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## New and rare orchids (Orchidaceae) in the flora of Cambodia and Laos

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**Key words:** Cambodia, Laos, flora, Orchidaceae, plant diversity.

**Summary.** Herbarium material collected in 2013–2015 in Cambodia and Laos provides 298 new localities for 167 orchid species (from 57 genera). Almost all reported locations are new on the territory of studied countries. These data provide substantial basis for understanding of present day distribution of rare species needed protection. Among reported species, 8 species are new for the flora of Cambodia (*Bulbophyllum macranthum*, *B. orientale*, *B. physocoryphum*, *B. retusiusculum*, *Dendrobium pachyphyllum*, *Eria tenuiflora*, *Pholidota recurva*, *Thelasis pygmaea*) and 43 species are new for the flora of Laos (*Bulbophyllum ambrosia*, *B. andersonii*, *B. bicolor*, *B. bisetoides*, *B. delitescens*, *B. depressum*, *B. forrestii*, *B. lilacinum*, *B. longibrachiatum*, *B. psyhoon*, *Calanthe alismifolia*, *C. sylvatica*, *Cheirostylis pusilla*, *Cleisostoma melanorachis*, *C. subulatum*, *C. williamsonii*, *Coelogyne eberhardtii*, *C. leucantha*, *C. ovalis*, *Dendrobium eriiflorum*, *D. falconeri*, *D. trantuanii*, *D. williamsonii*, *Didymoplexis pallens*, *Epigeneium fuscescens*, *Eria apertiflora*, *E. bambusifolia*, *E. pachyphylla*, *Flickingeria fimbriata*, *Gastrochilus suavis*, *Liparis mannii*, *L. sootenzanensis*, *Luisia ramosii*, *Oberonia kwangsiensis*, *O. maxima*, *Pelatantheria insectifera*, *Phalaenopsis braceana*, *Pholidota yunnanensis*, *Schoenorchis scolopendria*, *S. tixieri*, *Tainia cordifolia*, *Thrixspernum calceolum*). Five species (*Dendrobium minusculum*, *Oberonia simplex*, *Porpax capuccinorum*, *P. laosensis* and *Taeniophyllum filiferum*) discovered in Cambodia in Laos are described as new for science. One genus (*Didymoplexis*) was found in Laos at first. Such rare ornamental species as *Aerides falcata*, *A. flabellata*, *A. rosea*, *Arundina caespitosa*, *Ascolabium pusillum*, *Bulbophyllum bicolor*, *Calanthe cardioglossa*, *Coelogyne assamica*, *C. calcicola*, *C. eberhardtii*, *C. flaccida*, *C. trinervis*, *Dendrobium aphyllum*, *D. christyanum*, *D. chryseum*, *D. chrysotoxum*, *D. crepidatum*, *D. dixanthum*, *D. falconeri*, *D. fimbriatum*, *D. findleyanum*, *D. gratiosissimum*, *D. jenkinsii*, *D. loddigesii*, *D. nobile*, *D. senile*, *D. thyrsiflorum*, *D. trantuanii*, *D. trigonopus*, *D. williamsonii*, *Doritis pulcherrima*, *Gastrochilus suavis*, *Holcoglossum kimballianum*, *H. subulifolium*, *Hygrochilus parishii*, *Paphiopedilum concolor*, *P. dianthum*, *Phalaenopsis braceana*, *Schoenorchis scolopendria*, *S. tixieri*, *Spathoglottis affinis*, *Tainia cordifolia*, *Vanda brunnea*, *V. denisoniana*, *V. flavobrunnea* become presently very rare on the territory of studied local floras and badly need protection to prevent their extinction in nature.

## Новые и редкие виды орхидных во флоре Камбоджи и Лаоса

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**Ключевые слова:** Камбоджа, Лаос, флора, орхидные, Orchidaceae, разнообразие растений.

**Аннотация.** Гербарные сборы 2013–2015 годов документируют 298 новых находений 167 видов орхидных (из 57 родов) в Камбодже и Лаосе. Почти все приведенные местонахождения являются новыми для территорий изученных стран. Эти данные существенно расширяют современные знания о распространении редких растений, нуждающихся в охране. Среди приводимых видов 8 являются новыми для флоры Камбоджи (*Bulbophyllum macranthum*, *B. orientale*, *B. physocoryphum*, *B. retusiusculum*, *Dendrobium pachyphyllum*, *Eria tenuiflora*, *Pholidota recurva*, *Thelasis pygmaea*) и 43 – новые для флоры Лаоса (*Bulbophyllum ambrosia*, *B. andersonii*, *B. bicolor*, *B. bisetoides*, *B. depressum*, *B. forrestii*, *B. lilacinum*, *B. longibrachiatum*, *B. psyhoon*, *Calanthe alismifolia*, *C. sylvatica*, *Cheirostylis pusilla*, *Cleisostoma melanorachis*, *C. subulatum*, *C. williamsonii*, *Coelogyne eberhardtii*, *C. leucantha*, *C. ovalis*, *Dendrobium eriiflorum*, *D. falconeri*, *D. trantuanii*, *D. williamsonii*, *Didymoplexis pallens*, *Epigeneium fuscescens*, *Eria apertiflora*, *E. bambusifolia*, *E. pachyphylla*, *Flickingeria fimbriata*, *Gastrochilus suavis*, *Liparis manni*, *L. sootenzanensis*, *Luisia ramosii*, *Oberonia kwangsiensis*, *O. maxima*, *Pelatantheria insectifera*, *Phalaenopsis braceana*, *Pholidota yunnanensis*, *Schoenorchis scolopendria*, *S. tixieri*, *Tainia cordifolia*, *Thrixspermum calceolum*). Пять видов (*Dendrobium minusculum*, *Oberonia simplex*, *Porpax capuccinorum*, *P. laosensis* и *Taeniophyllum filiferum*) из Камбоджи и Лаоса описаны в качестве новых для науки. Один род (*Didymoplexis*) приводится для Лаоса впервые. Такие декоративные виды, как *Aerides falcata*, *A. flabellata*, *A. rosea*, *Arundina caespitosa*, *Ascolabium pusillum*, *Bulbophyllum bicolor*, *Calanthe cardioglossa*, *Coelogyne assamica*, *C. calcicola*, *C. eberhardtii*, *C. flaccida*, *C. trinervis*, *Dendrobium aphyllum*, *D. christyanum*, *D. chryseum*, *D. chrysotoxum*, *D. crepidatum*, *D. dixanthum*, *D. falconeri*, *D. fimbriatum*, *D. findleyanum*, *D. gratiosissimum*, *D. jenkinsii*, *D. loddigesii*, *D. nobile*, *D. senile*, *D. thyrsoflorum*, *D. trantuanii*, *D. trigonopus*, *D. williamsonii*, *Doritis pulcherrima*, *Gastrochilus suavis*, *Holcoglossum kimballianum*, *H. subulifolium*, *Hygrochilus parishii*, *Paphiopedilum concolor*, *P. dianthum*, *Phalaenopsis braceana*, *Schoenorchis scolopendria*, *S. tixieri*, *Spathoglottis affinis*, *Tainia cordifolia*, *Vanda brunnea*, *V. denisoniana*, *V. flavobrunnea* в настоящее время на территории изученных локальных флор становятся очень редкими и крайне нуждаются в охране для предотвращения их полного вымирания в природе.

