 5: 133, pl. 3, 3 (1930); non Bateman ex Steud. (1840).

Described from Peninsular Malaysia ("Padang woods" [Gunung Tahan mt.]). **Type** ("*Carr*") – [SING?]

Habitat, phenology and conservation status. Creeping branch epiphyte. Primary humid, evergreen, broad-leaved, mixed and coniferous forests on limestone and shale. 800–1500 m. Fl. April–June. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dien Bien (Tua Chua), Ha Giang (Quang Ba), Ha Tinh (Huong Son). Peninsular Thailand, Laos.

Studied specimens. N Vietnam, Dien Bien province, Tua Chua district, Sin Chai municipality, around point 22°03'38"N 103°19'56"E, epiphyte, 14 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 982a/9* [LE]. N Vietnam, Ha Giang province, Quang Ba district, Bat

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Dai Son village, Chung Ti Tei ridge at elev. 1100–1260 m, 28°08'11"N 105°00'48"E, epiphyte among mosses, peduncle red, rare, 4 April 2000, *D.K. Harder, N.T. Hiep, L. Averyanov, N.Q. Hieu, K. Daria, DKH 5283* [HN, LE, MO]. N Vietnam, Ha Tinh province, Huong Son district, Son Hong municipality, around point 18°34'06"N, 105°11'40"E, epiphyte on high tree, 11 May 2004, *P.K. Loc, L. Averyanov, P.V. The, N.T. Vinh, HAL 5336* [HN, LE].

Notes. Vietnamese plants show a very similar morphological structure and flower color scheme as the known specimens from Malacca Peninsula. Plants from both localities look conspecific though the wide disjunction in distribution looks strange. The species is certainly very close to *Bulbophyllum poilanei* Gagnep. (1930, Bull. Mus. Natl. Hist. Nat. 2, 2: 147) described from central Vietnam (Quang Tri province). Unfortunately, the only type specimen (*Poilane 10285*) in Paris Herbarium is in a rather bad condition. Studies of additional material from the locus classicus may reveal the identity of both taxa, the valid name of which will be *B. poilanei*. Record for Laos is based on following collection: Central Laos, Vientiane province, Kasi district, Tam Tai village, about 10 km to the NW of Kasi town, around point 19°12'57"N, 102°14'59"E, at elevation 500–650 m, creeping epiphyte on shady rocky slope, occasional, 24 March 2013, *L. Averyanov, N.S. Khang, S. Lorphengsy, LA–VN 749* [CPC Herbarium, HNL, FOF, LE].

***Bulbophyllum repens* Griff.** (Fig. 3G, H)

Not. Pl. Asiat. 3: 293 (1851); Seidenf., Dansk. Bot. Ark. 33, 3: 182, fig. 129 (1979); N. Pearce, P.J. Cribb, Orch. Bhutan: 480 (2002); Chen Xinqi, J.J. Verm., Fl. China 25: 436 (2009). – *Bulbophyllum khasyanum* Rchb. f., Trans. Linn. Soc. London 30, 1: 138 (1874), non Griff. (1851).

Described from NE India ("Assam: Myrung, Khasia"). **Type** ("*Griffith 1021*") – [K-LINDL].

Habitat, phenology and conservation status. Creeping trunk and branch epiphyte. Primary and old secondary broad-leaved, evergreen forests on limestone and granite, commonly on mountain and ridge tops. 1200–1400 m. Fl. May–June, September. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lai Chau (Sin Ho), Tay Nnh (Ba Den mt.). NE India, S China (Hainan), Thailand.

Studied specimens. N Vietnam, Lai Chau province, Sin Ho district, Phin Ho municipality, Ta Genh village, around point 22°28'44"N 103°16'23"E, 1326 m, epiphyte, rare, 12 Jan. 2006, *P.K. Loc, N.T. Vinh, N.S. Khang, P.N. Quan, L.H. Phong, HAL 8793* ([HN, LE]; S Vietnam, Tay Ninh province, Ba Den mt., Sept. 2014, *P.M. Trung s.n.* [LE – photo].

Notes. This rare species with disjunctive distribution sometime is wrongly mixed up with *B. poilanei*. Meanwhile, it distinctly differs from latter species in large leaves (much longer than inflorescence), elongate many-flowered inflorescence, oblong sepals round at apex, oblong elongate lip and very different color scheme of the flower.

***Cheirostylis glandulosa* Aver., sp. nov.** (Figs 3I, 4)

Described from S Vietnam "Dak Lak province, Chu Yang Sin Mountains at elevation about 500 m a.s.l."). **Type** (5 November 2014, *Q.V. Hoi, N.V. Canh, L. Averyanov, N.V. Duy, N.T. Hiep, CPC 7686*) – [LE (holotype)].

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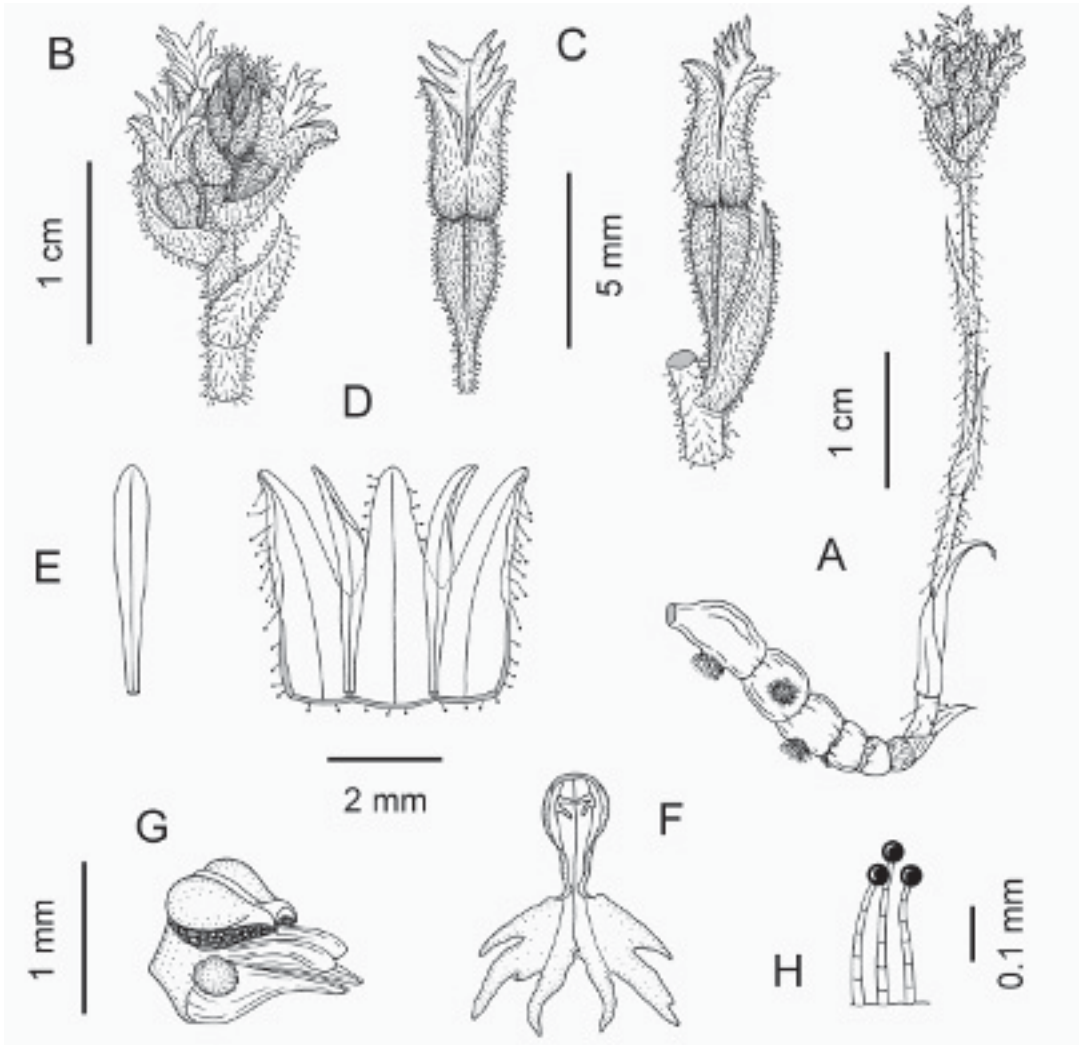

Figure 4. New orchids in the flora of Vietnam. *Cheirostylis glandulosa*. A – flowering plant. B – inflorescence. C – flowers, view from below and side view. D – flattened sepals and petals. E – flattened petal. F – Ffattened lip. G – column, half side view. H – typical glandular hairs. All drawn from the type *Q.V. Hoi, CPC 7686* by L. Averyanov.

Description. Perennial short creeping sympodial lithophytic dwarf herb. Plagiotropic part of stem in form of fleshy, succulent, leafless, light pale gray-greenish, cylindrical rhizome, 1–2(2.5) cm long, (2)3–5(6) mm in diam., apically ascending, glabrous, with (4)5–7(9) slightly, irregularly swollen internodes and few warty hemispheric pillows densely covered with root hairs, 1.5–2.5 mm in diam. Floriferous stem erect, more or less straight, aphyllous, glandular pilose, (3.5)4–5(6) cm tall, 1–1.5(2) mm in diam., with (4)5–6(7) narrowly triangular, acuminate, yellowish, scarious, glandular pilose, sterile bracts, (4)5–10(12) mm long, (0.8)1.2–2(2.5) mm wide, terminated by short, head-like inflorescence bearing (1)3–8(10) flowers. Leaves with developed leaf blade absent during anthesis. Inflorescence short, dense to sublax raceme; rachis, floral bracts, pedicel, ovaries and sepals densely covered with long glandular, white, pilose hairs; rachis (2)4–6(10) mm long. Floral bracts light pale olive-greenish to scarious-hyaline, triangular-cuneate, conduplicate, acuminate, (4.5)5–7(8) mm long, (1.5)2–2.5(3) mm wide, longer than ovary. Pedicel and ovary suberect, (3)3.5–4(4.5) mm long; pedicel terete 1–1.5 mm long, 0.6–0.8 mm in diam.; ovary

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obovoid, longitudinally 3-ridged, 2.5–3(3.5) mm long, 1.5–2 mm in diam. Flowers hardly opening, tubular, 3.5–4.5 mm long, resupinate; sepals dull olive-greenish, petals very thin, whitish to almost hyaline, lip white, with paired greenish spot at the center. Sepals sub-similar, 1-veined, slightly concave-conduplicate, recurved, narrowly triangular ovate, rather blunt at apex, (3.5)4(5.5) mm long, (0.8)1(1.2) mm wide, joined on ⅓–½ of their length to broad tube. Petals 1-veined, oblanceolate spatulate, gradually narrowing to the base, obtuse, 3.5–4 mm long, 0.4–0.6 mm wide, connivent at the apex to median sepal forming narrow hood. Lip white, 3-veined, (4)4.5(5) mm long, (3.5)4(4.5) mm wide, divided into distinct hypochile, mesochile and epichile. Hypochile concave, hemispheric, (1)1.2(1.4) mm long and wide, basally with 2 finger-like glands on each side along lateral vein. Claw short, straight, cymbiform. Epichile with 2 triangular lobes spreading at right angle; each lobe 2.5–3(3.5) mm long, (1)1.2–1.4(1.6) mm wide, deeply dissected into (2)3(4) irregular-erose dents along distal margin. Column ovoid, 1 mm long and wide, with 2 lateral convex verruculose stigmas, 2 lanceolate-spatulate rostellum arms directed forward and 2 subulate column wings 0.8–1 mm long, little longer than rostellar arms. Anther large, half-ovoid, 0.6–0.8 mm long. Pollinia 2, sectile.

Diagnosis. Among Indochinese representatives of the genus, the new species may be closest related to *Cheirostylis thailandica* Seidenf., but it distinctly differs in much smaller habit, much smaller flowers, a dense, long, glandular, white indumentum, erect deeply dissected lip, shorter petals and paired papillae in hypochile.

Etymology. Species name refers to the dense, long, glandular indumentum.

Habitat, phenology and conservation status. Short creeping lithophyte. Primary and secondary broad-leaved, evergreen, humid forests on granite, commonly on wet mossy rocks along waterfall cliffs. 400–600 m. Fl. December, March. Rare, but locally common. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dak Lak (Chu Yang Sin mt.). Endemic.

Notes. Species surely represents strict endemism of lowland flora associated with Chu Yang Sin Mountains known as one of the richest areas for local endemics of southern Vietnam.

***Cheirostylis pusilla* Lindl.** (Fig. 5A)

Gen. Sp. Orch. Pl.: 489 (1840); Seidenf., Dansk Bot. Ark. 32, 2: 64, fig. 36 (1978); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 77, fig. 28a–i (1992); Chen Xinqi et al., Fl. China 25: 59 (2009).

Described from Bangladesh ("Hab. in montes Sylhet, inter muscos …"). **Type** ("*Wallich 7382*") – [K].

Habitat, phenology and conservation status. Creeping lithophyte. Primary and old secondary, broad-leaved, evergreen, humid, shady submontane forests, commonly on wet mossy waterfall rocks. 800–1300 m. Fl. September–October. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dak Nong (Tuy Duc). NE India, S China (Yunnan), Thailand, Laos, Peninsular Malaysia.

Studied specimens. S Vietnam, Dak Nong province, Tuy Duc district, Dak Buk municipality, Ta Dung Mountain, at elevation 800–1000 m a.s.l., 5 December 2014, *N.V. Canh, Q.V. Hoi,*

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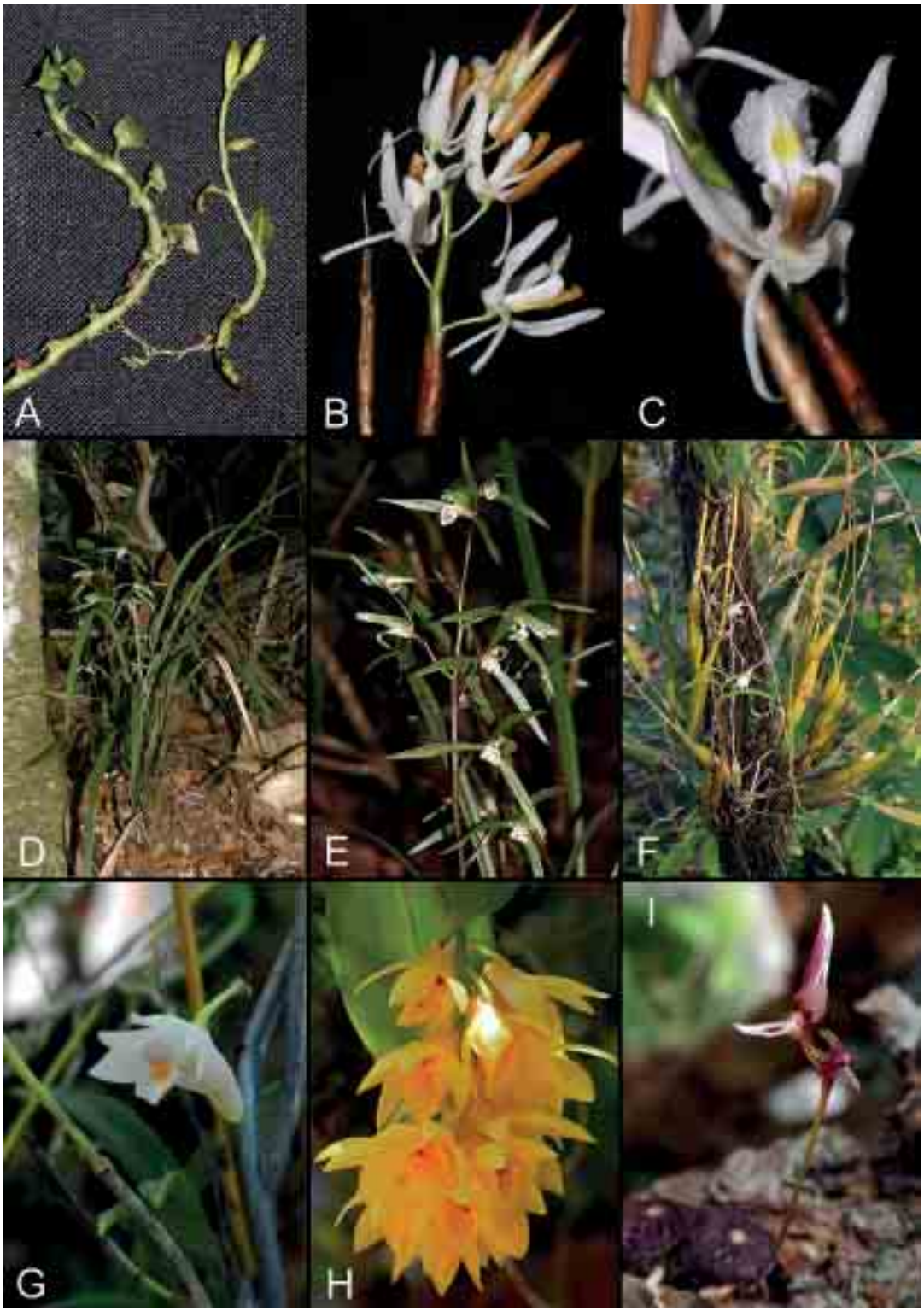

Figure 5. New orchids in the flora of Vietnam. A – *Cheirostylis pusilla* (*N.V. Canh et al.*, *CPC 7685*). B, C – *Coelogyne leucantha* (*L. Averyanov et al.*, *CPC 7581b/TM 1181*). D, E – *Cymbidium kanran (L. Averyanov et al.*, *CPC 6984*). F, G – *Dendrobium hendersonii* (*N.V. Canh et al.*, *CPC 7687*). H – *D. sulcatum* (*N.V. Canh, s.n.*). I – *Drymoda picta (N.V. Canh et al.*, *CPC 7692*). Photos by L. Averyanov (A–E) and N.V. Canh (F–I).