### Introduction

The orchid flora of Cambodia and Laos still remains one of the less studied orchid floras in Tropical Asia. In comparison to other countries of Indochina Peninsula, such as Thailand or Vietnam each including at least 1100 species (Seidenfaden, 1992; Averyanov, 2003; Pedersen et al., 2011), about 200 orchid species totally were recorded for Cambodia (Seidenfaden, 1992; Averyanov, 2013; Leti et al., 2013; Schuiteman et al., 2015, 2016; Tagane et al., 2015) and about 530 species for Laos (Newman et al., 2007; Schuiteman et al., 2008; Averyanov, 2013). Meanwhile, according to their

square and various natural conditions all countries of Indochina should certainly conceal similar orchid richness and diversity. Present paper summarizes some consequent steps in studies of the orchid flora of Cambodia and Laos based on herbarium specimens collected by different collectors in the field mainly during 2013–2015.

The paper provides 298 new localities for 167 species (from 57 genera) among which 8 species are new for the flora of Cambodia and 43 species represent new records for Laos. One genus – *Didymoplexis* is recorded for the Laotian flora at first. Mentioned new records (see table 1) represent sig-

Table 1

## New records of orchids in the flora of Cambodia and Laos

Names of new species for science and species new for the flora are marked with bold font (additionally, new species for science are marked with asterisk “\*”, new species for Cambodia and Laos are marked with superscript letters “<sup>C</sup>” and “<sup>L</sup>” respectively)

<i>Acampe rigida</i>	<i>Cleisostoma arietinum</i>	<sup>L</sup> <b>D. trantuanii</b>	<i>Odontochilus tortus</i>
<i>Aerides falcata</i>	<i>C. birmanicum</i>	<i>D. trigonopus</i>	<i>Panisea tricallosa</i>
<i>A. flabellata</i>	<i>C. fuerstenbergianum</i>	<sup>L</sup> <b>D. williamsonii</b>	<i>P. uniflora</i>
<i>A. rosea</i>	<sup>L</sup> <b>C. melanorachis</b>	<sup>L</sup> <b>Didymoplexis pallens</b>	<i>Paphiopedilum concolor</i>
<i>Appendicula hexandra</i>	<i>C. simondii</i>	<i>Doritis pulcherrima</i>	<i>P. dianthum</i>
<i>Arachnis labrosa</i>	<sup>L</sup> <b>C. subulatum</b>	<i>Epigeneium amplum</i>	<i>Pelatantheria ctenoglossum</i>
<i>Arundina caespitosa</i>	<sup>L</sup> <b>C. williamsonii</b>	<sup>L</sup> <b>E. fuscescens</b>	<sup>L</sup> <b>P. insectifera</b>
<i>Ascolabium pusillum</i>	<i>Coelogyne assamica</i>	<i>Eria acervata</i>	<i>Phaius flavus</i>
<i>Biermannia calcarata</i>	<i>C. calcicola</i>	<sup>L</sup> <b>E. apertiflora</b>	<sup>L</sup> <b>Phalaenopsis braceana</b>
<i>Bulbophyllum affine</i>	<sup>L</sup> <b>C. eberhardtii</b>	<sup>L</sup> <b>E. bambusifolia</b>	<i>Pholidota articulate</i>
<sup>L</sup> <b>B. ambrosia</b>	<i>C. flaccida</i>	<i>E. lasiopetala</i>	<i>P. imbricate</i>
<sup>L</sup> <b>B. andersonii</b>	<sup>L</sup> <b>C. leucantha</b>	<i>E. muscicola</i>	<i>P. pallida</i>
<i>B. apodum</i>	<sup>L</sup> <b>C. ovalis</b>	<sup>L</sup> <b>E. pachyphylla</b>	<sup>C</sup> <b>P. recurva</b>
<sup>L</sup> <b>B. bicolor</b>	<i>C. trinervis</i>	<i>E. paniculata</i>	<sup>L</sup> <b>P. yunnanensis</b>
<sup>L</sup> <b>B. bisetoides</b>	<i>C. viscosa</i>	<i>E. pannea</i>	<i>Podochilus oxystophylloides</i>
<i>B. clandestinum</i>	<i>Corymborkis veratrifolia</i>	<sup>C</sup> <b>E. tenuiflora</b>	<i>Polystachya concreta</i>
<sup>L</sup> <b>B. delitescens</b>	<i>Cymbidium aloifolium</i>	<i>E. tomentose</i>	<i>Pomatocalpa spicatum</i>
<sup>L</sup> <b>B. depressum</b>	<i>Dendrobium aphyllum</i>	<i>Flickingeria angustifolia</i>	<b>*Porpax capuccinorum</b>
<i>B. flabellum-veneris</i>	<i>D. christyanum</i>	<sup>L</sup> <b>F. fimbriate</b>	<i>P. elwesii</i>
<sup>L</sup> <b>B. forrestii</b>	<i>D. chrysanthum</i>	<sup>L</sup> <b>Gastrochilus suavis</b>	<b>*P. laosensis</b>
<i>B. helenae</i>	<i>D. chryseum</i>	<i>Goodyera procera</i>	<i>Robiquetia spathulata</i>
<sup>L</sup> <b>B. lilacinum</b>	<i>D. chrysotoxum</i>	<i>Hetaeria affinis</i>	<sup>L</sup> <b>Schoenorchis scolopendria</b>
<sup>L</sup> <b>B. longibrachiatum</b>	<i>D. concinnum</i>	<i>Holcoglossum kimballianum</i>	<sup>L</sup> <b>S. tixieri</b>
<sup>C</sup> <b>B. macranthum</b>	<i>D. crepidatum</i>	<i>H. subulifolium</i>	<i>Smitinandia micrantha</i>
<sup>C</sup> <b>B. orientale</b>	<i>D. dixanthum</i>	<i>Hygrochilus parishii</i>	<i>Spathoglottis affinis</i>
<i>B. parviflorum</i>	<i>D. ellipsophyllum</i>	<i>Liparis bootanensis</i>	<i>Sunipia scariosa</i>
<sup>C</sup> <b>B. physocoryphum</b>	<sup>L</sup> <b>D. eriiflorum</b>	<i>L. cespitosa</i>	<b>*Taeniophyllum filiferum</b>
<sup>L</sup> <b>B. psyhoon</b>	<sup>L</sup> <b>D. falconeri</b>	<sup>L</sup> <b>L. mannii</b>	<sup>L</sup> <b>Tainia cordifolia</b>
<i>B. repens</i>	<i>D. fimbriatum</i>	<i>L. pumila</i>	<sup>C</sup> <b>Thelasis pygmaea</b>
<sup>C</sup> <b>B. retusiusculum</b>	<i>D. findleyanum</i>	<sup>L</sup> <b>L. sootenzanensis</b>	<sup>L</sup> <b>Thrixspernum calceolum</b>
<i>B. rufilabrum</i>	<i>D. gratiosissimum</i>	<i>L. viridiflora</i>	<i>T. centipeda</i>
<i>B. spathulatum</i>	<i>D. jenkinsii</i>	<sup>L</sup> <b>Luisia ramosii</b>	<i>Trias disciflora</i>
<i>B. tenuifolium</i>	<i>D. lagarum</i>	<i>L. zollingeri</i>	<i>Trichoglottis lorata</i>
<i>B. violaceolabellum</i>	<i>D. loddigesii</i>	<i>Malleola dentifera</i>	<i>T. orchidea</i>
<i>B. xylophyllum</i>	<i>D. nobile</i>	<i>Nervilia aragoana</i>	<i>Trichotosia dasyphylla</i>
<sup>L</sup> <b>Calanthe alismifolia</b>	<b>*D. minusculum</b>	<i>Oberonia cavaleriei</i>	<i>T. pulvinata</i>
<i>C. cardioglossa</i>	<sup>C</sup> <b>D. pachyphyllum</b>	<i>O. ensiformis</i>	<i>Tropidia angulosa</i>
<i>C. lyroglossa</i>	<i>D. parciflorum</i>	<i>O. gammiei</i>	<i>T. curculigoides</i>
<i>C. odora</i>	<i>D. porphyrochilum</i>	<sup>L</sup> <b>O. kwangsiensis</b>	<i>Vanda brunnea</i>
<sup>L</sup> <b>C. sylvatica</b>	<i>D. salaccense</i>	<sup>L</sup> <b>O. maxima</b>	<i>V. denisoniana</i>
<i>Callostylis rigida</i>	<i>D. senile</i>	<i>O. mucronate</i>	<i>V. flavobrunnea</i>
<sup>L</sup> <i>Cheirostylis pusilla</i>	<i>D. thyrsiflorum</i>	<b>*O. simplex</b>	

nificant addition to our previous knowledge (Gagnepain, Guillaumin, 1932–1934; Vidal, 1959; Seidenfaden, 1966, 1973, 1975; Schuiteman, Vogel, 2000; Callaghan, 2004; Svengsuksa, Lamxay, 2005) summarized in last accounts of Cambodian (Seidenfaden, 1992) and Laotian floras (Newman et al., 2007; Schuiteman et al., 2008). Five species – *Den-*

*drobium minusculum* Aver., *Oberonia simplex* Aver., *Porpax capuccinorum* Aver., *P. laosensis* Aver. and *Taeniophyllum filiferum* Aver. discovered in Cambodia and Laos are described as new for science.

The annotated list of all discovered species is presented below. Paragraphs for species are arranged in the list according to species name in

alphabetic order. The annotation for each species includes following data in separate lines:

– valid name and main synonyms, occurring in regional literature;

– maximally abbreviated and unified text of herbarium labels including geographical locality, collection date, collectors' names, collection number and acronym of Herbarium where mentioned specimen is housed;

– living form, summarized available data on ecology, habitat elevation, phenology and observed rarity;

– general distribution and distribution in studied countries (by listing of the country provinces).

Color and line illustrations as well as taxonomic notes are additionally provided for new and most significant species. The names of orchid species and genera reported for Cambodia and Laos at first are marked in the list with superscript letters “<sup>C</sup>” and “<sup>L</sup>” respectively, and species described as a new for science are marked with asterisk “\*”.

The following Herbarium acronyms are used in the text:

CPC – Herbarium of the Center for Plant Conservation, Vietnam Union of Science and Technology Associations, Hanoi, Vietnam.

LE – Herbarium of Komarov Botanical Institute, Russian Academy of Sciences, St. Petersburg, Russian Federation.

HNL – Conseil National des Sciences, National Herbarium of Laos, Vientiane, Lao PDR.

FOF – Herbarium of National University of Laos, Vientiane, Lao PDR.

Prefixes “CPC” and “LA-VN” at some collecting numbers represent abbreviations of “The Center for Plant Conservation” (CPC) and “Laos – Vietnamese expedition” (LA-VN). Both collecting series are attributed to herbaria collected in expeditions managed by the Center for Plant Conservation (Vietnam Union of Science and Technology Associations) with main collectors – Leonid V. Averyanov and Nguyen Tien Hiep. Prefixes “K” and “TM” at plant collecting numbers designate herbarium collections of Eugene L. Konstantinov and Tatiana V. Maisak with their co-workers.

Attractive species highly desirable for cultivation are indicated in the list as “ornamental”. Almost all these species fast become very rare due to commercial collecting even on protected areas and badly need conservation to prevent their full extinction in nature.

## New and rare orchids in the flora of Cambodia and Laos

*Acampe* Lindl.

*A. rigida* (J. E. Smith) P. F. Hunt, 1970, Kew Bull. 24, 1: 98; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 251; Schuit. et al., 2008, Nord. Journ. Bot. 26: 262; Aver., 2013, Turczaninowia 16, 4: 28.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1144 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1163 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen forests on limestone, often on exposed cliffs near hilltops, 200–950 m. Fl. September – November. One of the commonest species in observed limestone areas.

Southern and east Africa, Sri Lanka, India, Myanmar, China, Thailand, Cambodia, Vietnam, Peninsular Malaysia. Laos: Attapu, Bolikhamxai, Champasak, Houaphan, Khammouan, Louangphrabang, Phongsali, Savannakhet, Vientiane, Xaignabouri.

*Aerides* Lour.

*A. falcata* Lindl. et Paxton, 1851, Fl. Gard. 2: 142; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 252; Schuit. et al., 2008, Nord. Journ. Bot. 26: 263.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1433 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen open forests on any kind of soil, 170–1200 m. Fl. March – June. Locally common. Ornamental.

NE. India, Myanmar, Thailand, Cambodia, Vietnam. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louangphrabang, Xaisomboun.

*A. flabellata* Downie,

1925, Bull. Misc. Inform. Kew 1925(9): 387; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 252; Schuit. et al., 2008, Nord. Journ. Bot. 26: 314.

≡ *Vanda flabellata* (Downie) Christenson, 1985, Indian Orchid Journ. 1, 4: 156.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1419 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous open dry forests on any kind of soil, often in dipterocarp forests or forests on limestone, (500)1000–1200 m. Fl. April – May. Not common. Ornamental.

SW. China, Thailand, Vietnam. Laos: Bokeo, Bolikhamxai, Houaphan, Louang Namtha, Louangphrabang.

*A. rosea* Paxton,

1851, Fl. Gard. 2: 109; Schuit. et al., 2008, Nord. Journ. Bot. 26: 263; Aver., 2013, Turczaninowia 16, 4: 28.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1235 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1322 (HNL, FOF, LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, 500–1200 m. Fl. March – May. Locally common. Ornamental.

NE. India, Bhutan, Myanmar, S. China, Thailand, Vietnam. Laos: Houaphan, Louangphrabang, Vientiane.

*Appendicula* Blume

*A. hexandra* (J. Koenig) J. J. Sm.,

1932, Bull. Jard. Bot. Buitenzorg 3, 12: 119; Aver., 2013, Turczaninowia 16, 4: 28.

Southern Cambodia, Kampot province, Phnom Bokor National park, 1 December 2014, *E. Konstantinov, K-365* (LE).

Epiphyte and occasionally lithophyte. Cloud evergreen forests on mountain tops, usually along rocky streams. 900–100 m. Fl. May – July. Occasional.

Thailand, Vietnam, Sumatra. Cambodia: Kampot.

*Arachnis* Blume

*A. labrosa* (Lindl. et Paxton) Rchb. f.,

1886, Bot. Centralbl. 28: 343; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 253; Schuit. et al., 2008, Nord. Journ. Bot. 26: 265; Aver., 2013, Turczaninowia 16, 4: 28.

= *Renanthera bilinguis* Rchb. f., 1854, Xenia Orchid. 1: 7.

= *Renanthera labrosa* (Lindl. et Paxton) Rchb. f., 1855, Xenia Orchid. 1: 88.