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L. Averyanov, N.V. Duy, N.T. Hiep, CPC 7685 [LE]. NE Laos, Houphan prov., Hem distr., Na Puok village, Pu Tham Nhon mountain around point 20°10'00.0"N 103°24'37.0"E, primary and secondary broad-leaved, evergreen, dry forest on very steep rocky mountain slopes composed of solid marble-like highly eroded limestone at elev. 1050–1150 m a.s.l., lithophyte on shady mossy rocks on mountain top, very common, 11 April 2015, *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Hieu, T. Maisak, Pheng Phengsintham, LA-VN 1335* [LE].

Notes. Very tiny plant easily overlooked in botanical surveys and scarcely represented in herbaria collections. Collection from Laos (*LA-VN 1335*) cited here represents the first record of this species for the flora of Laos.

***Coelogyne leucantha* W.W. Sm.** (Fig. 5B, C)

Notes Roy. Bot. Gard. Edinburgh 13: 198 (1921); Clayton, Gen. Coelogyne: 36, fig. 5a, 8 (2002); Chen Xinqi, Clayton, Fl. China 25: 321 (2009).

Described from Myanmar ("Burma, Hpimaw"). **Type** ("*Kingdon–Ward s.n.*") – [E].

Habitat, phenology and conservation status. Creeping trunk and branch epiphyte. Primary broad-leaved, mixed and coniferous, evergreen, humid, montane forests, on rocky limestone, shale, sandstone, granite and quartzite, commonly on tall mossy trees near mountain tops. 1500–2400(2700) m. Fl. March–May (June). Locally very common. Estimated IUCN Red List status – LC.

Distribution. Vietnam: Cao Bang (Bao Lac), Lao Cai (Van Ban), Nghe An (Ky Son, Phu Xai Lai Leng mt.). N Myanmar, S China, Laos.

Studied specimens. N Vietnam, Cao Bang province, Bao Lac district, Hong An municipality, Mi Lung village, elevation 1500–1550 m around point 22°49'15.4"N 105°49'53"E, 21 November 2014, *L. Averyanov, N.T. Hiep, N.S. Khang, T. Maisak, L. Osinovetz, CPC 7581b/TM 1181* [CPC Herbarium, LE]. N Vietnam, Lao Cai province, Van Ban district, Khanh Yen Ha municipality, to the SW of Na Nheo village, point 21°57'41"N 104°13'29"E, at elev. 2000–2100 m, 16 March 2002, *L. Averyanov, P.K. Loc, D.T. Doan, HAL 2393* [LE]. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng mt. at elevation 1900 m a.s.l. around point 19°13'37.5"N 104°06'11.8"E, 20 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, CPC 6027* [CPC Herbarium, LE]; at elevation 2000–2300 m around point 19°11'58.2"N 104°11'38.6"E, 24 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6161* [CPC Herbarium, LE]; at elevation 2100–2200 m around point 19°13'52.9"N 104°05'30.5"E, 25 October 2013 *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan CPC 6127* [CPC Herbarium, LE]; at elevation 1300–2000 m around point 19°12'54"N 104°12'01"E, 26 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6307* [CPC Herbarium, LE]. NE Laos, Xiangkhoang Prov., Peak Distr., Oran village, around point 19°38'53"N 103°23'12"E, primary and secondary broad-leaved evergreen dry forest on shale sandstone slopes and along ridge edge at elev. about 1750–1850 m a.s.l., epiphyte on tall mossy tree along ridge edge, not rare, 2 April 2015, *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Hieu, T. Maisak, Pheng Phengsintham, LA-VN 931/TM 1221* [LE].

Notes. In northern Vietnam this species is occasionally observed as usual dominant of epiphytic plant communities in montane forests at elevations of 2000–2400 m a.s.l. Collection *LA-VN 931/TM 1221* cited here is a new record for the flora of Laos.

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***Cymbidium kanran* Makino** (Fig. 5D, E)

Bot. Mag. (Tokyo) 16: 10 (1902); Su Horng-Jye, Fl. Taiwan 5: 828 (2000); Liu Zhongjian et al., Gen. Cymbidium China: 184, 3–36A, B (2006); Puy, P.J. Cribb, Cymbidium: 290, fig. 167, 168, map 47 (2007); Liu Zhongjian, Chen Xinqi, P.J. Cribb, Fl. China 25: 275 (2009); Barretto, P.J. Cribb, Gale, Orch. Hong Kong: 363, 365, fig. 303–305 (2011).

Described from Japan on the base of cultivated plants ("Hab. Prov. Musashi: Tokyo, Bot. Gard. Koishikawa, cult."). **Type** ("*T. Makino s.n.* Jan. 1902") – [MAK].

Habitat, phenology and conservation status. Terrestrial and lithophytic rosulate herb. Primary shady, mixed and coniferous, submontane forest (with *Pinus cernua* Aver., K.S. Nguyen & T.H. Nguyen) on sandstone. 900–1100 m. Fl. October–December. Locally common. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Son La (Van Ho). S China, Taiwan, Hainan, S Japan, S Korea.

Studied specimens. N Vietnam, Son La province, Van Ho district, Chieng Xuan municipality, Co Hong village, territory of Xuan Nha natural reserve, Pha Luong Mountain, at elevation 1000–1050 m a.s.l. around point 20°42'14.2"N 104°43'53.9"E, locally common, 12 November 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, N.D. Thang, L.D. Qui, CPC 6984* [CPC Herbarium, LE].

Notes. Ornamental plant, one of the most elegant terrestrial species among its congeners.

***Dendrobium hendersonii* A.D. Hawkes & A.H. Heller** (Fig. 5F, G)

Lloydia 20: 120 (1957); Seidenf., Opera Bot. 83: 196, fig. 135, pl. 22a (1985); id., ibid. 114: 247 (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 250 (1994); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 407, fig. 184a–d, pl. 29b (1992); J.B. Comber, Orch. Sumatra: 590 (2001). – *D. fugax* Schltr., Bull. Herb. Boissier 2, 6: 455 (1906); non Rchb. f. (1871). – *D. ridleyanum* Kerr, Bull. Misc. Inform. Kew 1927: 218 (1927); non Schltr. (1905). – *D. rudolphii* A.D. Hawkes & A.H. Heller, Lloydia 20: 123 (1957).

Described from Sumatra ("Soengi Lalah, Indragiri"). **Type** ("*Schlechter 13297*") – destroyed.

Habitat, phenology and conservation status. Trunk and branch clustering epiphyte. Primary and old secondary broad-leaved, evergreen and deciduous lowland forests, riverine woods, open dry woodlands and scrub on granite outcrops along seashore. 20–800 m. Fl. April–July. Occasional, locally common. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Khanh Hoa (Ninh Hoa), Quang Nam? Gia Lai? Peninsular Thailand, Malaya, Sumatra, Kalimantan.

Studied specimens. S Vietnam, Khanh Hoa province, 400–800 m, locally very common, 5 November 2014, *N.V. Canh, Q.V. Hoi, L. Averyanov, N.V. Duy, N.T. Hiep, CPC 7687* [LE]. S Vietnam, Khanh Hoa province, Ninh Hoa district, Ninh Phu village, Mont Hon Heo (Suoi Hoa Lan area), 18 July 2014, *Le Hong Son* et al., *Tich 05-06-15* [SGN, LE – photo].

Notes. Our record complementary confirms earlier questionable records based on a short description and drawing of Tixier (Seidenfaden, 1992: 447) and earlier observations which were not confirmed by herbarium vouchers (Tran Hop 1998: 235). According to recent observations,

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this species is also fairly common in dry lowland primary forests of Quang Nam and Gia Lai provinces (N.V. Canh unpublished data). Regular flowering period of this species comprises the end of April, May, June and first weeks of July. Meanwhile, formation of single flowers may be observed all over the year.

***Dendrobium sulcatum* Lindl.** (Fig. 5H)

Edwards's Bot. Reg. 24: t. 65 (1838); Seidenf., Opera Bot. 83: 19, fig. 5, pl. 1d (1985); id., ibid. 114: 208 (1992); N. Pearce, P.J. Cribb, Orch. Bhutan: 405 (2002); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 265 (2007); Schuit. et al., Nord. J. Bot. 26: 287 (2008); Zhu Guanghua et al., Fl. China 25: 375 (2009).

Described from India. **Type** – Ic.: 1838, Bot. Reg. 25. t. 65 ("cult Chatsworth").

Habitat, phenology and conservation status. Trunk and branch clustering epiphyte. Primary broad-leaved, evergreen, humid forests on granite and shale. 700–1200(2000) m. Fl. April–July. Rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Dak Lak, Gia Lai (Pleiku), Thanh Hoa (Thuong Xuan). NE India, Myanmar, S China (S Yunnan), N Thailand, N Laos.

Studied specimens. N Vietnam, Thanh Hoa province, Thuong Xuan district, Bat Mot municipality, Vin village, Xuan Lien Natural Reserve, 1000–1200 m, around point 19°58'18.2"N 104°59'24.0"E, rare, 2 November 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, CPC 6622* [CPC Herbarium, LE]; S Vietnam, Dak Lac province, *N.V. Canh s.n.* [LE – photo]; S Vietnam, Gia Lai, Pleiku, *N.T. Tich, Tich 00.04.07* [Herbarium of the Department of Botany and Ecology, University of Science, Ho Chi Minh City Vietnam National University?].

Notes. Widespread, but rare ornamental species easily recognized by its flat stems and large yellow flowers.

***Drymoda* Lindl.**

Sert. Orchid. t. 8c (1838); Gagnep., Fl. Gen. Indo-Chine 6: 305–307 (1934); Seidenf., Opera Bot. 89: 168 (1986); id., ibid. 114: 317 (1992); Schuit. et al., Nord. J. Bot. 26: 289 (2008).

Type. *D. picta* Lindl.

2 species. Myanmar, Thailand, Laos, Vietnam. New generic record in the flora of Vietnam.

***Drymoda picta* Lindl.** (Figs 5I, 6A)

Sert. Orchid. tab. 8 C (1838); Seidenf., Opera Bot. 89: 168, fig. 110, pl. 15d (1986); id., ibid. 114: 317 (1992); Schuit. et al., Nord. J. Bot. 26: 289 (2008).

Described from Peninsular Myanmar ("Burma: Mergui"). **Type** ("*Griffith 1035*") – [K-LINDL].

Habitat, phenology and conservation status. Clustering trunk and branch epiphyte. Primary evergreen, broad-leaved, submontane forests. 800–1000 m. Fl. October. Rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Dak Nong (Dak Song). Myanmar, Thailand, Laos.

Studied specimens. S Vietnam, Dak Nong province, Dak Song district, Nam Nung municipality, 800–1000 m, 25 June 2013, *N.V. Canh, L. Averyanov, CPC 7692* [LE – photo].

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Figure 6. New orchids in the flora of Vietnam. A – *Drymoda picta* (*N.V. Canh et al.*, *CPC 7692*). B, C – *D. siamensis* (*P.D. Dang et al.*, *CPC 7691*). D – *Eria grandicaulis* (*L. Averyanov et al.*, *CPC 7705*). E – *E. javanica* (*D. Bui, s.n.*). F, G – *E. pudica* (*K.H. Thang, Thang 79*). H, I – *Gastrochilus distichus* (*L. Averyanov et al.*, *CPC 6073*). Photos by N.V. Canh (A–C), L. Averyanov (D, H, I), D. Bui (E) and K.H. Thang (F, G).

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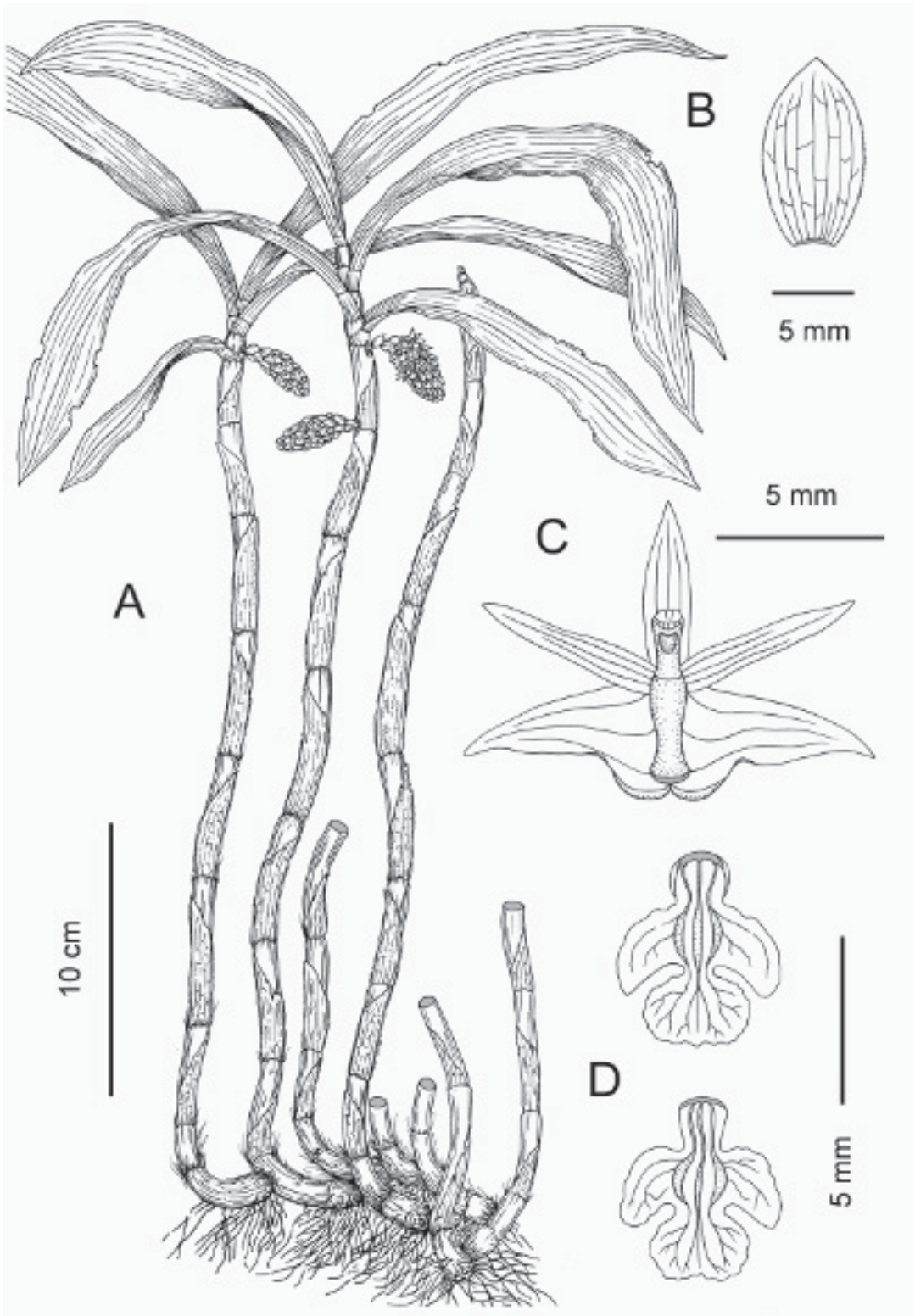

Figure 7. New orchids in the flora of Vietnam. *Eria grandicaulis*. A – flowering plant. B – floral bract. C – flattened flower with lip removed. D – flattened lips. All drawn from the type *L. Averyanov et al.*, *CPC 7705* by L. Averyanov and T. Maisak.

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Notes. Very rare, miniature orchid with small crowded, flat adpressed pseudobulbs flowering in leafless condition. It is very easily overlooked in botanical surveys.

***Drymoda siamensis* Schltr.** (Fig. 6B, C)

Repert. Spec. Nov. Regni Veg. 2: 170 (1906); Gagnep., Fl. Gen. Indo-Chine 6: 305, fig. 26, 1–8 (1934); Seidenf., Opera Bot. 89: 168, fig. 111, pl. 16a (1986); id., ibid. 114: 317 (1992); Schuit. et al., Nord. J. Bot. 26: 289 (2008).

Described from NW Thailand ("Doi Sutep"). **Type** ("*Hosseus 473*") – [K, P].

Habitat, phenology and conservation status. Trunk and branch clustering epiphyte. Primary evergreen, broad-leaved, submontane forests. 600–900(1800) m. Fl. March–April (June). Very rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Dak Lak (Krong Ana). Thailand, Laos.

Studied specimens. S Vietnam, Dak Lak province, Krong Ana district, Duk Mal locality, 600–700 m, epiphyte, 20 April 2012, *P.D. Dang, N.V. Canh, L. Averyanov, CPC 7690, 7691* [LE].

Notes. Very rare plant similar to previous species in mode of life, habit and type of habitat.