= *Armodorium labrosum* (Lindl. et Paxton) Schltr., 1911, Repert. Spec. Nov. Regni Veg. 10: 197.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1463 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1107 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous open dry forests on any kind of soil, often in dipterocarp forests or on forests on limestone, 150–1500 m. Fl. July – August. Locally common.

NE. India, Bhutan, Myanmar, S. China, Ryukyu Is., Thailand, Vietnam. Laos: Attapu, Champasak, Houaphan, Saravan, Vientiane.

*Arundina* Blume

*A. caespitosa* Aver.,

2007, Taiwania 52: 289; Schuit. et al., 2008, Nord. Journ. Bot. 26: 265.

**Fig. 1A.**

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 159a* (LE – photo).

Lithophyte. Primary and secondary dry evergreen forests along rocky stream, commonly of wet sandstone rocks, rarely on sandy wet soil in deciduous dipterocarp forests, 300–800 m. Fl. August – December. Locally common. Ornamental.

Vietnam. Laos: Bolikhamxai, Khammouan, Vientiane.

This rare species almost extinct in Vietnam but remains still common fairly in some observed areas in central Laos (Phou Khao Khouay National Protected Area).

*Ascolabium* S. S. Ying

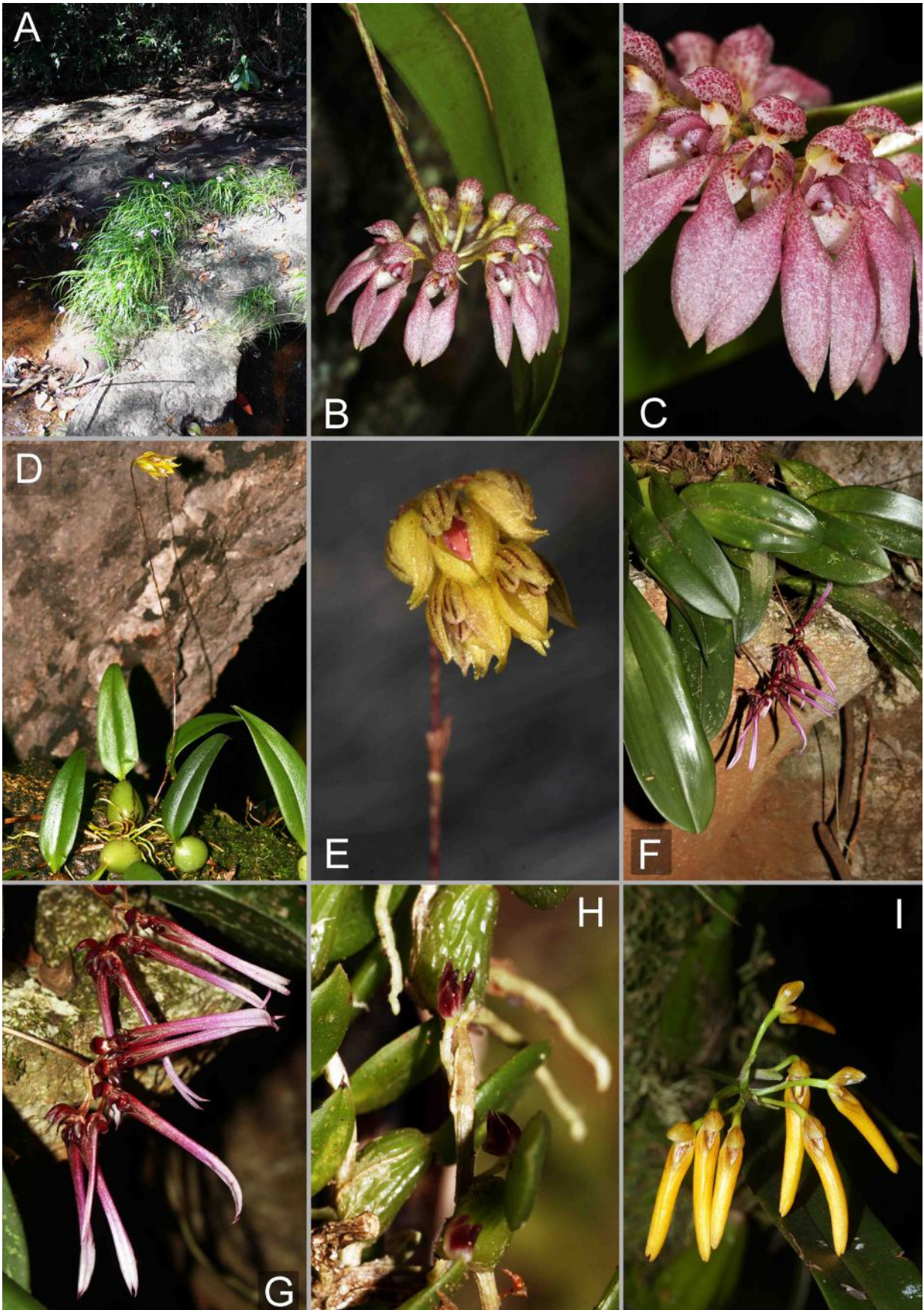
*A. pusillum* (Aver.) Aver.,

1994, Identification Guide. Viet. Orch.: 397; Schuit. et al., 2008, Nord. Journ. Bot. 26: 265.

= *Ascocentropsis pusilla* (Aver.) Senghas et Schildh., 2000, Orchideenfr. 7: 290; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 253.

= *Ascocentrum pusillum* Aver., 1988, Bot. Journ. (Moscow & Leningrad) 73: 104.

Southwestern Laos, Champasak province, Pakse district, Bolaven plateau, along road Paksong – Ban Houay Kong, 26 November 2015, *E. Konstantinov, T. Vongsa, K-389* (LE).



**Fig. 1.** New and rare orchids in the flora of Cambodia and Laos. A – *Arundina caespitosa* Aver. (AL 159a). B, C – *B. andersonii* (Hook. f.) J. J. Sm. (LA-VN 1184a). D, E – *Bulbophyllum bisetoides* Seidenf. (LA-VN 514). F, G – *B. delitescens* Hance (LA-VN 954). H – *B. depressum* King et Pantl. (LA-VN 1157). I – *B. forrestii* Seidenf. (LA-VN 516). Photos by L. Averyanov.

Epiphyte. Primary and old secondary evergreen and deciduous open forests, 800–1200 m. Fl. November – December. Rare. Ornamental.

Thailand, Vietnam. Laos: Bolikhamxai, Champasak.

Rare endemic of eastern Indochina standing in Vietnam on the verge of full extinction.

**Biermannia** King et Pantl.

**B. calcarata** Aver.,

1988, Bot. Journ. (Moscow & Leningrad) 73: 429; Schuit. et al., 2008, Nord. Journ. Bot. 26: 265.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 972 (HNL, FOF, LE).

Canopy epiphyte. Primary and secondary broad-leaved evergreen humid forests on any kind of soil, commonly along stream valleys, 900–1450 m. Fl. May – June. Rare.

Vietnam. Laos: Phongsali, Xiangkhouang.

Plants from Laos may be different from the type originated from northern Vietnam (Schuiteman et al., 2008).

**Bulbophyllum** Thouars

**B. affine** Lindl.,

1830, Gen. Sp. Orch. Pl.: 48; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 254; Schuit. et al., 2008, Nord. Journ. Bot. 26: 266; Aver., 2013, Turczaninowia 16, 4: 29.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1184 (HNL, FOF, LE).