***Eria grandicaulis* Aver., sp. nov.** (*E.* sect. *Hymenaria* Lindl.) (Figs 6D, 7)

Described from S Vietnam ("Lam Dong province, Dalat City area. Primary broad-leaved evergreen mountain forest"). **Type** ("7 December 2014, *L. Averyanov, N.T. Hiep, N.P. Tam, CPC 7705*") – [LE (holotype)].

Description. Perennial sympodial short creeping epiphytic herb with numerous erect stems, sympodially arising from basal part of each other, bearing dense tuft of thin, rigid, flexuose brownish roots. Stems pseudobulbous, thick, fleshy, straight or indistinctly zigzag flexuose, (25)30–40(45) cm tall, (0.5)0.7–1.5(1.8) cm in diam., with (8)10–14(16) internodes, at nodes with scarious dull brownish distinctly veined cataphylls, bearing (2)3–4(6) leaves in apical part. Leaves sessile, dark green, arching, leathery, sometimes somewhat twisted, oblong narrowly elliptic, (12)15–22(25) cm long, (3)3.5–4.5(5) cm wide, acute. Inflorescence dense, many-flowered raceme, 1–2(3) per stem, arising horizontally from a node of the apical part of the stem, opposite the leaf axil, scape and rachis densely hairy with short, dull yellowish hairs; scape light green, 1–2 cm long, covered by (3)4–5(6) large, ovate, concave, yellow-greenish sterile bracts 6–10 mm long, 4–5 mm wide, finely white ciliate along margin; rachis (3)4–6(7) cm long with (8)12–16(18) dense flowers. Floral bracts ovate, elliptic, obtuse, concave, dull yellow-greenish, (6)8–12(14) mm long, (3.5)4.5–7(8) mm wide, finely white ciliate along margin and sparsely hairy near base. Pedicel and ovary dull yellowish, sometimes flushed with purple, almost cylindric, sparsely shortly hairy, 8–12 mm long, (0.6)0.8–1(1.2) mm in diam. Flowers spirally arranged, widely opening; sepals light dull yellowish, striped with purple along nerves. Sepals free, spreading, acute, glabrous or sparsely hairy near base; median sepal broadly lanceolate, slightly concave, (4.5)5–6(7) mm long, (1.2)1.4–1.6(1.8) mm wide; lateral sepals narrowly triangular, oblique, (5.5)6–7.5(8.5) mm long, (3)3.5–4(5) mm wide at the base, joined to column foot. Petals straight, narrowly lanceolate triangular, acuminate, acute, glabrous, (4.5)5–6(7) mm long, (0.8)1–1.2(1.4) mm wide. Lip flattened, broadly obovate, 5–6 mm long and wide, recurved, 3-lobed; narrowly joined to column foot in an acute angle; lateral lobes triangular obovate, oblique falcate, erect, 2.5–3 mm long, 1.4–1.6 mm broad, rounded or subobtuse; disc with

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3 low longitudinal keels coming from lip base to base of median lobe, median keel rather insignificant; median lobe obcordate to almost orbiculate, irregularly wavy along margin, often indistinctly emarginate, 2–2.5(3) mm long, 2.5–3.5(4) mm wide, almost flat, recurved, lacking prominent ornamentation. Column erect, straight, cylindric, simple, without distinct wings or stelidia, (1.8)2–2.2(2.4) mm tall, 1–1.2 mm broad; column foot straight, directed down, (2)2.2–2.8(3) mm long. Anther cap hemispheric, 0.8–1.2 mm in diam., beak triangular, insignificant. Pollinia 4, clavate.

Diagnosis. Very remarkable species easily recognized by its erect, stout and unusually long stems. The only species in northern Indochina of similar habit is *E. bambusifolia* Lindl. It was reported from northern Vietnam, but has certainly no close relations to *E. grandicaulis*. According to the floral structure *E. grandicaulis* belongs to sect. *Hymenaria* Lindl. It may be related to east Himalayan *E. amica* Rchb. f. and *E. graminifolia* Lindl. However, it strikingly differs from both mentioned species in very long, cylindric stems, horizontal inflorescences, very small yellowish flowers and lips lacking prominent median keels.

Etymology. Species epithet refers to the remarkably large plant stems.

Habitat, phenology and conservation status. Short creeping to clustering trunk and branch epiphyte. Primary and old secondary broad-leaved, evergreen, montane forests. 1400–1600 m. Fl. December–January. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lam Dong (sine loc.). Endemic.

***Eria javanica* (Sw.) Blume** (Fig. 6E)

Rumphia 2: 23 (1836); Seidenf., Opera Bot. 62: 26, fig. 10, pl. 2a (1982); id., ibid. 114: 165 (1992); J.B. Comber, Orch. Java: 166, fig. (1990); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 271, fig. 115 (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 213, fig. 26a, b, pl. 10f (1994); J.B. Comber, Orch. Sumatra: 446, fig. (2001); N. Pearce, P.J. Cribb, Orch. Bhutan: 369 (2002); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 267 (2007); Schuit. et al., Nord. J. Bot. 26: 290 (2008); Chen Xinqi, Luo Yibo, J.J. Wood, Fl. China 25: 344 (2009). – *Dendrobium javanicum* Sw., Neues J. Bot. 1, 1: 96 (1805). – *Eria stellata* Lindl., Bot. Reg. 11: t. 904 (1825).

Described from Java ("E Java"). **Type** ("*Thunberg s.n.*") – [UPS?].

Habitat, phenology and conservation status. Short creeping to clustering epiphyte and lithophyte. Primary and old secondary broad-leaved, evergreen and semi-deciduous forests, particularly on rocks along streams and rivers. 300–1000 m. Fl. September–October. Rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Dak Lak, Khanh Hoa (Khanh Vinh). NE India, Nepal, Bhutan, Myanmar, S China, Taiwan, Thailand, Laos, Peninsular Malaysia, Sumatra, Java, Philippines, New Guinea.

Studied specimens. S Vietnam, Dak Lak province, 2014, *N.V. Canh s.n.* [LE – photo]; S Vietnam, Khanh Hoa province, Khanh Vinh district, Khanh Binh municipality, June 2014, *T.T. Tung 25* [LE – photo]; S Vietnam, Khanh Hoa, Khanh My forest, July 2014, *D. Bui s.n.* [LE – photo].

Notes. One of the most widespread species of the genus. It is reported as the most common plant in some areas of its distribution. In Vietnam, however, it is a rather rare species. It grows

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in lowland and densely populated country regions and special attention has to be paid to its protection. Regular flowering period in Vietnam comprises September to October. Meanwhile, occasional flowering may happen all the year. It is remarkable that the plants from Vietnam have a strong pleasant fragrance though some plants from Thailand smell unpleasantly.

***Eria praecox* Aver., sp. nov.** (*E.* sect. *Hymenaria* Lindl.) (Fig. 8)

Described from S Vietnam (Lam Dong province, environs of Dalat City). **Type** ("28 November 2013, *L. Averyanov, N.V. Duy, N.P. Tam, CPC 7251i*") – [LE (holotype)]. **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA *0217/CPC 7251i* (Fig. 8).

Description. Perennial sympodial epiphytic herb with contiguous pseudobulbs, regularly arranged in a row on short, thin, insignificant rhizome, bearing dense tuft of thin, flexuose, light yellowish-brown roots. Old stems pseudobulbous, thick, fleshy, clavate, slightly flattened, (1.5)2–3(3.5) cm tall, (0.8)1–1.2(1.4) cm wide and 0.5–0.8 cm thick, with (4)5–7(10) internodes, at nodes with scarious dull brownish cataphylls, bearing in apical part 2–3(4) well developed leaves and 3–5(6) light greenish tubular bracts. Leaves sessile, arching, rather thin, herbaceous, oblong oblanceolate to broadly oblanceolate, narrowing to the base, (4)5–8(10) cm long, (4)5–8(10) mm wide, acute. Inflorescence lax, (2)4–8(10)-flowered raceme, 1 per stem, erect, arising vertically from the node of apical part of stem, up to 10 cm tall, as long as leaves or longer; scape light green to almost white, (1.5)2–4(6) cm long, naked, white villous; rachis (0.5)1–3(4) cm long, white woolly hairy. Floral bracts narrowly triangular, acuminate, concave, light yellow-greenish to dull yellowish, (2.5)3–5(6) mm long, 1–1.5(2) mm wide, almost glabrous. Pedicel and ovary light greenish, obconic, densely white villous, 2–2.5 mm long, 0.8–1.2 mm in diam. Flowers spirally arranged, widely opening; sepals, petals, column and anther pure white, lip white with brightly yellow-orange epichile. Sepals subsimilar, spreading, free, oblong narrowly ovate, obtuse, 3-nerved, white woolly hairy outside near base, (5)5.5–6.5(7) mm long, (2.5)3–4(4.5) mm wide; lateral sepals little broader, oblique at base, partially embracing lip base. Petals straight, spreading, narrowly ovate, 3-nerved, triangular obtuse at apex, (4.5)5–6(6.5) mm long, (1.8)2–2.5(3.2) mm wide. Lip recurved, conduplicate, flattened obovate, (4)4.5–5.5(6) mm long, 2.5–3.5 mm wide, 3-lobed, narrowly joined to column foot in an acute angle; lateral lobes oblique, narrowly obovate, erect, 3–3.5 mm long, 1–1.2 mm tall, rounded at apex; disc with 2 small transverse, turned forward lamellae 0.5–0.6 mm wide, placed from both sides at the base of side lobes; median lobe fleshy, obcordate to almost orbiculate, emarginate, 2.5–3(3.5) mm long and wide, slightly conduplicate to almost flat, usually slightly recurved, finely verruculose, lacking any ornamentation. Column erect, straight, cylindric, simple, without distinct wings or stelidia, 1.6–2.2 mm tall, 1–1.2 mm broad; column foot straight, directed down, 1.5–2 mm long. Anther cap hemispheric, 1–1.2 mm in diam., white to hardly yellowish, beak very short, triangular. Pollinia 4, white to light yellowish, clavate. Fruits unknown.

Diagnosis. Species belongs to sect. *Hymenaria* Lindl. and may be close to *Eria szetschuanica* Schltr., *E. acervata* Lindl. and *E. japonica* Maxim., but it differs well in smaller flowers, very short subsessile ovary, very broad epichile and two transverse lamellae on the lip disc. The plant remains leafless during the dry winter period and quickly forms leaves and a synanthous inflorescence with first spring rains.

Etymology. Species epithet refers to early 'flowering' at the beginning of the rainy season when the leafless plant sprouts young leaves fast.

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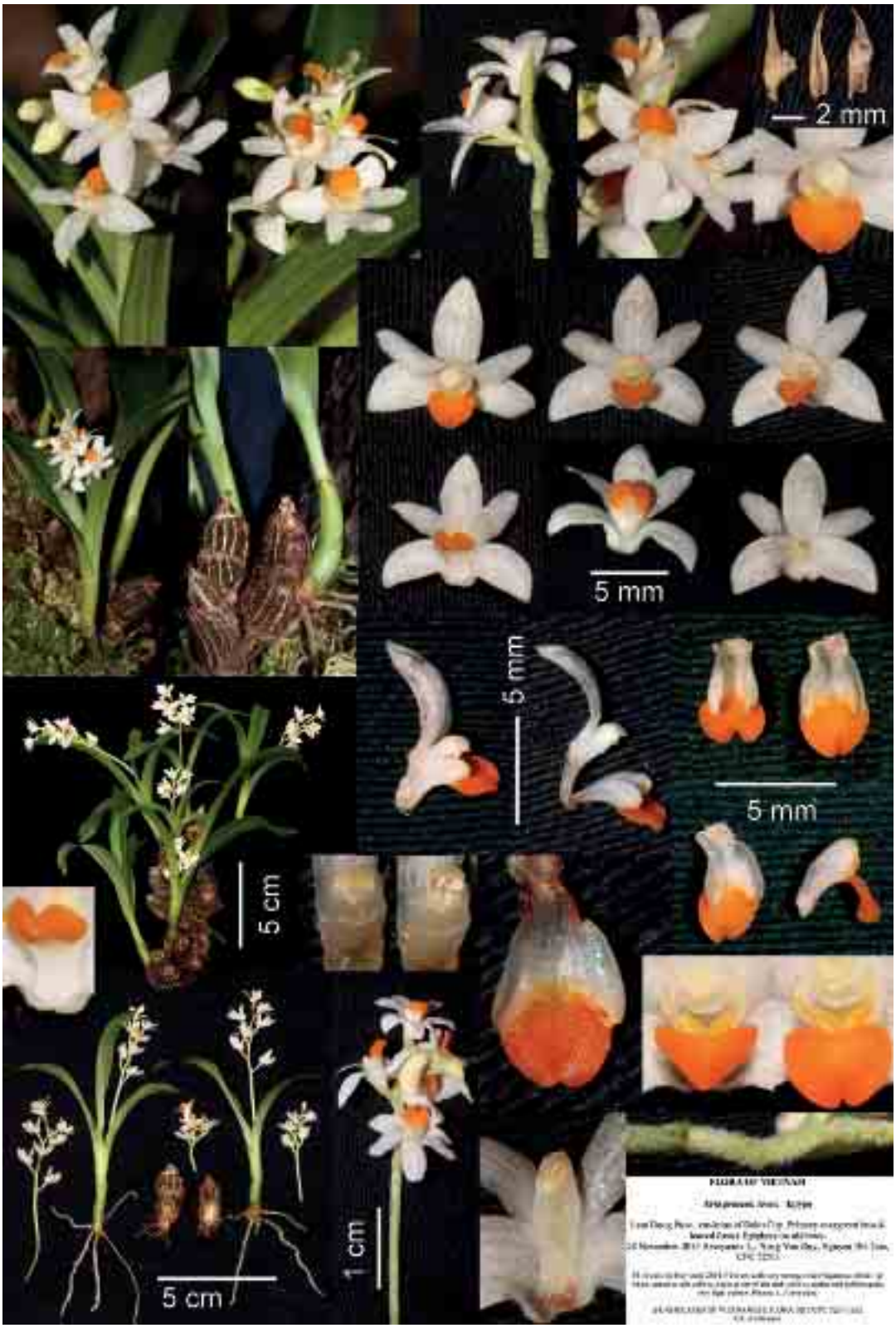

Figure 8. New orchids in the flora of Vietnam. *Eria praecox*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA *0217/CPC 7251i*.

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Habitat, phenology and conservation status. Short creeping or clustering branch epiphyte. Primary evergreen, broad-leaved forests. 1400–1600 m. Fl. in cultivation May–June. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lam Dong (Dalat). Endemic.

***Eria pudica* Ridl.** (Fig. 6F, G)

Journ. Linn. Soc., Bot. 32: 294 (1896); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 303, fig. 130f–h (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 218 (1994); N. Pearce, P.J. Cribb, Orch. Bhutan: 386 (2002). – *E. monophylla* Schltr., Bull. Herb. Boissier 2, 6: 461 (1906). – *E. hindei* Summerh., Bull. Misc. Inform. Kew 1932: 321 (1932); Schuit. et al., Nord. J. Bot. 26: 290 (2008). – *Bryobium pudicum* (Ridl.) Y.P. Ng, P.J. Cribb, Orchid Rev. 113: 272 (2005); Chen Sing-chi, Luo Yibo, J.J. Wood, Fl. China 25: 352 (2009). – *Eria porteri* Seidenf. & A.D. Kerr, Opera Bot. 62: 83, fig. 44 (1982); Seidenf., Opera Bot. 114: 182, fig. 115 (1992); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 268 (2007).

Described from Singapore ("Singapore, Changi"). **Type** ("*Ridley s.n.*") – [SING, K].

Habitat, phenology and conservation status. Trunk and branch short creeping and clustering epiphyte. Primary and old secondary evergreen or semi-deciduous, seasonal, broad-leaved, lowland forests, particularly along streams and on lower parts of hill slopes on basalt and shale. (100)300–400(1500) m. Fl. May–September. Rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Binh Phuoc (Phuoc Long), Dak Lak (sine loc.). NE India, S China (S Yunnan), Laos, Cambodia, Peninsular Malaysia, Singapore, Kalimantan.

Studied specimens. S Vietnam, Binh Phuoc province, Phuoc Long district, Bu Gia Map municipality, Bu Gia Map national park, along Dak Ka stream, around point 12°12'23"N 107°11'59"E, 300–400 m, 2009, *K.H. Thang, Thang 79* [LE]; S Vietnam, Dak Lak province, 2014, *N.V. Canh, s.n.* [LE – photo].

Notes. Very rare orchid with sporadic and disjunctive distribution. Special attention has to be paid to its protection throughout its complete distribution range.

***Gastrochilus distichus* (Lindl.) Kuntze** (Fig. 6H, I)

Revis. Gen. Pl. 2: 661 (1891); N. Pearce, P.J. Cribb, Orch. Bhutan: 525 (2002); Chen Xinqi, Ji Zhanhe, J.J. Wood, Fl. China 25: 496 (2009). – *Saccolabium distichum* Lindl., J. Proc. Linn. Soc., Bot. 3: 36 (1858). – *Gastrochilus biglandulosus* Kuntze, Revis. Gen. Pl. 2: 661 (1891).

Described from NE India ("Sikkim, … Khasia"). **Syntypes** ("*Hooker 206, Hooker 83*") – [K-LINDL].

Habitat, phenology and conservation status. Clustering pendulous trunk and branch epiphyte. Primary evergreen, broad-leaved and coniferous, humid, mossy mountain forests on shale and granite, commonly in moss pillows. 2200–2600 m. Fl. March–May. Very rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Nghe An (Ky Son, Phu Xai Lai Leng mt.). Bhutan, Nepal, NE India, SW China, Laos.

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Studied specimens. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, Phu Kha village, eastern slopes of Phu Xai Lai Leng mountain system, 2350 m, around point 19°12'21.2"N 104°11'28.9"E, 23 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dang, CPC 6073* [CPC Herbarium, LE]; the same locality, 2100–2200 m, around point 19°11'59.3"N 104°11'23.9"E, 25 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6282* [CPC Herbarium, LE].

Notes. Populations of this rare Himalayan species were actually found on the Vietnam-Laos border. Therefore this record concerns in fact territories of both countries.

***Holcoglossum flavescens* (Schltr.) Z.H. Tsi** (Fig. 9A)

Acta Phytotax. Sin. 20: 441 (1982); Jin Xiaohua, J.J. Wood, Fl. China 25: 501 (2009). – *Aerides flavescens* Schltr., Repert. Spec. Nov. Regni Veg. 19: 382 (1924). – *Saccolabium yunpeense* Tang & F.T. Wang, Acta Phytotax. Sin. 1: 97 (1951).

Described from SW China ("West-China: In silvis prope Nan-fau-tschang (Yunpe), Yunnan"). **Type** ("Rev. Pere Tschang (*no 23. Herb. S. Ten*), Junio 1920") – ?

Habitat, phenology and conservation status. Clustering pendulous trunk and branch epiphyte. Primary evergreen, broad-leaved and coniferous, humid, mossy mountain forests on shale and granite, commonly in moss pillows. 1900–2200(2600) m. Fl. March–May. Very rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Nghe An (Ky Son, Phu Xai Lai Leng mt.). S China, Laos.

Studied specimens. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng mountain system, 1900 m, around point 19°13'37.5"N 104°06'11.8"E, 20 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, CPC 6024, 6025* [CPC Herbarium, LE]; the same locality, around point 19°13'52.9"N 104°05'30.5"E, 27 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6361* [CPC Herbarium, LE].

Notes. Populations of this very rare species were actually found on the Vietnam-Laos border, therefore this record concerns in fact territories of both countries. This miniature plant with large attractive flowers is highly demanded on the ornamental plant market and special attention has to be paid to its protection.

***Liparis caudata* Aver. & K.S. Nguyen, sp. nov.** (*L.* sect. *Cestichis* Lindl., 1830; *L.* sect. *Coriifoliae* Ridl., 1886) (Figs 9B, C, 10)

Described from N Vietnam ("Thanh Hoa province, Thuong Xuan district, Bat Mot municipality, Vin village, Xuan Lien natural reserve, 1000–1200 m, around point 19°58'51.6"N 104°59'38.08"E"). **Type** ("5 November 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, N.D. Thang, L.V. Tien, CPC 6809*") – [LE (holotype), CPC Herbarium (isotype)].

Description. Perennial sympodial epiphytic herb with 2–3(5) densely clustering pseudobulbs and many thin, flexuose, light greenish roots. Pseudobulbs narrowly ovoid to ovoid, compressed, (1)1.5–3(3.5) cm tall, (1)1.2–1.5(2) cm wide and (2)3–5(7) mm thick, at the base with 1–3 white, scarious, triangular, conduplicate bracts 1–3 cm long, 5–8 mm wide. Leaves 2, broadly oblanceolate, herbaceous, slightly conduplicate, (6)8–12(14) cm long, (1.6)2–2.5(3) cm wide, narrowed at

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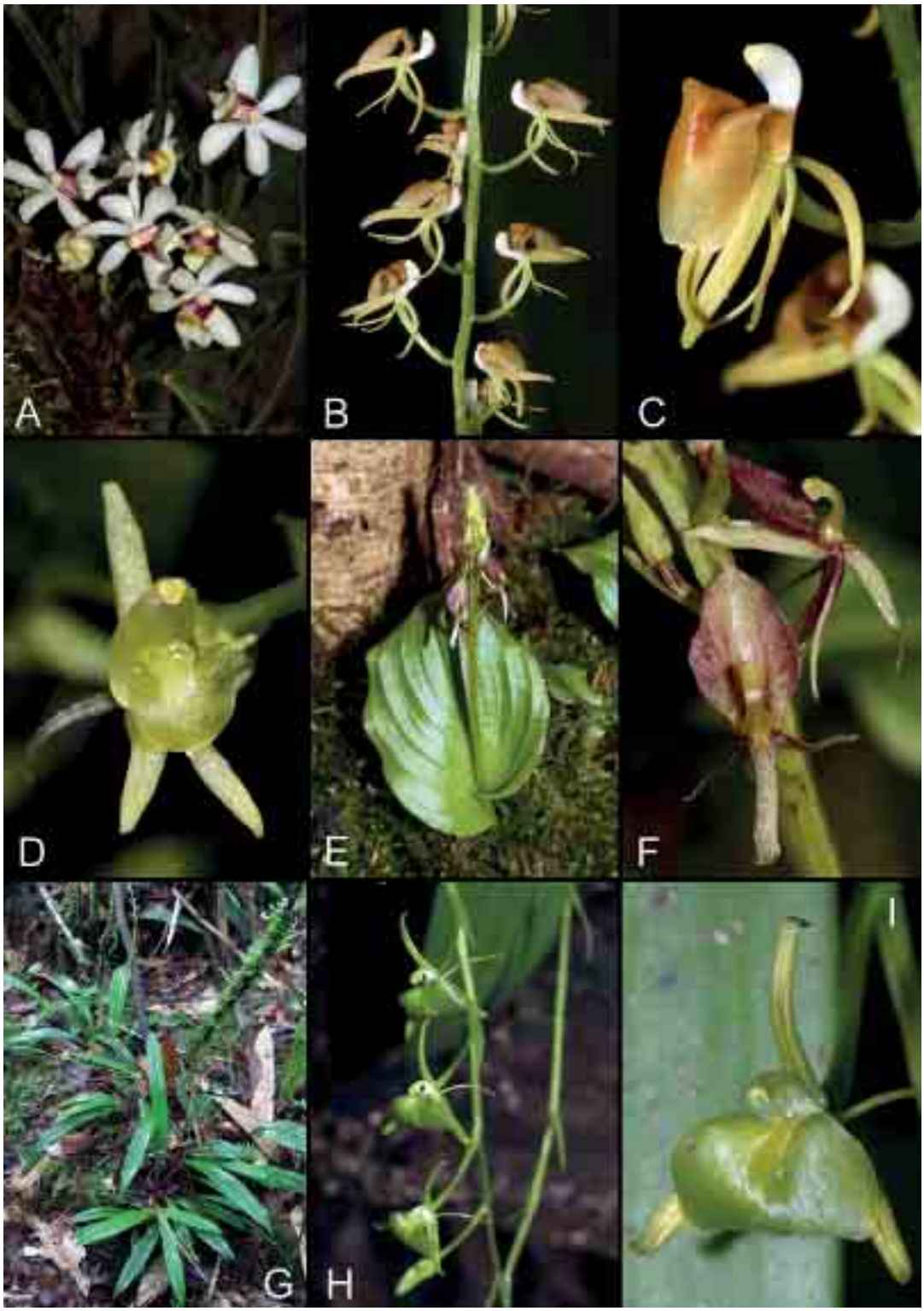

Figure 9. New orchids in the flora of Vietnam. A – *Holcoglossum flavescens* (*L. Averyanov et al.*, *CPC 6024*). B, C – *Liparis caudata* (*L. Averyanov et al.*, *CPC 6809*). D – *L. delicatula* (*Nguyen Thien Tich et al., Tich 10-09-13*). E, F – *L. gamblei* (*L. Averyanov et al.*, *CPC 6220*). G–I – *L. longispica* (*L. Averyanov et al.*, *CPC 7043*). Photos by L. Averyanov (A–C, E, F), N.T. Tich (D) and N.S. Khang (G–I).

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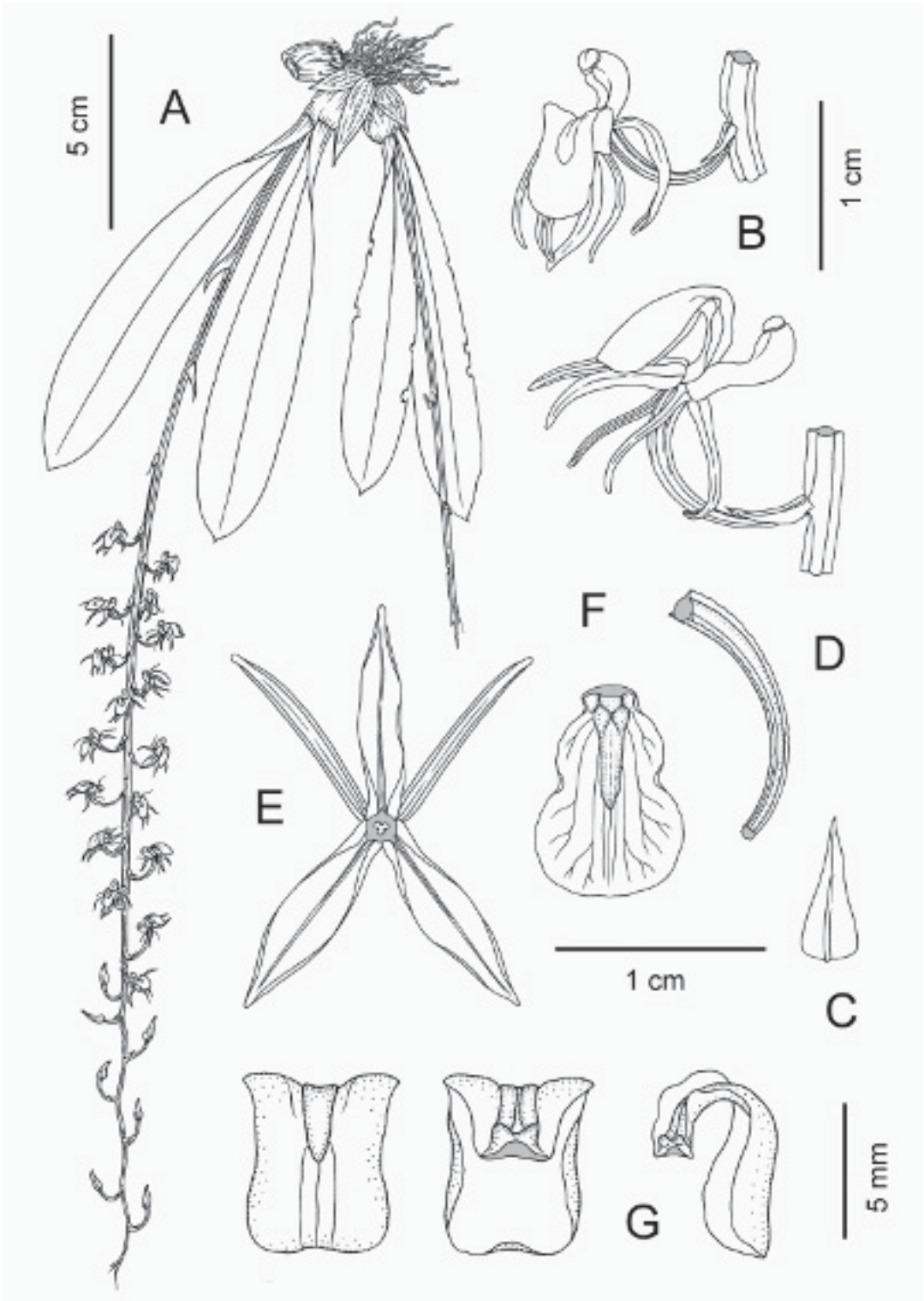

Figure 10. New orchids in the flora of Vietnam. *Liparis caudata.* A – flowering plant. B – flowers, side and half side views. C – floral bract. D – pedicel and ovary. E – flattened sepals and petals, view from behind. F – flattened lip. G – lip, frontal view, view from behind and side view. All drawn from the type *L. Averyanov et al.*, *CPC 6809* by L. Averyanov.

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the base into a short, broad petiole, articulate, apex acute to shortly apiculate. Inflorescence pendulous, many-flowered raceme, (20)30–35(40) cm long; scape and rachis somewhat flattened and narrowly winged; scape with 1–3(4) sterile, narrowly triangular, conduplicate, acute bracts 5–15 mm long; rachis (15)18–22(26) cm long, slightly zigzag curved. Floral bracts narrowly triangular, membranaceous, light greenish, (2)3–5(6) mm long, 0.5–1.5 mm wide. Pedicel and ovary green, cylindric, 3-winged, ascending to erect, (6)8–12(14) mm long, 1–1.5 mm in diam. Flowers yellowish to light brown, lip orange-brown, column and anther white. Sepals oblong lanceolate, with revolute margins, obtuse, (8)9.5–10(10.5) mm long, 2–3 mm wide when flattened, 1-veined. Petals linear, with revolute margins, as long as sepals, twice narrower. Lip flattened narrowly obovate, strongly bent at the middle, 8.5–9.5 mm long, 6–7 mm wide; hypochile cymbiform, rectangular, 2.5–3 mm long and wide, at the base with 2 broadly conical bosses; epichile recurved down, rectangular obovate, convex, 5.5–7 mm long and wide, truncate and finely incised at apex. Column (4)4.5–5(5.5) mm tall, 1.5 mm broad, bent at the middle, broadening to the apex, with low, broad lateral wings. Anther cap hemispheric, 0.8–1 mm in diam., shortly beaked, pollinia dull yellow.

Diagnosis. The new species belongs to a distinct group of epiphytes with flattened pseudobulbs, which includes two species in eastern Indochina, *Liparis elliptica* Wight and *L. sparsiflora* Aver. From both species, *L. caudata* strikingly differs in a very long pendulous inflorescence, large flowers, long ascending pedicels and lip structure. It is very distinct species easily recognizable by its compressed pseudobulbs and remarkably long inflorescence, which is more than twice exceeding the leaves.

Etymology. Species epithet refers to the very long pendulous inflorescence.

Habitat, phenology and conservation status. Clustering trunk and branch epiphyte. Primary broad-leaved, evergreen, humid forests on shale, commonly on mossy pillows. 1000–1200 m. Fl. October–November (December). Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Thanh Hoa (Thuong Xuan, Xuan Lien natural reserve). Endemic.

Studied specimens (paratypes). N Vietnam, Thanh Hoa province, Thuong Xuan district, Bat Mot municipality, Vin village, Xuan Lien Natural Reserve, at elevation 1000–1200 m a.s.l. around point 19°58'51.6"N 104°59'38.08"E, 5 November 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, N.D. Thang, L.V. Tien, CPC 6787* [CPC Herbarium, LE].

***Liparis delicatula* Hook. f.** (Fig. 9D)

Fl. Brit. India 5: 705 (1890); Seidenf., Opera Bot. 114: 145, fig. 88 (1992); N. Pearce, P.J. Cribb, Orch. Bhutan: 206 (2002); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 272 (2007); Schuit. et al., Nord. J. Bot. 26: 296 (2008); Chen Xinqi, Ormerod, J.J. Wood, Fl. China 25: 227 (2009).

Described from NE India ("India, Churra, Khasia"). **Type** ("*Hooker & Thomson 1109*") – [K].

Habitat, phenology and conservation status. Miniature branch and canopy epiphyte. Primary and secondary evergreen, broad-leaved, shady submontane forests, commonly along streams. 600–800 m. Fl. September–October. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Khanh Hoa (Khanh Son). NE India, S China, Laos.

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Studied specimens. S Vietnam, sine loc., a. 2014, *N.T. Tich s.n.* [LE]; Khanh Hoa province, Khanh Son district, Son Trung municipality, Mt. O-Kha (Suoi Che), 19 July 2013, *Nguyen Thien Tich, Tran Gioi, Luu Hong Truong, Tich 10-09-13* [SGN, LE – photo].

Notes. In Vietnam this rare species is poorly known. In China it was recorded from Hainan, Xizang and Yunnan, where it grows at elevations of 500–2900 m a.s.l. Flowering is reported there from December to February (Chen Xinqi et al. 2009).

***Liparis gamblei* Hook. f.** (Fig. 9E, F)

Icon. Pl. 19: t. 1812 (1889); Seidenf., Dansk Bot. Ark. 31, 1: 11, fig. 2 (1976); N. Pearce, P.J. Cribb, Orch. Bhutan: 199 (2002).

Described from NE India ("India, Sikkim, Rimbi Chu (Rungbee) …", "Darjeeling, Senchal …"). **Syntypes** ("*Clarke 12450*", "*Gamble 3988A*") – [K].

Habitat, phenology and conservation status. Terrestrial or hemiepiphytic ephemeroid herb on wet ground and moist mossy deceiving timber. Primary evergreen, broad-leaved, humid, mossy mountain forests on sandstone and shale, usually on very steep slopes. (1800)2000–2300 m. a.s.l. Fl. June–July (August). Very rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Nghe An (Ky Son, Phu Xai Lai Leng mt.). NE India, Laos.