Primary and secondary broad-leaved evergreen and deciduous dry forests on any kind of soil, 600–1500 m. Fl. May – August.

NE. India, Nepal, Bhutan, China, Ryukyu Islands, Thailand, Vietnam, Cambodia. Laos: Bolikhamxai, Houaphan, Khammouan, Louang Namtha, Phongsali, Saravan, Vientiane.

It is “one of the most frequent epiphytic orchids in northern Laos” (Schuiteman et al., 2008).

<sup>1</sup> **B. ambrosia** Schltr.,

1919, Repert. Spec. Nov. Regni Veg. Beih. 4: 247. = *B. amygdalinum* Aver., 1988, Bot. Journ. (Moscow & Leningrad) 73: 1023.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1152 (HNL, FOF, LE). Northeastern Laos, Houaphan

province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1240 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved evergreen dry forests, often on rocky limestone, 800–1200 m. Fl. December – April. Locally very common.

S. China, Hong Kong, Hainan, Vietnam. Laos: Houaphan.

<sup>1</sup> **B. andersonii** (Hook. f.) J. J. Sm.,

1912, Bull. Jard. Bot. (Buitenzorg) 2 ser. 8: 22.

**Fig. 1B, C.**

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1184a (LE).

Primary and secondary broad-leaved evergreen dry forests on rocky limestone, 600–700 m. Fl. May – August. Not common.

NE. India, Bhutan, China, Myanmar. Laos: Houaphan.

**B. apodum** Hook. f.,

1890, Fl. Brit. India 5: 766; Aver., 2013, Turczaninowia 16, 4: 29.

Creeping lithophyte and epiphyte. Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1441 (HNL, FOF, LE).

Creeping epiphyte and lithophyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone, 500–1200 m. Fl. May – June. Locally very common.

NE. India, Thailand, Vietnam, Malaysia, Sumatra, Java, Kalimantan. Laos: Houaphan, Vientiane.

<sup>1</sup> **B. bicolor** Lindl.,

1830, Gen. Sp. Orch. Pl.: 49; Aver., 2012, Taiwania, 57, 2: 127.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1152a / TM 1271 (LE).

**Fig. 2.** (d-EXSICCATES OF VIETNAMESE FLORA 0252/LA-VN 1152a).

Creeping epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen open forests on rocky limestone, commonly on mossy hill and mountain tops, 800–950 m. Fl. May – June. Locally common. Ornamental.

SE. China (Hong Kong), NW. Vietnam. Laos: Houaphan.

This species considered earlier as endemic of Hong Kong (Barretto, Cribb, Gale, 2011) has actually broad distribution in limestone areas of north-eastern Laos and northwestern Vietnam. It is noteworthy that in Indochina the species was observed exclusively in forests on rocky limestone.

<sup>1</sup> *B. bisetoides* Seidenf.,  
1970, Bot. Tidsskr. 65: 354.

**Fig.** 1D, E.

Central Laos, Vientiane province, Vang Vieng district, Na Po village, about 12 km to the W of Vang Vieng town, 17 March 2013, *N. T. Hiep, L. Averyanov et al., LA-VN 514* (LE).

Epiphyte. Primary and secondary dry broad-leaved evergreen and semideciduous forests on rocky limestone, 500–1000 m. Fl. December. Rare.

Thailand, Vietnam. Laos: Vientiane.

*B. clandestinum* Lindl.,

1841, Bot. Reg. 27, misc.: 77; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 955; Schuit. et al., 2008, Nord. Journ. Bot. 26: 267.

= *B. sessile* (Kuntze) J. J. Sm., 1905, Orch. Java: 448.

= *B. bolovenense* Guillaumin, 1958, Bull. Mus. Natl. Hist. Nat. 2I, 29: 500.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1088* (HNL, FOF, LE).

Lithophyte and epiphyte. Primary and secondary broad-leaved evergreen and deciduous dry forests on any kind of soil, often along streams, 170–1400 m. Fl. June – August. Occasional.

Thailand, Vietnam, Malacca Peninsula, Singapore, Sumatra, Java, Borneo, Sulawesi, Moluccas, New Guinea, Philippines, tropical Pacific islands. Laos: Bolikhamxai, Champasak, Khammouan, Vientiane, Xiangkhouang.

<sup>1</sup> *B. delitescens* Hance,  
1876, Journ. Bot. 14: 44.

**Fig.** 1F, G.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1033* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 954* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et*

*al., LA-VN 1180* (HNL, FOF, LE).

Creeping epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on rocky limestone, commonly on shady cliffs, 600–1450 m. Fl. March – May. Locally common. Ornamental.

NE. India, continental SE. China, Hong Kong, Hainan, Vietnam. Laos: Houaphan, Xiangkhouang.

<sup>1</sup> *B. depressum* King et Pantl.,

1897, Journ. Asiat. Soc. Bengal, 2, Nat. Hist. 66: 585.

= *B. hastatum* Tang et F. T. Wang, 1974, Acta Phytotax. Sin. 12: 44.

**Fig.** 1H.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1157* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on hill and mountain tops, 600–700 m. Fl. April – May. Not common.

N. India, S. China, Myanmar, Thailand, Laos, Vietnam, Java, Sumatra, Kalimantan. Laos: Houaphan.

*B. flabellum-veneris* (J. Koenig) Aver.

2003, Updated Checklist Orchids Vietnam: 73.

= *B. lepidum* (Blume) J. J. Sm., 1905, Orch. Java: 471; Seidenf., 1992, Opera Bot. 114: 279.

Southern Cambodia, to the N of Sihanoukville town, Koch Rong Island in Siam Gulf, 20 November 2011, *T. Maisak, L. Osinovetz, M. Telepova, 729* (LE).

Epiphyte. Secondary dry evergreen broad-leaved lowland forest, 50–600 m. Fl. April – October. Not rare. Ornamental.

Myanmar, Andaman Islands, Thailand, Laos, Vietnam, Malacca Peninsula, Singapore, Sumatra, Java, Borneo, Sulawesi, tropical Pacific islands. Cambodia: *Siem Reap*, Sihanoukville.

<sup>1</sup> *B. forrestii* Seidenf.,

1974, Dansk Bot. Ark. 29, 1: 120, fig. 60.

**Fig.** 1I; 3A.

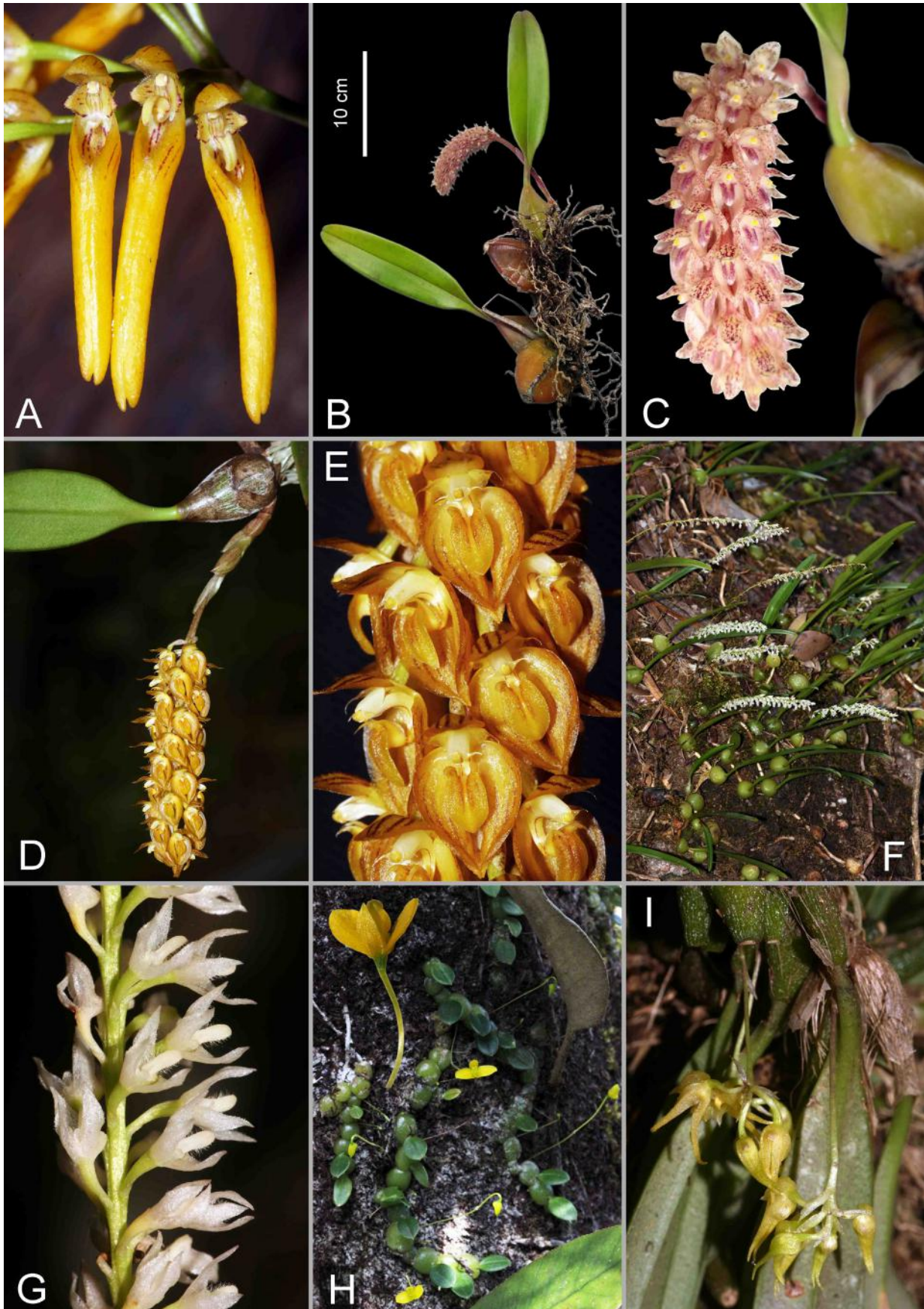
Central Laos, Vientiane province, Vang Vieng district, Na Po village, about 12 km to the W of Vang Vieng town, 17 March 2013, *N. T. Hiep, L. Averyanov, K. Chantthavongsa et al., LA-VN 516* (HNL, FOF, LE).

Epiphyte or occasionally lithophyte. Primary and secondary dry broad-leaved evergreen and





**Fig. 2.** New and rare orchids in the flora of Cambodia and Laos. *Bulbophyllum bicolor* Lindl. Digital herbarium specimen – d-EXSICCATES OF LAOTIAN FLORA 0252/LA-VN 1152a / TM 1271. Photos, design and image correction by L. Averyanov and T. Maisak.



**Fig. 3.** New and rare orchids in the flora of Cambodia and Laos. A – *Bulbophyllum forrestii* Seidenf. (LA-VN 516). B, C – *B. lilacinum* Ridl. (K-387). D, E – *B. orientale* Seidenf. (LA-VN 1241a / TM 1287). F, G – *B. parviflorum* Par. et Rchb. f. (AL 154). H – *B. physocoryphum* Seidenf. (K-366). I – *B. psyhoon* Schltr. (LA-VN 613). Photos by L. Averyanov (A, D–G, I) and E. Konstantinov (D, C, H).

semideciduous forests on rocky limestone, commonly on hill tops, 500–1000 m. Fl. December – February. Not common.

Myanmar, SW. China (Yunnan), Thailand, Vietnam. Laos: Vientiane.

Flowers with very strong unpleasant smell.

***B. helenae*** J. J. Sm.,

1912, Bull. Jard. Bot. Buitenzorg 2, 8: 24; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 255; Schuit. et al., 2008, Nord. Journ. Bot. 26: 267.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1241* (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, 900–1250 m. Fl. March – May, August – September. Not common.

NE. India, Nepal, Myanmar, Thailand. Laos: Houaphan, Louang Namtha, Phongsali.

***B. lilacinum*** Ridl.,

1897, Journ. Linn. Soc., Bot. 32: 276.

**Fig. 3B, C.**

Southwestern Laos, Champasak province, Pakse district, Bolaven plateau, road Paksong – Ban Houay Kong, 1170 m, 21 November 2015, *E. Konstantinov, T. Vongsa, K-387* (LE).

Creeping epiphyte. Primary and secondary evergreen and deciduous broad-leaved open dry forests, 1100–1200 m. Fl. November. Rare.

Thailand, Malacca Peninsula. Laos: Champasak.

***B. longibrachiatum*** Z. H. Tsi,

1981, Bull. Bot. Res., Harbin 1: 115.

= *B. purpureifolium* Aver., 1997, Bot. Journ. (Moscow & Leningrad) 82: 141.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 988* (HNL, FOF, LE).

Creeping lithophyte or occasionally epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on hill and mountain tops, 1200–1450 m. Fl. September – October. Locally common. Ornamental.

SE. China (SE. Yunnan), N. Vietnam. Laos: Xiangkhouang.

***B. macranthum*** Lindl.,

1844, Bot. Reg. 30, tab. 13.

Southern Cambodia, to the N of Sihanoukville town, Koch Rong Island in Siam Gulf, 20 November

2011, *T. Maisak, L. Osinovetz, M. Telepova, 843* (LE).

Creeping epiphyte. Primary and secondary dry evergreen broad-leaved lowland forests on low hills, 20–150 m. Fl. March – May. Locally common.

Myanmar, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Kalimantan, Bangka, Philippines, New Guinea, tropical Pacific islands. Cambodia: Sihanoukville.

***B. orientale*** Seidenf.,

1979, Dansk Bot. Ark. 33: 138; Aver. et Averyanova, 2003, Updated Checklist Orch. Viet.: 16; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 256; Schuit. et al., 2008, Nord. Journ. Bot. 26: 270.

**Fig. 3D, E.**

Southern Cambodia, about 16 kilometers to the N of Sihanoukville town, Khan Prey Nup district, Kbal Chhay Waterfall, 5 December 2012, *T. Maisak, L. Osinovetz, M. Telepova, 971* (LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1241a / TM 1287* (LE).

Creeping epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and semideciduous forests on any kind of soil, (150)600–1200 m. Fl. October – November. Occasional.

Thailand, Vietnam. Cambodia: Sihanoukville. Laos: Bolikhamxai, Houaphan.

***B. parviflorum*** Par. et Rchb. f.,

1874, Trans. Linn. Soc. London 30: 152; Schuit. et al., 2008, Nord. Journ. Bot. 26: 270; Aver., 2013, Turczaninowia 16, 4: 30.