Studied specimens. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng Mountain, 2300 m, around point 19°12'23.3"N 104°11'33.7"E, 24 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6220* [CPC Herbarium, LE]; the same locality, 1300–2000 m, around point 19°12'54"N 104°12'01"E, 26 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6311* [CPC Herbarium, LE].

Notes. Populations of this very rare species were actually found on the Vietnam-Laos border, therefore this record concerns in fact territories of both countries. It is a rather surprising discovery of a montane Himalayan species in eastern Indochina which essentially expands its known distribution area.

***Liparis longispica* Aver. & K.S. Nguyen, sp. nov.** (*L.* sect. *Cestichis* Lindl., 1830; *L.* sect. *Coriifoliae* Ridl., 1886) (Figs 9G–I, 11)

Described from N Vietnam ("Son La province, Van Ho district, Chieng Xuan municipality, Co Hong village, territory of Xuan Nha natural reserve, Pha Luong mt., … at elevation 1200–1400 m around point 20°41'40.5"N 104°39'24.7"E"). **Type** ("13 November 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, N.D. Thang, L.D. Qui, CPC 7043*") – [LE (holotype, isotype), CPC Herbarium (isotype)].

Description. Perennial sympodial epiphytic, lithophytic or occasionally terrestrial herb with a series of pseudobulbs placed in a row on a thin rhizome, touching each other, each with many thin, flexuose, light greenish roots. Pseudobulbs narrowly ovoid to ovoid, often slightly oblique, (0.8)1–1.6(1.8) cm tall, (0.6)0.7–1(1.2) cm in diam., at the base with 2–3(4) white, scarious, narrowly triangular, acuminate, conduplicate, often slightly falcate bracts (1.5)3–7(10) cm long, (3.5)4–7(8) mm wide. Leaves 1, oblanceolate, herbaceous, conduplicate in lower part, (12)14–24(26) cm long, (1)1.5–2.8(3.2) cm wide, tapering to the base, articulate, triangular acute

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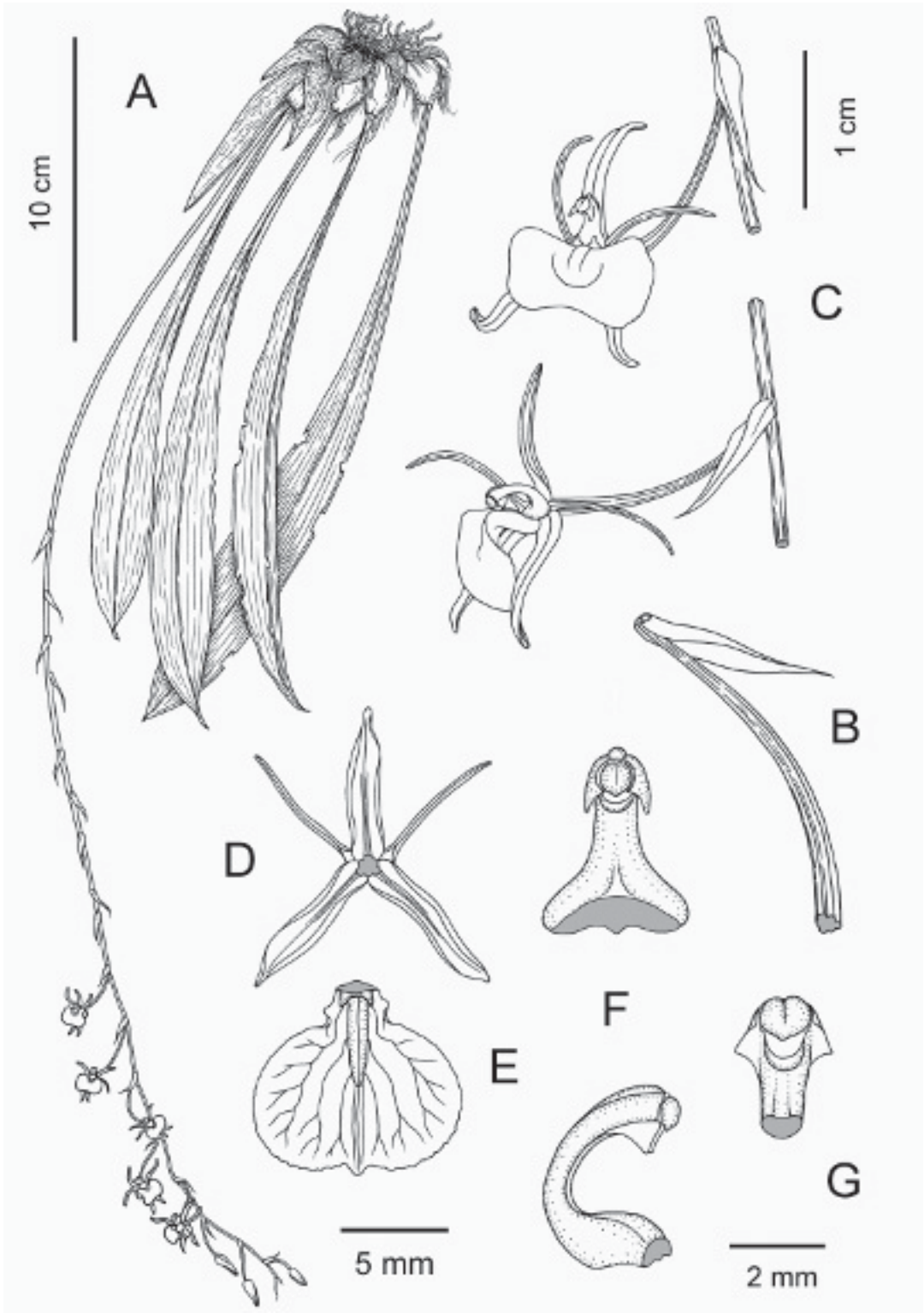

Figure 11. New orchids in the flora of Vietnam. *Liparis longispica*. A – flowering plant. B – pedicel, ovary and floral bract. C – flowers, frontal and side view. D – flattened sepals and petals, view from behind. E – flattened lip. F – column frontal and side view. G – column apex, view from below. All drawn from the type *L. Averyanov et al.*, *CPC 7043* by L. Averyanov.

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at apex. Inflorescence slender, straight to arching and pendulous, indistinctly secund raceme, (16)20–35(40) cm long, with (3)4–10(12) lax flowers; scape and rachis almost cylindrical, wingless or with very narrow wings; scape (12)14–24(26) cm long, in the upper third with (1)4–10(14) sterile, linear to narrowly triangular, conduplicate, acuminate bracts (0.8)1–1.5(1.8) cm long, (1)1.5–2(2.5) mm wide; rachis (5)8–12(14) cm long, more or less straight. Floral bracts linear, narrowly triangular, often subulate, membranaceous, light greenish to almost white, (4)5–12(15) mm long, (0.6)1–1.5(2) mm wide, twice shorter than pedicel and ovary. Pedicel and ovary light green, cylindric, 6-ribbed, straight to slightly curved, (1)1.2–1.8(2) cm long, (0.6)0.8–1(1.2) mm in diam. Flowers light green to yellowish-green, column white, lip apex and anther greenish. Sepals narrowly elliptic lanceolate, with revolute margins, obtuse, (7.5)8–9(9.5) mm long, 2–2.5 mm wide when flattened, 3-veined. Petals linear, with revolute margins, as long as sepals or little shorter, 0.2–0.3 mm wide. Lip being flattened, broadly obovate, strongly bent near base, (6.5)7–8(8.5) mm long; hypochile shortly cymbiform, 1.5–2 mm long and wide, at the base with 2 conical bosses; epichile recurved, broadly obovate to almost orbicular, convex, (4.5)5–6(6.5) mm long, (8)8.5–9.5(10) mm wide, shallowly emarginate, with small triangular tooth, finely irregularly incised crenulate along margin. Column 4.5–5 mm tall, slender, strongly curved forward, proximally broadening into massive, shortly conical, fleshy base 2–2.5 mm in diam., at the apex with small, triangular lateral wings directed down. Anther cap hemispheric, 0.8 mm in diam., shortly beaked, pollinia dull yellow.

Diagnosis. The new species belongs to a distinct group of taxa with 1-leaved pseudobulbs and is closest to *L. balansae* Gagnep. and *L. bootanensis* Griff. From both mentioned species, the described plant strikingly differs in very long inflorescence, long pedicels, lip shape, specific structure of column and hardly beaked anther cap.

Etymology. Species epithet refers to the very long scape of the inflorescence.

Habitat, phenology and conservation status. Clustering trunk and branch epiphyte or lithophyte (occasionally terrestrial) on mossy cliffs or steep slopes. Primary evergreen, mixed and coniferous forests with *Pinus cernua* on sandstone, commonly on mossy pillows near mountain tops. 1200–1400 m. Fl. October–November. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Son La (Van Ho, Xuan Nha natural reserve, Pha Luong Mountains). Endemic.

***Luisia parviflora* Aver., sp. nov.** (Figs 12A, 13)

Described from S Vietnam ("Lam Dong province, Lac Duong district, Bidoup mt., 1500 m"). **Type** ("May 2013, *Nguyen Phi Tam CPC 7251a*") – [LE (holotype)].

Description. Perennial monopodial epiphytic herb with ascending to erect, rigid, semi-woody, rather straight stem (8)10–12(15) cm tall, 4–5 mm in diam., with many white, flexuose roots, densely adpressed to the bark; internodes (3)5–10(12) mm long. Leaves 2–4(6), straight to slightly arching, on upper part of stem, more or less spirally arranged, (3)4–6(10) cm long, 2.5–3(3.5) mm in diam., obtuse. Inflorescence opposite to leaves, 4–6(8) mm long, 1–2(3)-flowered; floral bracts broadly triangular, about 1.5 mm long and wide, thick. Pedicel and ovary cylindrical, (4)5–6(6.5) mm long, 0.8–1 mm in diam. Flowers widely opening, reddish-brown, rather thick. Median sepal elliptic, 3–4 mm long, 1.4–1.6 mm wide, concave, obtuse. Lateral sepals oblong triangular elliptic, slightly oblique, 4–4.5 mm long, 1.2–1.4 mm wide, dorsally carinate and

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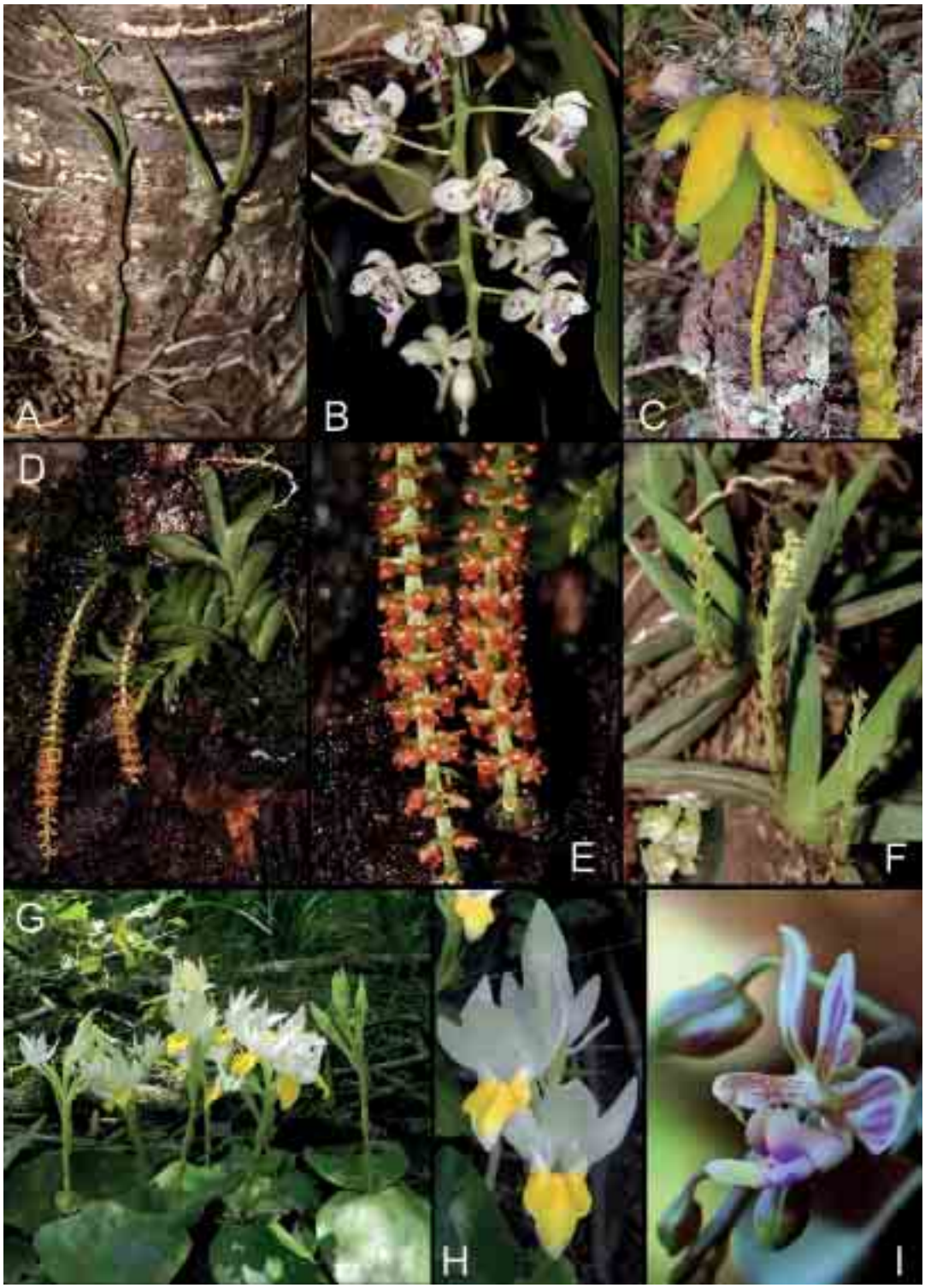

Figure 12. New orchids in the flora of Vietnam. A – *Luisia parviflora* (*Nguyen Phi Tam, CPC 7251a*). B – *Macropodanthus alatus* (*L. Averyanov et al., AL 68*). C – *Oberonia janae* (*J.L. Skornickova et al.*, *JLS–2678*). D, E – *O. tatianae* (*L. Averyanov et al., CPC 7581a/TM 1186*). F – *Octarrhena minuscula* (*N.V. Canh et al.*, *CPC 7694*). G, H – *Pecteilis hawkesiana* (*N.V. Canh et al.*, *CPC 7695*). I – *Phalaenopsis finleyi* (*N.M. Duc, s.n.*). Photos by L. Averyanov (A, D, E), N.M. Duc (B, I), J.L. Skornickova (C) and N.V. Canh (F–H).

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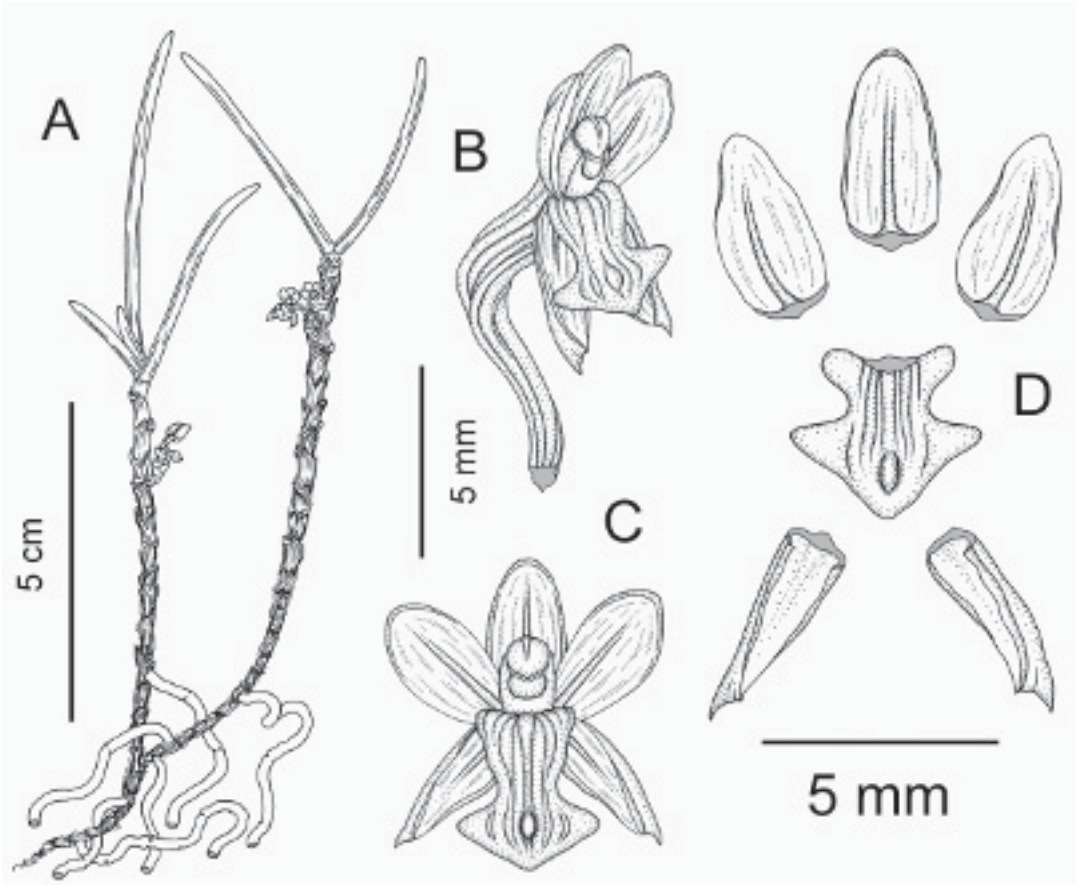

Figure 13. New orchids in the flora of Vietnam. *Luisia parviflora.* A – flowering plant. B – flowers, side view. C – flower, frontal view. D – flattened sepals, petals and lip. All drawn from the type *Nguyen Phi Tam, CPC 7251a* by L. Averyanov.

winged, protruding at apex into acute awn-like teeth. Petals narrowly ovate, obtuse, 4–4.5 mm long, 1.8–2.2 mm wide. Lip obovate in outline, rigid and fleshy, longitudinally indistinctly grooved, 3.5–4.5(5) mm long, strongly contracted near middle, with distinct epichile and hypochile; hypochile 1.2–1.4 mm long, 2–2.2 mm wide, with small round side lobes; epichile broader than hypochile, triangular cordate, 1.6–1.8 mm long, 3.5–4 mm wide, blunt to obtuse at apex, in center with short, raised, boss-like keel. Column stout, shortly cylindrical, 1.5–1.8 mm tall. Pollinarium 0.5–0.6 mm long, stipe ovate; viscidium large, suborbicular.