**Fig. 3F, G.**

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 154* (LE – photo).

Creeping epiphyte and lithophyte. Primary and secondary dry evergreen forests on any kind of soil, commonly on large rocks along streams, 300–350 m. Fl. November – December. Not rare.

NE. India, Bhutan, Burma, Thailand, Vietnam, Cambodia. Laos: Bolikhamxai, Vientiane.

***B. physocoryphum*** Seidenf.,

1979, Dansk Bot. Ark. 33: 51.

**Fig. 3H.**

Southern Cambodia, Kampot province, Phnom Bokor National park, 16 December 2014, *E. Konstantinov, K-366* (LE).

Epiphyte. Cloud evergreen broad-leaved forests near mountain tops, commonly along stream, 900–1000 m. Fl. December – January. Rare.

Thailand. Cambodia: Kampot.

<sup>1</sup>*B. psyhoon* Schltr.,

1878, Gard. Chron. n.s., 1878: 170.

= *B. lockii* Aver. et Averyanova, 2006, Komarovia 4: 5.

**Fig.** 3I; 4A.

Central Laos, Khammouan province, Bounlapha district, Thong Sam village, Hinnam No Protected Area, 9 March 2013, *L. Averyanov, N. T. Hiep, V. Lamxay et al.*, LA-VN 319 (HNL, FOF, LE). Central Laos, Vientiane province, Kasi district, Thong Mout village, 20 March 2013, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 613 (HNL, FOF, LE).

Epiphyte. Primary evergreen broad-leaved and mixed forests on any kind of soil, commonly on mountain tops, 800–1650 m. Fl. March – April. Locally very common.

NE. India, S. China, Vietnam. Laos: Khammouan, Vientiane.

*B. repens* Griff.,

1851, Not. Pl. Asiat. 3: 293; Schuit. et al., 2008, Nord. Journ. Bot. 26: 270.

Southwestern Laos, Champasak province, Pakse district, Bolaven plateau, road Paksong – Ban Houay Kong, 1170 m, 21 November 2015, *E. Konstantinov, T. Vongsa, K-386* (LE).

Creeping lithophyte and epiphyte. Primary and secondary broad-leaved open evergreen and semi-deciduous forests, mostly on rocky limestone, 1100–1200 m. Fl. November – January. Not common.

NE. India, Myanmar, Thailand, Vietnam. Laos: Champasak.

<sup>c</sup>*B. retusiusculum* Rchb.f.,

1869, Gard. Chron. 1869: 1182; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 256; Schuit. et al., 2008, Nord. Journ. Bot. 26: 270.

Southern Cambodia, Kampot province, Phnom Bokor National park, 16 December 2014, *E. Konstantinov, K-367* (LE). Southeastern Laos, Secong province, Thateng district, Bolaven Plateau, 16 December 2015, *E. Konstantinov, T. Vongsa, K-401* (LE).

Epiphyte. Primary and secondary evergreen broad-leaved forests on any kind of soil, commonly on mountain tops, 900–1700 m. Fl. December – April. Not rare.

NE. India, Nepal, Bhutan, Myanmar, Taiwan, Hainan, Thailand, Vietnam, Malacca Peninsula.

Cambodia: Kampot. Laos: Champasak, Secong, Xiangkhouang.

*B. rufilabrum* Hook. f.,

1890, Fl. Brit. India 5: 761; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 256; Schuit. et al., 2008, Nord. Journ. Bot. 26: 271; Aver., 2013, Turczaninowia 16, 4: 30.

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 158* (LE). Central Laos, Vientiane province, Vang Vieng district, Nathong village, about 5 km to the W of Vang Vieng town, 14 March 2013, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 385b (LE).

Creeping epiphyte and lithophyte. Primary and secondary dry evergreen broad-leaved forests on any kind of soil, commonly along streams, 300–500 m. Fl. November – December. Locally very common.

Myanmar, Thailand, Cambodia. Laos: Bolikhamxai, Khammouan, Vientiane.

*B. spathulatum* (E.W. Cooper) Seidenf.,

1970, Bot. Tidsskr. 65: 347; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 256; Schuit. et al., 2008, Nord. Journ. Bot. 26: 271.

**Fig.** 4B, C.

Central Laos, Bolikhamxai province, Khamkeut district, Dan Khum Ngan locality, 18 January 2009, *S. Bounphanmy, N. T. Hiep, L. Averyanov et al.*, LA-VN 21j (LE). Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 154a* (LE – photo).

Creeping epiphyte. Primary and secondary broad-leaved evergreen and semideciduous open forests on thin soil, commonly along rivers or granite outcrops, 300–600 m. Fl. October – December. Occasional.

NE. India, Myanmar, Thailand, Vietnam. Laos: Bolikhamxai, Khammouan, Vientiane.