Diagnosis. The new species may be close to *Luisia ramosii* Ames distributed in southern China and Philippines, but it differs in twice smaller flowers and triangular cordate epichile with a central boss-like keel.

Etymology. Species epithet refers to very small flowers, which probably are the smallest among all its congeners.

Habitat, phenology and conservation status. Trunk and branch epiphyte on tall trees. Primary evergreen, broad-leaved, montane forests, commonly on tall mossy trees. 1400–1600 m. Fl. October–November. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lam Dong (Lac Duong, Bidoup Mountains). Endemic.

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***Macropodanthus* L.O. Williams**

Bot. Mus. Leafl. 6: 103 (1938); Seidenf., Opera Bot. 95: 260–265 (1988); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 681–683 (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 351 (1994); J.B. Comber, Orch. Sumatra: 850–851 (2001).

Type. *M. philippinensis* L.O. Williams.

6–7 species. Andaman and Nicobar Islands, Thailand, Vietnam, Peninsular Malaysia, Java, Kalimantan, Sumatra, Philippines. New generic record in the flora of Vietnam.

***Macropodanthus alatus* (Holttum) Seidenf. & Garay** (Fig. 12B)

Opera Bot. 95: 261, fig. 166 (1988), non pl. 29c (*Pteroceras teres* (Blume) Holttum); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 683, fig. 306 a–c (1992), non pl. 47c (*Pteroceras teres* (Blume) Holttum); Tich, Tim Hieu Hoa Lan (1993): 6–7 (1993). – *Sarcochilus alatus* Holttum, Gard. Bull. Singapore 14: 5 (1953). – *Macropodanthus tridentatus* Seidenf., Opera Bot. 95: 265, fig. 168 (1988). – *Pteroceras alatum* (Holttum) Holttum, Kew Bull. 14: 269 (1960).

Described from Malacca Peninsula ("Malaya: Fraser's Hill 4000 ft. …"). **Type** ("*Holttum 39467*") – [SING].

Habitat, phenology and conservation status. Trunk and branch epiphyte. Broad-leaved, evergreen lowland forests. 300–500 m. Fl. April–June. Very rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Lam Dong (Di Linh, Da Huoai, Madagui forest resort), S Vietnam (sine loc.). India (Andaman Islands), Peninsular Thailand, Malaya.

Studied specimens. S Vietnam, Lam Dong province, Madagui forest resort, 1992, *Nguyen Tien Tich, Tich 00.05.92* [Herbarium of the Department of Botany and Ecology, University of Science, Ho Chi Minh City Vietnam National University?]. Plant from Hanoi street market originated supposedly from southern Vietnam, a. 2014, *N.M. Duc, N.V. Canh, s.n.* [LE – photo]. S Vietnam., Lam Dong prov., Di Linh distr., 2014, *Tran Huu Nam s.n.*, flowered and herbarized at 3 May 2015, *L. Averyanov, T. Maisak, Nong Van Duy, Nguyen Phi Tam, AL 67* [LE]. S Vietnam., Lam Dong prov., Di Linh distr., 2014, *Nguyen Van Tien s.n.*, lowered and herbarized at 3 May 2015, *L. Averyanov, T. Maisak, Nong Van Duy, Nguyen Phi Tam, AL 68* [LE – photo].

Notes. Very rare species, which was recorded in Vietnam before only by few observations, but not verified by herbarium vouchers.

***Oberonia janae* Aver., sp. nov.** (*O.* subgen. *Oberonia*) (Figs 12C, 14)

Described from S Vietnam ("Binh Thuan province, Bac Binh district, Phan Son commune, Sa Mai mt., 11°29'36.6"N 108°20'18.2"E; 824 m"). **Type** ("*Jana Leong–Skornickova, Nguyen Quoc Binh, Tran Huu Dang, Aung Thame & Edward Ong, JLS–2678*, 6 November 2013") – [SING (holotype), LE, VNMN (isotypes)].

Description. Perennial sympodial epiphytic miniature herb 3–4(5) cm tall. Stems abbreviate, very short, 2–4(5) mm long, completely covered by (2)3–4(5) imbricate leaves, with many thin, flexuose, dull yellowish gray roots at the base. Leaves very fleshy, without distinct articulation at the base, oblong narrowly ovate, slightly oblique, triangular acute at apex, (1.5)2–3(4.5) cm long, (4)5–8(10) mm wide. Inflorescence subterminal, straight to arching, spadix-like raceme,

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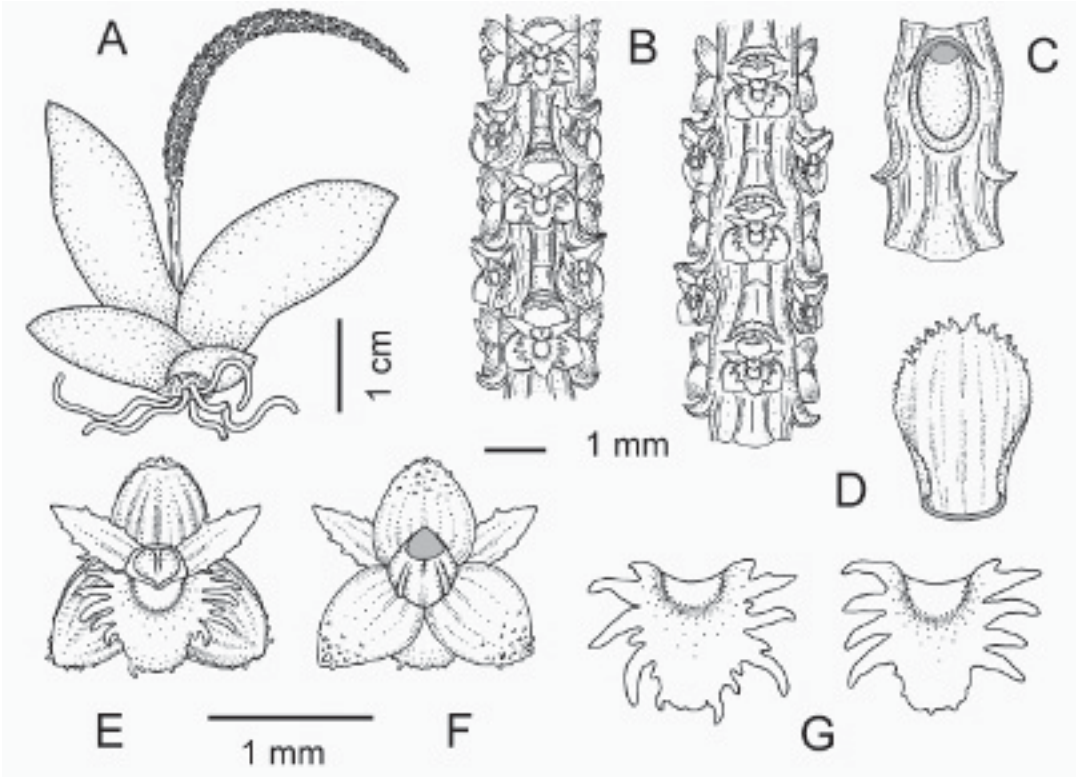

Figure 14. New orchids in the flora of Vietnam. *Oberonia janae*. A – flowering plant. B – portion of inflorescence in the middle and its apical part. C – floral alveole in rachis with removed flowers. D – floral bract. E, F – flower, frontal view and view from behind. G – flattened lips. All drawn from the type *J.L. Skornickova et al.*, *JLS–2678* by L. Averyanov and T. Maisak.

(3.5)4–6(7.5) cm long, 2–2.5(3) mm in diam.; scape stout, erect, straight, 0.8–1.2(1.5) cm long, covered by few distant, oblong ovate, finely irregularly incised fimbriate sterile bracts 0.7–1.5(2) mm long; rachis straight to arching, inflated, fleshy, longitudinally ribbed, (2.5)3–5(6) cm long, (1)1.2–1.4(1.5) mm in diam. Floral bracts oblong ovate, cymbiform, 1–1.2 mm long, 0.8–1 mm wide, rounded and irregularly fimbriate at apex, during anthesis strongly recurved. Pedicel and ovary obconic, 0.3–0.4 mm long and wide, completely sunk into ovate rachis alveole. Flowers 1.2–1.4 mm in diam., uniformly dull yellowish-green to yellow-orange. Sepals broadly ovate, 0.6–0.7 mm long, 0.5–0.6 mm wide, fleshy, concave, obtuse, often slightly cucullate, almost straight along margin, finely verruculose outside, near the apex. Petals narrowly ovate to broadly lanceolate, acute, sparsely, irregularly denticulate along the margin. Lip broadly triangular ovate in outline, 0.7–0.8 mm long, 0.9–1.1 mm wide, laterally fimbriate or long dentate, apex orbicular, irregularly denticulate, at the base with distinct orbicular fovea.

Diagnosis. The new species resembles *Oberonia pachyphylla* King & Pantl., but it differs well in fimbriate floral bracts, verruculose sepals, denticulate petals and fimbriate lips. According to its articulate leaves, the new species should be placed into *O.* subgen. *Oberonia*, where it does not meet any closely related species.

Etymology. Species is named after its discoverer, eminent plant taxonomist Dr Jana Leong-Skornickova.

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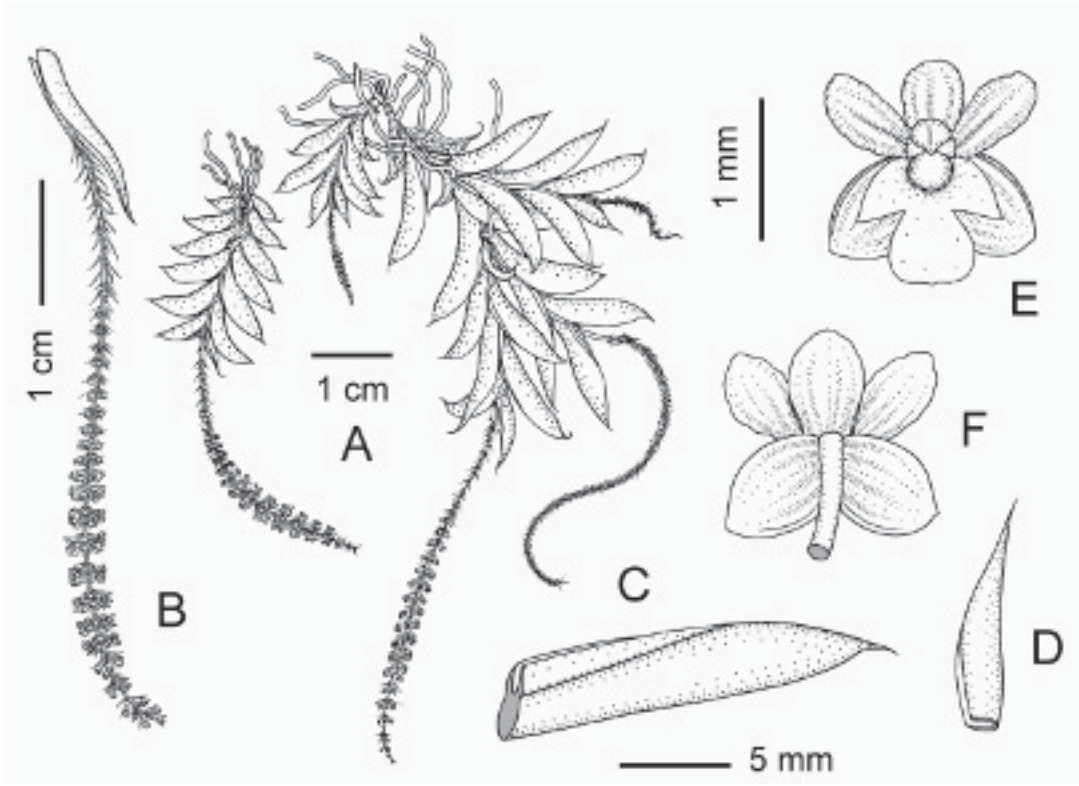

Figure 15. New orchids in the flora of Vietnam. *Oberonia tatianae*. A – flowering plants. B –inflorescence. C – leaf, side view. D – floral bract, side view. E, F – flower, frontal view and view from behind. All drawn from the type *L. Averyanov et al.*, *CPC 7581a/TM 1186* by L. Averyanov and T. Maisak.

Habitat, phenology and conservation status. Clustering trunk and branch epiphyte. Dry dipterocarp forests and woodlands. 700–800 m. Fl. October–November. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Binh Thuan (Bac Binh, Sa Mai mt.). Endemic.

***Oberonia tatianae* Aver., sp. nov.** (*O.* subgen. *Menophyllum* Schltr.) (Figs 12D, E, 15)

Described from N Vietnam ("Cao Bang province., Bao Lac district, Hong An municipality, Mi Lung village. 1500–1550 m, around point 22°49'15.4"N 105°49'53"E"). **Type** ("21 November 2014, *L. Averyanov, N.T. Hiep, N.S. Khang, T. Maisak, L. Osinovetz, CPC 7581a/TM 1186*") – [LE (holotype)].

Description. Perennial sympodial epiphytic miniature herb with leafy pendulous stems. Stem 1–3(4.5) cm long, branching, producing annual shoots arising from leaf axil of middle part of previous stem, each annual shoot (0.6)0.8–1.5(2) cm long, leafy throughout, with (6)7–12(14) distichous leaves, rooting at the base with few white roots, terminated in inflorescence. Leaves little fleshy, with no articulation at the base, distichous, equitant with hyaline sheaths, oblong narrowly ovate, somewhat recurved, apiculate, (5)7–15(17) mm long, (1.8)2–3(3.5) mm wide. Inflorescence straight to arching and paniculate raceme, with verticillate arranged flowers, (1)1.5–4.5(5) cm long, 2–2.5 mm in diam.; scape rather slender, curved, (4)6–12(14) mm long, with many narrowly triangular acuminate sterile bracts 1–1.5 mm long, 0.2–0.3 mm wide,

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arranged into (2)4–6(8) verticillate whorls; rachis straight to arching, longitudinally ribbed, (0.5)1–3(3.5) cm long, (0.3)0.5–0.6 mm in diam. Floral bracts narrowly triangular, straight, erect, 0.8–1.2 mm long, 0.2–0.3 mm wide, acuminate to shortly aristate, as long as flowers or little shorter. Pedicel and ovary shortly cylindric, (0.4)0.5–0.6(0.8) mm long, erect. Flowers arranged into regular distant whorls each with (5)6–7(8) flowers, widely opening, 1.2–1.4 mm in diam., orange-brown, column and anther white to light yellowish. Sepals broadly ovate, 0.7–0.8(0.9) mm long, 0.5–0.6 mm wide, concave, obtuse to blunt at apex, straight along margin, median sepal little smaller. Petals narrowly obovate, as long as sepals, blunt to orbiculate at apex, shallowly irregularly crenulate along margin. Lip suborbicular in outline, 0.7–0.8 mm long, 1–1.2 mm wide, straight along margin, at the base with distinct orbicular fovea, 3-lobed; side lobes oblique triangular, spreading, 0.3 mm long and wide; median lobe broadly obovate, 0.6–0.7 mm long and wide.

Diagnosis. Species may be related to *Oberonia falcata* King & Pantl. because of its similar superficially slender paniculate stems, but the new species is very different in the lip structure. The discovered plant has a rather isolated taxonomic position because each annual floriferous shoot arises from a leaf axil of the stem of the previous year. This is a unique character in the genus.

Etymology. The species is named after its collector, Mrs. Tatiana Maisak, plant artist and a professional orchid gardener of the Komarov Botanical Institute of the Russian Academy of Sciences.

Habitat, phenology and conservation status. Pendulous miniature branch and canopy epiphyte. Primary broad-leaved and mixed, humid, shady evergreen forest with *Podocarpus pilgeri, Pinus wangii, Fokienia hodginsii* and *Tsuga chinensis* on rocky solid limestone, commonly on mossy trees in deep shade. 1500–1600 m. Fl. January–February. Very rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Cao Bang (Bao Lac). Endemic.

***Octarrhena* Thwaites**

Enum. Pl. Zeylaniae: 305 (1861); J.B. Comber, Orch. Java: 204–205 (1990); id., Orch. Sumatra: 563–565 (2001); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 337–338 (1992); J.J. Wood, P.J. Cribb, Checkl. Orch. Borneo: 235 (1994).

Type. *O. parvula* Thwaites.

35–40 species. Sri Lanka, Vietnam, Peninsular Malaysia, Java, Kalimantan, Sumatra, New Guinea, Fiji. New generic record in the flora of Vietnam.

***Octarrhena minuscula* Aver. & N.V. Duy, sp. nov.** (Figs 12F, 16)

Described from S Vietnam ("Dak Nong province, Dak Song district"). **Type** ("5 December 2014, *N.V. Canh, Q.V. Hoi, L. Averyanov, N.V. Duy, N.T. Hiep, CPC 7694*") – [LE (holotype)].

Description. Perennial sympodial epiphytic miniature herb (0.5)1–1.5(2) cm tall. Stems abbreviate, very short, (2)3–5(6) mm long, completely covered by overlapping equitant imbricate leaf sheaths, with dense bunch of thin, flexuose, gray to dull light brownish roots at the base. Leaves (3)4–6(7), distichous, articulate at the base, fleshy, subterete, laterally compressed, ensiform, oblong lanceolate to broadly lanceolate, commonly broadest near the base, narrowing

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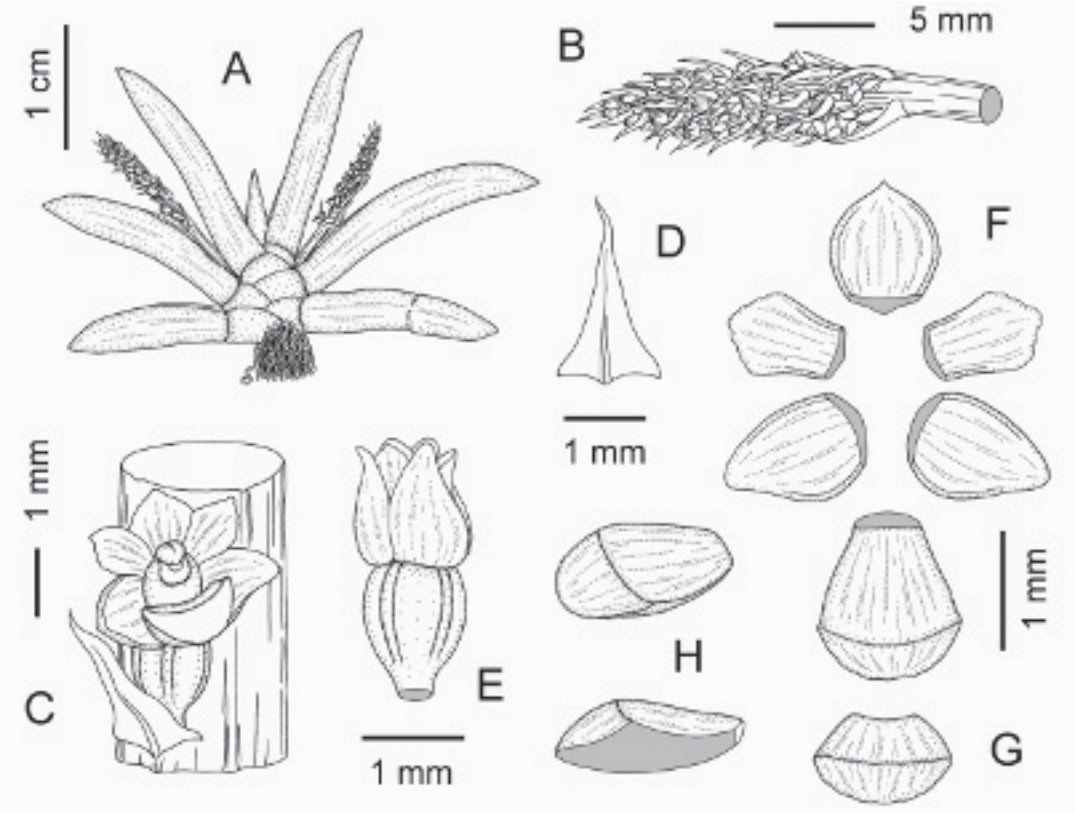

Figure 16. New orchids in the flora of Vietnam. *Octarrhena minuscula*. A – flowering plant. B – inflorescence. C – flower and portion of rachis. D – floral bract. E – flower, side view. F – flattened sepals, petals and lip. G – lip, frontal view. H – lip, side view and its sagittal section. All drawn from the type *N.V. Canh et al.*, *CPC 7694* by L. Averyanov.

to triangular acute apex, often slightly recurved, (0.8)1–1.8(2.2) cm long, (2)3–4(5.5) mm wide. Inflorescence lateral, arising from leaf axil, almost straight or slightly curved, somewhat secund, subdense raceme, (0.8)1–1.4(1.8) cm long, 3–4(4.5) mm in diam.; scape light green, indistinctly longitudinally ribbed, stout, erect, straight, 2–4(5) mm long, naked or with 1(2) small triangular sterile bracts; rachis straight, (6)8–12(15) mm long, 1.2–1.5 mm in diam., with (4)6–13(18) flowers. Floral bracts triangular, acuminate, 1-veined, light green to almost white, membranaceous, later dull yellowish, scarious, (1)1.2–1.8(2.2) mm long, (0.4)0.6–1(1.2) mm wide, indistinctly conduplicate, more or less straight or spreading and slightly incurved. Flowers resupinate, subsessile, campanulate, not widely opening, 1.8–2.2 mm in diam., uniformly light pale greenish. Sepals broadly ovate, 1.2–1.5 mm long, 0.6–0.8 mm wide, spreading and slightly recurved, somewhat fleshy, concave, obtuse, entire along margin. Petals deltoid narrowly obovate, obtuse, as long as sepals, but a little narrower, with entire or shallowly irregularly crenulate margin. Lip sessile, solidly fused with column base, simple, obovate, entire, concave, somewhat fleshy, obliquely truncate at apex, as wide as sepals and little longer. Column broadly short cylindric, 0.6–0.7 mm tall and broad. Anther cap hemispheric, light greenish to dull yellowish, pollinia yellow. Fruits erect, obovoid, 3-ridged capsule, (1.6)1.8–2.2(2.6) mm long.

Diagnosis. The new species well differs from all its congeners known in Asia in remarkably dwarf habit, short abbreviated stem and very small, not widely opening campanulate flowers.

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Etymology. The species name refers to the remarkably tiny habit of the described plant.

Habitat, phenology and conservation status. Branch and canopy miniature epiphyte. Primary and old secondary broad-leaved, evergreen, humid, submontane forests. 950–1000 m. Fl. September–November. Very Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Dak Nong (Dak Song; Dak R'Lap). Endemic.

Studied specimens (paratypes). S Vietnam, Dak Nong province, Dak R'Lap district, Nhan Dao municipality, 950–1000 m, around point 11°53'32"N 107°36'33"E, 17 September 2011, *N.V. Duy, L. Averyanov, CPC 7693* [Herbarium of Tay Nguyen Institute of Scientific Researches, LE – photo].

Notes. Tropical genus *Octarrhena* Thwaites comprises about 35 species distributed from Ceylon to Fiji, with the greatest numbers of species in New Guinea. It seems, the plant described here, is the first generic record for Indochina.

***Odontochilus aureus* Aver., sp. nov.** (Fig. 17)

Described from N Vietnam ("Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng Mountain, 1300–2000 m, around point 19°12'54"N 104°12'01"E"). **Type** ("26 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6323*") – [LE (holotype), CPC Herbarium (isotype)]. **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA *0220/CPC 6323a* (Fig. 17).

Description. Perennial sympodial terrestrial creeping herb. Plagiotropic part of stem dark purple to almost black, epigeous, leafless, fleshy, rooting at nodes, (5)8–12(15) cm long, (2.5)3–4(4.5) mm in diam., apically ascending; erect leafy stem glabrous, (3)4–8(10) cm long, with (2)3–6(7) spirally arranged leaves, terminated by erect inflorescence (8)14–18(22) cm tall. Leaves petiolate; petiole and sheath (1)1.5–2(2.2) cm long, 2–5(6) mm wide; leaf blade ovate, usually slightly oblique, sometimes irregularly, broadly undulate along margin, with 3 main veins, acute to apiculate, (3)4–5(5.5) cm long, (2)2.5–3.5(4) cm wide, velvety black with white median stripe above, uniform velvety pale dark purple below. Scape and rachis erect, straight, pink, sparsely hairy with short glandular hairs; scape (5)6–10(12) cm long, with (1)2–3(4) sterile triangular, acute bracts (0.4)0.5–1(1.5) cm long, (1.5)2–3(3.5) mm wide; rachis (2)3–6(8) cm long, with (4)6–10(14) lax flowers. Floral bracts pale pink-purple, sparsely shortly glandular hairy, triangular-cuneate, conduplicate, acuminate, (4)5–8(10) mm long, (1.5)2–2.5(3) mm wide. Pedicel and ovary subglabrous or sparsely glandular hairy, cylindric, reddish-brown to olive-purple, (5)6–9(10) mm long, 1.2–1.8(2) mm in diam. Flowers odorless, not resupinate, not widely opening, about 1 cm in diam.; sepals pale olive, pink in apical part; petals olive, darker toward apex; lip golden-yellow, spur brightly red; column dull yellow; anther cap pale pink. Sepals free, narrowly ovate to ovate, concave, glabrous, shortly attenuate and obtuse, (5.5)6–7(7.5) mm long, rather straight, spreading and directed forward, 1-veined; median sepal narrowly ovate, 2–2.5(3) mm wide; lateral sepals ovate, oblique, 3.5–4 mm wide. Petals as long as sepals, 1.8–2.2 mm wide, glabrous, rather straight, strongly oblique, half (longitudinally) narrowly ovate, narrowing from broad base to acuminate and obtuse apex, 1-veined, connivent and forming a hood with the dorsal sepal. Lip glabrous, spurred, clawed, 2-lobed, (5.5)6.5–7.5(8) mm long and wide, distinctly divided into hypochile and epichile. Hypochile (3.5)4(4.5) mm long, 1–2 mm wide, fleshy, concave, boat-shaped to almost tubular, narrowing apically from broad base, margins

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Figure 17. New orchids in the flora of Vietnam. *Odontochilus aureus*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA *0220/CPC 6323*.

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more or less straight, entire. Epichile 2-lobed, lobes more or less flat, spreading in a wide angle, oblique triangular, finely papillose, (3.5)4(4.5) mm long, 2.2–2.6 mm wide, slightly incised along lateral margin. Spur saccate, subspherical, (1.8)2(2.2) mm in diam., longitudinally grooved and notched at apex, completely covered by concave bases of lateral sepals, inside with 2 massive, fleshy, stalked, clavate, yellowish glands, dentate or shortly digitate at apex. Column subspherical, (2)2.2–2.4(2.8) mm tall and wide, with 2 short, fleshy, vertical wings at front, stigma entire, transversely oblong; anther cap hemispheric, 2 mm long and wide, with triangular attenuate beak; viscidium 0.6 mm long, narrowly ovate, dark brown to almost black.

Diagnosis. The described plant looks unique in the genus *Odontochilus* Blume combining such features as black leaves, yellow colored lips as well as structure of hypochile and character of glands in the spur. It is not related to any of the known species of the genus.

Etymology. Species name refers to the golden yellow lip color.

Habitat, phenology and conservation status. Terrestrial creeping herb. Primary and secondary broad-leaved, evergreen, humid montane forests on sandstone and shale, usually on steep shady slopes. 1500–2000 m. Fl. September–October. Rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Nghe An (Ky Son, Phu Xai Lai Leng mt.). Endemic.

***Pecteilis hawkesiana* (King & Pantl.) C.S. Kumar** (Fig. 12G, H)

Nord. J. Bot. 22: 526 (2003); Schuit. et al., Nord. J. Bot. 26: 303 (2008); Pedersen, Fl. Thailand 12, 1: 217, fig. 127, pl. 17, 1 (2011). – *Habenaria hawkesiana* King & Pantl., J. Asiat. Soc. Bengal, pt. 2, Nat. Hist. 66: 603 (1897). – *Pecteilis sagarikii* Seidenf., Bot. Tidsskr. 68: 46, fig. 11, t. 1 (1973).

Described from N Myanmar ("Upper Burma"). **Syntypes** ("*Prazer s.n.*") – [CAL].

Habitat, phenology and conservation status. Terrestrial tuberiferous ephemeroid herb. Dry evergreen and semi-deciduous, lowland, broad-leaved, particularly dipterocarp forests, woodlands and bamboo thickets. 200–600 m. Fl. July–August (September). Rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Dak Lak (Buon Don, Yok Don national park). Myanmar, Thailand, Laos.

Studied specimens. S Vietnam, Dak Lak province, Buon Don district, Yok Don national park. 5 December 2014, *N.V. Canh, P.D. Hiep, Q.V. Hoi, L. Averyanov, N.V. Duy, N.T. Hiep, CPC 7695* [LE].

Notes. This is a very rare species, which has a sporadic, sparse and disjunctive distribution. This ornamental plant is highly demanded on the market and special attention has to be paid to its protection.

***Phalaenopsis finleyi* Christenson** (Fig. 12I)

Richardiana 11: 80 (2011). – *Kingidium minus* Seidenf., Opera Bot. 95: 188, fig. 116, pl. 20a (1988). – *Phalaenopsis minus* (Seidenf.) Christenson, Phalaenopsis: 54, fig. (2001), non F.Y. Liu (1988).

Described from N Thailand, Loei province ("Thailand. Loei"). **Type** ("*Hort. Suphachadiwong S. 736*") – [C].

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Habitat, phenology and conservation status. Trunk and branch miniature epiphyte. Broad-leaved evergreen forests. Fl. June–July. Very rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: sine loc. (expectedly northwestern provinces). Myanmar, NE Thailand.

Studied specimens. Wild collected plant of unknown origin obtained from Hanoi street market, originated expectedly from NW Vietnam, 2010, *N.M. Duc, N.V. Canh, s.n.* [LE – photo].

Notes. This very rare tiny plant grows in canopies of tall trees and is difficult to observe and collect hence its distribution remains unclear. The cited specimen was undoubtedly collected in Vietnam, most probably in northwestern territories adjacent to the border of Laos. Nevertheless, its certain origin is still unknown. The species is an attractive ornamental plant, which needs further studies and appropriate protection.

***Pleione hookeriana* (Lindl.) Rollisson** (Fig. 18A)

Cat. (Rollisson) 1875–1876: 39 (1875); Seidenf., Opera Bot. 114: 106, pl. 6b (1992); P.J. Cribb, Butterf., Gen. *Pleione*: 53, 59, fig. 15–18, pl. 4, map 7 (1999); N. Pearce, P.J. Cribb, Orch. Bhutan: 355, fig. 85, pl. 16 (2002); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 278 (2007); Schuit. et al., Nord. J. Bot. 26: 306 (2008); Chen Xinqi, P.J. Cribb, Gale, Fl. China 25: 328 (2009). – *Coelogyne hookeriana* Lindl., Fol. Orch. Coelogyne: 14 (1854). – *Pleione laotica* Kerr, J. Siam Soc., Nat. Hist. Suppl. 9: 235 (1933).

Described from NE India ("India, Sikkim, Darjeeling"). **Type** ("*Hooker 74*") – [K-LINDL].

Habitat, phenology and conservation status. Trunk and humus epiphyte or lithophyte in moss pillows. Primary humid, evergreen, broad-leaved and coniferous forests on sandstone, granite and shale, commonly on very steep mossy slopes and cliffs. 2400–2500(2700) m. Fl. April–June. Rare. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Nghe An (Ky Son, Phu Xai Lai Leng mt.). Nepal, Bhutan, NE India, Myanmar, S China, N Thailand, N Laos.

Studied specimens. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, Phu Kha village, eastern slopes of Phu Xai Lai Leng mountain system, at elevation about 2350 m around point 19°12'21.2"N 104°11'28.9"E, 23 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dang, CPC 6069* [CPC Herbarium, LE]; the same locality, at elevation 2400–2500 m around point 19°12'17.7"N 104°11'06.6"E, 25 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6234* [CPC Herbarium, LE].

Notes. This is another interesting ornamental highland species from Himalaya which is new for the Vietnamese flora. The record from Laos ("Phu Sai Lai Long, *Smiles s.n.*") reported by G. Seidenfaden (1992: 106) probably belongs to the same locality as ours, which is situated on the Vietnam-Laotian border. The species holds the altitudinal record among Laotian orchids occurring in highest mountain in Laos, Phu Bia, where it reaches 2817 m a.s.l. (Schuiteman et al. 2008).

***Saccolabiopsis pusilla* (Lindl.) Seidenf. & Garay** (Fig. 18B)

Bot. Tidsskr. 67: 118, fig. 33 (1972); Seidenf., Opera Bot. 95: 228, fig. 141, pl. 24d (1988); N. Pearce, P.J. Cribb, Orch. Bhutan: 555, fig. 126, pl. 31 (2002). – *Oeceoclades pusilla* Lindl., Gen. Sp. Orch. Pl.: 237 (1833). – *Saccolabium pumilio* Rchb. f., Ann. Bot. Syst. 6: 886 (1864).

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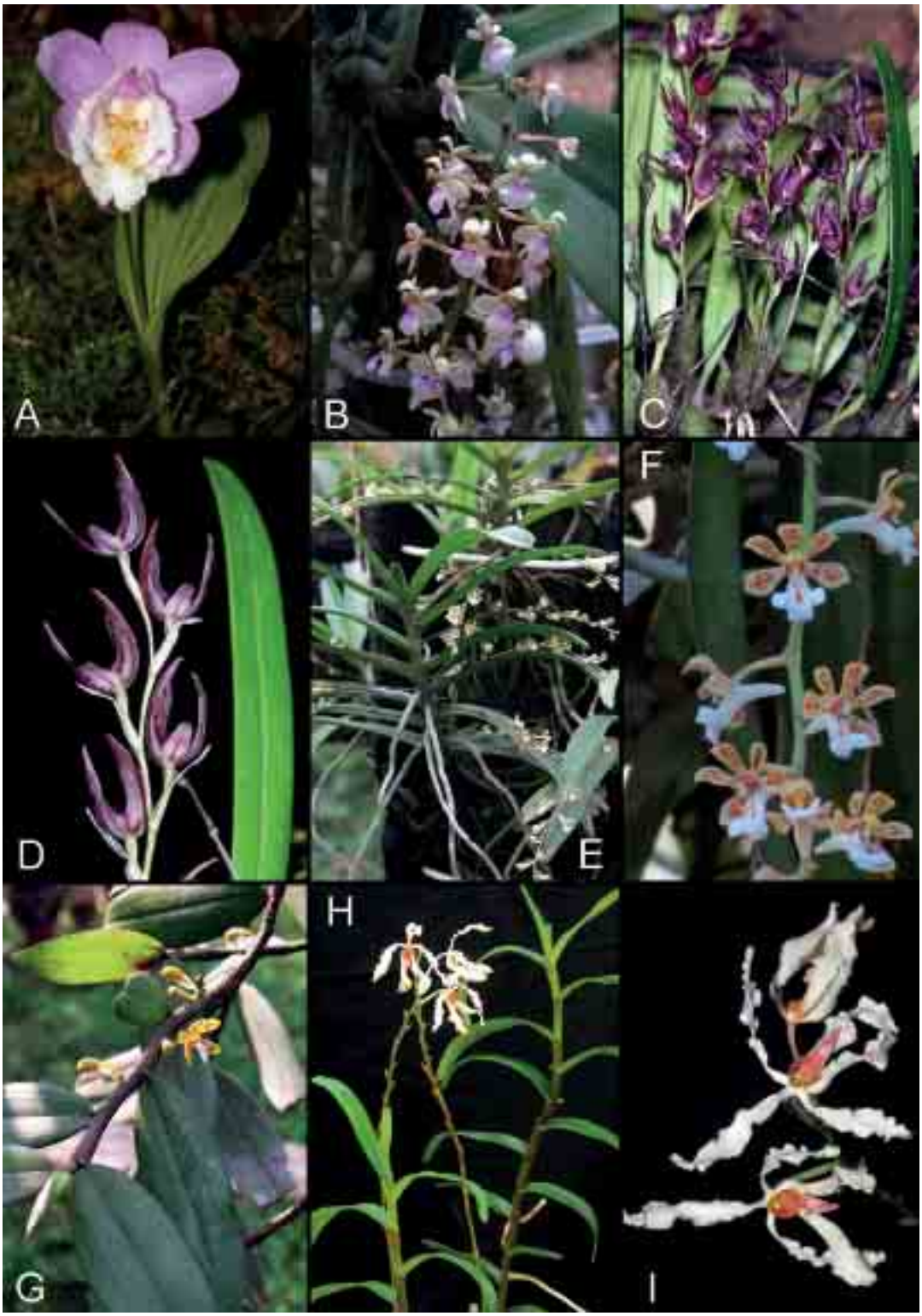

Figure 18. New orchids in the flora of Vietnam. A – *Pleione hookeriana* (*L. Averyanov et al.*, *CPC 6069*). B – *Saccolabiopsis pusilla* (*N.V. Canh, s.n.*). C, D – *Sunipia bicolor* (*N.T. Hiep et al., HAL 10205*). E, F – *Staurochilus loratus* (*N.M. Duc, s.n.*). G – *Trichoglottis orchidea* (*N.M. Duc, s.n.*). H, I – *Vandopsis undulata* (*C.X. Canh, CXC s.n.*). Photos by L. Averyanov (A, C, D), N.V. Canh (B) and N.M. Duc (E, F, G).

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Described from Bangladesh ("Sylhet"). **Type** ("*F. De Silva, Wall. Cat. 7332A*") – [K-LINDL].

Habitat, phenology and conservation status. Branch and canopy miniature epiphyte. Primary and secondary broad-leaved, evergreen, and semi-deciduous, dry gallery forests on volcanic tuffs, commonly along streams and rivers. 300–400 m. Fl. March–April. Very rare. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Dak Nong (Krong No). NE India, Bangladesh, Myanmar, Thailand.

Studied specimens. S Vietnam, Dak Nong province, Krong No district, March 2014, *N.V. Canh s.n.* [LE – photo]. S Vietnam, "Central Highlands" March 2014, *C.X. Canh s.n.* [LE – photo]. S Vietnam, Dak Lak province, Krong No district, Nam Ha municipality, Day Sap – Gia Long Waterfall Historical and Cultural Area about 3 km from Buon Ma Thuot City to the S, around point 12°32'17.0"E 107°53'24.0"E, 27 November 2014, *L. Averyanov, N.T. Hiep, N.V. Duy, Q.V. Hoi, CPC 7680* [LE].

Notes. This very rare ornamental species is known in Vietnam from only one locality. Special attention has to be paid to its protection.

***Sunipia bicolor* Lindl.** (Fig. 18C, D)

Gen. Sp. Orchid. Pl.: 179 (1833); Seidenf., Opera Bot. 89: 176, fig. 116 (1986); N. Pearce, P.J. Cribb, Orch. Bhutan: 481, fig. 103, pl. 26 (2002); Chen Xinqi, J.J. Verm., Fl. China 25: 443 (2009). – *Ione bicolor* (Lindl.) Lindl., Fol. Orchid. 2: 3 (1853).

Described from Nepal ("Hab. in Napalia"). **Type** – Ic. ("*Wallich s.n.*") – [K].

Habitat, phenology and conservation status. Trunk and branch short creeping miniature epiphyte. Primary and old secondary evergreen, broad-leaved, mixed and coniferous montane humid forests on sandstone, shale, granite and quartzite, commonly on mossy trees on very steep slopes and on mountain tops. (1500)1900–2300(2700) m. Fl. October–December. Locally common. Estimated IUCN Red List status – VU.

Distribution. Vietnam: Lai Chau (Tam Duong), Nghe An (Ky Son, Phu Xai Lai Leng mt.). Bhutan, Nepal, NE India, Bangladesh, Myanmar, S China, N Thailand.

Studied specimens. N Vietnam, Lai Chau province, Tam Duong district, Ho Thau community, Ho Thau village, around point 22°23'05"N 103°36'46"E, 1500–1900 m, 29 Nov. 2006, *N.T. Hiep, L. Averyanov, P.V. The, HAL 10205* [HN, LE, MO]. N Vietnam, Nghe An province, Ky Son district, Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng mountain system, 1900 m, around point 19°13'37.5"N 104°06'11.8"E, 20 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, CPC 6023, CPC 6025a* [CPC Herbarium, LE]; the same locality, 2000–2300 m, around point 19°11'58.2"N 104°11'38.6"E, 24 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6181, CPC 6182* [CPC Herbarium, LE].

Notes. The discovery of this widely distributed Himalayan highland species in the high mountains of northern Vietnam is not surprising. However, this novelty for the Vietnamese flora essentially expands the known distribution area in southeastern direction.

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***Staurochilus loratus* (Downie) Seidenf.** (Fig. 18 E, F)

Opera Bot. 95: 95, fig. 54 (1988). – *Ascochilus loratus* Downie, Bull. Misc. Inform. Kew 1925: 407 (1925). – *Pteroceras loratum* (Downie) Seidenf., Orch. Thailand: 534 (1963). – *Trichoglottis lorata* (Downie) Schuit., Orch. Journ. 14: 62 (2007); Schuit. et al., Nord. J. Bot. 26: 312 (2008).

Described from NW Thailand ("Doi Sutep, 900 m., on small trees near stream in evergreen jungle…"). **Type** ("Dec. 10th, *Kerr 290*") – [K?].

Habitat, phenology and conservation status. Trunk and branch epiphyte. Primary and old secondary broad-leaved, humid, evergreen, submontane forests, particularly along streams and rivers. 800 m. Fl. March–May. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: S Vietnam (sine loc.). Thailand, Laos.

Studied specimens. S Vietnam, Kon Tum prov., Sa Thay distr., Ro Koi municipality, Chu Mom Ray national park, 33 km WNW from Kon Tum City, 14°29'40"N 107°43'10"E, 29 March 2015, *A.N. Kuznetsov, S.P. Kuznetsova, M.S. Nuraliev 1212* [LE, MW]. Another wild collected plant of unknown origin obtained from Hanoi street market, expectedly collected in areas of southern Vietnam adjacent to Laotian border, 8 March 2009, *N.M. Duc, N.V. Canh, s.n.* [LE – photo].

Notes. Very rare species. Presence in Vietnam is verified by only one collection (*Nuraliev 1212*).

***Trichoglottis orchidea* (J. Koenig) Garay** (Fig. 18G)

Bot. Mus. Leafl. 23: 209 (1972); Seidenf., Descr. Epidendr.: 22 (1995); Schuit. et al., Nord. J. Bot. 26: 313 (2008). – *Epidendrum orchideum* J. Koenig, Observ. Bot. 6: 48 (1791). – *Trichoglottis cirrhifera* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Ind. 5: 493 (1853); Seidenf., Opera Bot. 95: 83, fig. 47, pl. 8b (1988); id., Seidenf., ibid. 114: 374 (1992); J.B. Comber, Orch. Java: 368, fig. (1990); Seidenf., J.J. Wood, Orch. Pen. Mal. Sing.: 601, fig. 272i–k, pl. 42c (1992); M.F. Newman et al., Checkl. Vasc. Pl. Lao PDR: 282 (2007). – *Saccolabium peperomioides* Kraenzl., Bot. Tidsskr. 24: 11 (1901); Gagnep., Fl. Gen. Indo-Chine 6: 502 (1934).

Described from Peninsular Thailand ("Thailand, Laen Yamu, Phuket, 7°59'N lat."). **Type** ("*Koenig,* 5 June 1779") – ?

Habitat, phenology and conservation status. Trunk and branch epiphyte with pendulous shoots. Primary and old secondary broad-leaved, evergreen, dense humid lowland forests, commonly on small trees in shady places. 200–400 m. Fl. February–April. Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: S Vietnam (sine loc.). Nicobar Islands, Thailand, Laos, Malaya, Java.

Studied specimens. Wild collected plant of unknown origin obtained from Hanoi street market, expectedly collected in areas of southern Vietnam adjacent to Laotian border, 12 February 2009, *N.M. Duc, N.V. Canh, s.n.* [LE – photo].

Notes. This species is quite common in Laos, hence its discovery in Vietnam was expectable. However, its exact locality is still unknown and needs confirmation by herbarium vouchers.

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***Vanda gracilis* Aver., sp. nov.** (Fig. 19)

Described from N Vietnam (Quang Binh province, Tuyen Hoa district, Lam Hoa municipality, Chuoi village, around point 17°56'51"N, 105°49'18"E, at elevation 200–250 m). **Type** ("3 May 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, P.V. The, N.T. Vinh, CPC 2726*") – [LE (holotype, isotype), CPC Herbarium (isotype)]. **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA *0221/CPC 2726* (Fig. 19).

Description. Lithophytic monopodial herb or climbing undershrub. Stem ascending to erect, rigid, semi-woody, 0.5–1(2) m long, 5–6(7) mm in diam., leafy in upper half, internodes (0.8)1–1.5(2) cm long, in lower half with several thick, rigid, light gray to white flexuose stilt roots. Leaves distichous, sessile, with equitant bases, dark green, conduplicate, very rigid, thick, recurved, linear, (7)10–14(16) cm long, (4)5–7(9) mm wide, with 2 unequal straight, acute to apiculate lobes at apex. Inflorescence lateral, arising from leaf axil in upper part of the stem, erect, rigid, 6–10(15) cm tall, bearing 2–3(4) flowers; scape green, terete, ascending to erect, (4)5–6(8) cm long, 1.5–2.5(3) mm in diam., naked or with 1–2 small, triangular ovate sterile bracts; rachis slightly zigzag curved, (1)1.5–4(5) cm long. Floral bracts broadly ovate, (3)3.5–4(4.5) mm long, 2–2.5 mm wide, hyaline and rounded at apex, densely adpressed to pedicel. Pedicel and ovary terete, white, erect, straight, 3.5–4.5 cm long, 2–2.5 mm in diam. Flowers widely opening, (3)3.5(4) cm in diam.; sepals and petals glossy, chestnut-brown, with unclear yellowish stripes or tessellation at center, almost white behind; lip white, hypochile with 2 transversal yellow stripes, side lobes finely mottled with very small brown-purple spots, epichile with 4 brown grooves, apex entirely brown; spur, column and anther cap pure white. Sepals and petals subsimilar, narrowly obovate, broadening from the base to the rounded apex, (1.2)1.4–1.6(1.8) cm long, (5.5)6–7(7.5) mm wide, widely irregularly undulate, lateral sepals and petals slightly falcate. Lip spurred, fleshy, 3-lobed, distinctly divided into hypochile and epichile, (14)15–16(18) mm long from the base to apex; side lobes erect, oblique obovate, rounded at apex, 6–8 mm long, 4–5 mm wide; median lobe pandurate, with 3 low keels, 11–13 mm long, (4)5–6(7.5) mm broad, restricted at middle to (2.5)3–3.5(4) mm width, apex broadening, truncate, (4.5)5–6.5(7.5) mm wide, notched into 2 indistinct diverging lobules; spur shortly conic, laterally flattened 4–5 mm long, 2–3 mm wide at the base. Column simple, without wings or stelidia, stout, erect, shortly cylindric, 5.5–6.5 mm tall, 4–4.5 mm in diam.; anther cap hemispheric, 2.5–3 mm in diam., shortly beaked. Pollinarium with very short triangular stipe, about 0.5 mm long and wide; viscidium large, suborbicular, about 2 mm in diam.; pollinia 2, each deeply notched into two unequal hemispheric halves, yellow, globular, solid, 1.5 mm in diam.

Diagnosis. The discovered plant has probably closest relation to *Vanda concolor* Blume distributed in southern China and northern Vietnam, from which it differs in obovate, prominent, elongate lip side lobes, narrow sepals and petals and 3-keeled lip with entire apex, not divided into distinct lobules. Very distinct vine-like habit of the plant with very narrow, arching, rigid linear leaves also well distinguishes the new species from its congeners. This species grows at lowest elevations known in the distribution area of the genus and surely represents a strict local endemic of a highly endangered lowland limestone flora of the central part of Vietnam.

Etymology. Species epithet reflects the elegant flowers and slender plant habit.

Habitat, phenology and conservation status. Lithophytic herb of short semi-woody vine. Primary and old secondary broad-leaved, evergreen, dry, rather open forests and scrub on rocky tops of

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Figure 19. New orchids in the flora of Vietnam. *Vanda gracilis*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA *0221/CPC 2726*.

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ridges composed of highly eroded crystalline limestone. 200–250 m. Fl. January–February. Locally common. Estimated IUCN Red List status – EN.

Distribution. Vietnam: Quang Binh (Tuyen Hoa). Endemic.

***Vandopsis undulata* (Lindl.) J.J. Sm.** (Fig. 18H, I)

Natuurw. Tijdschr. Ned.-Ind. 72: 77 (1912); N. Pearce, P.J. Cribb, Orch. Bhutan: 578, fig. 135, pl. 32 (2002); Chen Xinqi, J.J. Wood, Fl. China 25: 447 (2009). – *Vanda undulata* Lindl., J. Proc. Linn. Soc., Bot. 3: 42 (1858). – *Fieldia undulata* (Lindl.) Rchb. f., Xenia Orchid. 2: 38 (1862). – *Stauropsis undulatus* (Lindl.) Hook. f., Fl. Brit. India 6: 27 (1890).

Described from NE India ("India, Sikkim"). **Type** ("icon – *Cathcart s.n.*") – [K].

Habitat, phenology and conservation status. Trunk and branch epiphyte or lithophyte on mossy cliffs. Primary and old secondary evergreen, broad-leaved and mixed montane forests on shale. 1500–2300 m. Fl. April–May (June). Very rare. Estimated IUCN Red List status – DD.

Distribution. Vietnam: Lai Chau (Sin Ho). N India, Nepal, Bhutan, SW China.

Studied specimens. N Vietnam, Lai Chau province, Sin Ho district, 2014, *C.X. Canh, CXC s.n.* [LE].

Notes. The discovery of this Himalayan montane species in northwestern Vietnam essentially expands its known distribution area in southeastern direction. The generic position of this plant remains unclear. Its position within *Vandopsis* is certainly speculative.

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