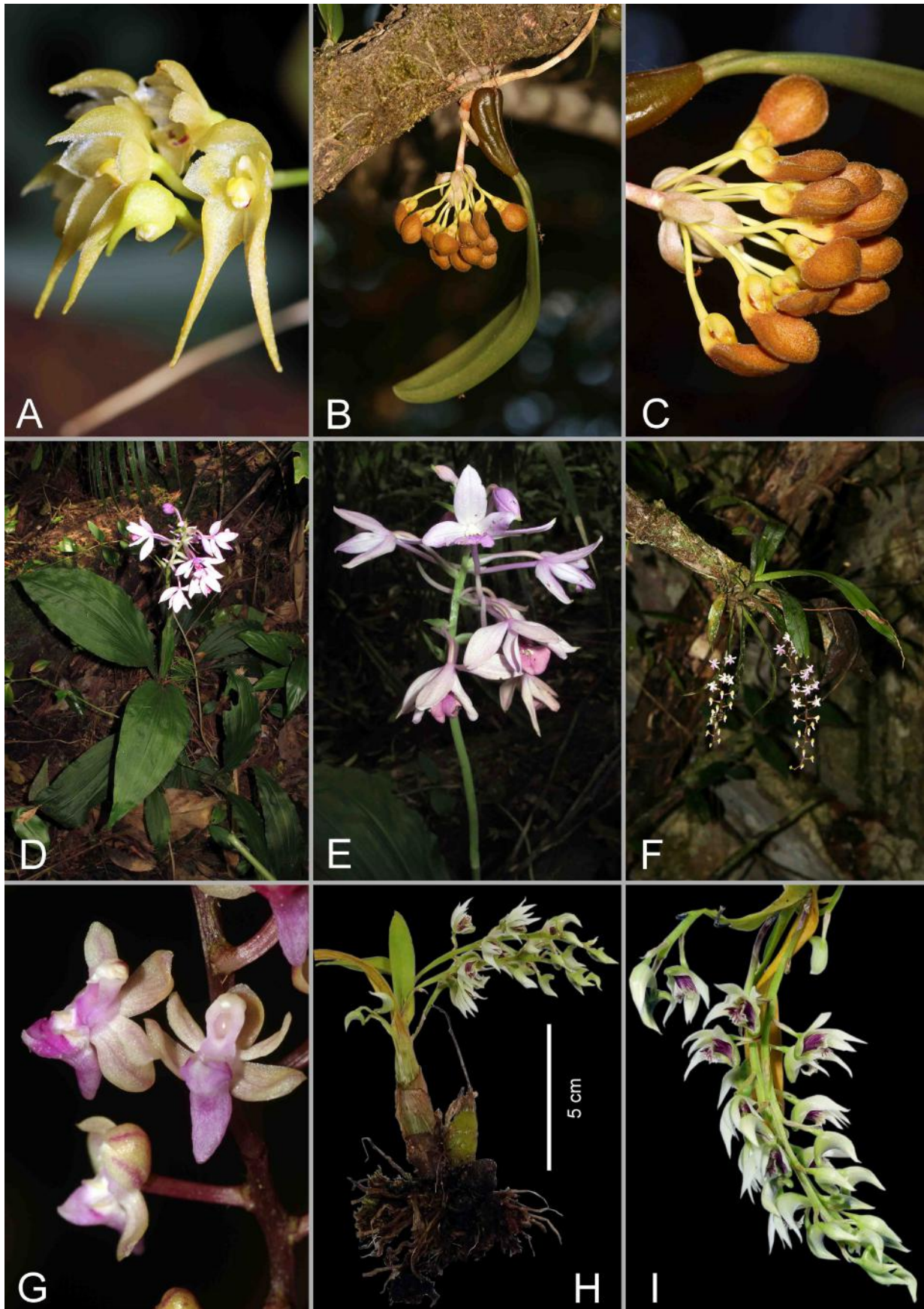
*B. tenuifolium* (Blume) Lindl.,

1830, Gen. Sp. Orch. Pl.: 50.

= *B. konstantinovii* Aver., 2013, Turczaninowia 16, 4: 29.

Southern Cambodia, Kampot province, Bokor National Park, Bokor mt., 24 November 2012, *T. Maisak, M. Telepova, L. Osinovetz, I. Kutuzova s.n.* (LE). Southern Cambodia, Kampot province, Bokor National park, 16 December 2014, *E. Konstantinov, K-368* (LE).

Epiphyte. Cloud evergreen broad-leaved and mixed forests on mountain tops, often along rocky



**Fig. 4.** New and rare orchids in the flora of Cambodia and Laos. A–B. *B. psyhoon* Schltr. (LA-VN 319). B, C – *B. spathulatum* (E. W. Cooper) Seidenf. (AL 154a). D, E – *C. sylvatica* (Thouars) Lindl. (P. Thomas, R. Timmins s.n.). F, G – *C. melanorachis* Aver. et Averyanov (LA-VN 1176). H, I – *D. eriiflorum* Griff. (K-391). Photos by L. Averyanov (A–C, F, G), P. Thomas, R. Timmins (D, E) and E. Konstantinov (H, I).

mountain streams, 900–1500 m. Fl. November – December. Not common.

Thailand, Malaysia, Sumatra, Java, Kalimantan. Cambodia: Bokor.

***B. violaceolabellum*** Seidenf.,

1981, Nord. Journ. Bot. 1: 210; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 857; Schuit. et al., 2008, Nord. Journ. Bot. 26: 272; Aver., 2012, Taiwania, 57, 2: 129.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1457* (HNL, FOF, LE).

Creeping epiphyte and lithophyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone, (500)1000–1200 m. Fl. March – May. Not common.

Vietnam. Laos: Houaphan, Louangphrabang.

***B. xylophyllum*** Par. et Rehb. f.,

1874, Trans. Linn. Soc. London 30: 151; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 257; Schuit. et al., 2008, Nord. Journ. Bot. 26: 272.

Central Laos, Vientiane province, Vang Vieng district, close vicinities of Vang Vieng town, 13 December 2015, *L. Averyanov, T. Maisak, AL 203* (LE).

Creeping epiphyte and lithophyte. Primary and secondary evergreen broad-leaved forests on rocky limestone, 350–500 m. Fl. December – February. Rare.

NE. India, Bhutan, Myanmar, Thailand, Vietnam. Laos: Vientiane.

***Calanthe*** R. Br.

<sup>1</sup>***C. alismifolia*** Lindl.,

1854, Fol. Orch. Calanthe: 8.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1116* (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly in shady humid depressions, 800–950 m. Fl. January – February, July – August. Locally common.

NE. India, Bhutan, Japan, China, Taiwan, Vietnam. Laos: Houaphan.

***C. cardioglossa*** Schltr.,

1906, Repert. Spec. Nov. Regni Veg. 2: 85; Aver., 2013, Turczaninowia 16, 4: 30.

Southern Cambodia, Kampot province, Bokor National park, 16 December 2014, *E. Konstantinov, K-363* (LE).

Lithophytic and terrestrial herb on rocky ground. Primary and secondary dense humid and cloud evergreen broad-leaved forests, often along streams, 600–1000 m. Fl. January, October – December. Locally common. Ornamental.

Thailand, Laos, Vietnam. Cambodia: Kampot.

***C. lyroglossa*** Rehb. f.,

1878, Otia Bot. Hamburg.: 53; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 257; Schuit. et al., 2008, Nord. Journ. Bot. 26: 272.

= *Calanthe nephroidea* Gagnep., 1951, Bull. Mus. Natl. Hist. Nat. 2, 22: 625.

Central Laos, Khammouan province, Nakai district, Ban Theung commune, Nakai Plateau, 19 January 2015, *P. Thomas, R. Timmins, s.n.* (LE – photo).

Terrestrial herb. Primary and secondary humid evergreen, broad-leaved and coniferous forests, commonly in wet shady depressions growing on decaying timber, 900–1000 m. Fl. December – February. Not common.

Myanmar, Taiwan, Thailand, Cambodia, Vietnam, Malacca Peninsula, Malaysia, Philippines. Laos: Champasak, Khammouan.

***C. odora*** Griff.

1851, Not. Pl. Asiat. 3: 365; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 257; Schuit. et al., 2008, Nord. Journ. Bot. 26: 272.

= *Calanthe angusta* Lindl., 1855, Fol. Orchid. 6: 7.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1060* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1483* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1356* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1427* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1171* (HNL, FOF, LE).

Terrestrial and lithophytic herb. Primary and secondary broad-leaved evergreen and

semideciduous dry forests on rocky limestone, commonly in humid shady places, 600–1400 m. Fl. April – June. Locally common. Ornamental.

NE. India, China, Thailand, Cambodia, Vietnam. Laos: Houaphan, Xiangkhouang.

<sup>1</sup>*C. sylvatica* (Thouars) Lindl., 1833, Gen. Sp. Orch. Pl.: 250.

**Fig.** 4D, E.

Central Laos, Khammouan province, Nakai district, Ban Theung commune, Nakai Plateau, 19 January 2015, *P. Thomas, R. Timmins, s.n.* (LE – photo).

Terrestrial herb. Primary evergreen broad-leaved, mixed and coniferous forests, commonly in shady humid places, 800–900 m. Fl. December – January. Not common. Ornamental.

Africa, Madagascar, Sri Lanka, India, Bhutan, Nepal, Myanmar, China, Japan, Thailand, Malaysia, Indonesia. Laos: Khammouan.

*Callostylis* Blume

*C. rigida* Blume

1825, Bijdr.: 340; Aver., 2013, Turczaninowia 16, 4: 30.

= *Eria discolor* Lindl., 1858, Journ. Proc. Linn. Soc., Bot. 3: 51; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 267; Schuit. et al., 2008, Nord. Journ. Bot. 26: 290.

= *Tylostylis discolor* (Lindl.) Hook. f., 1895, Ann. Roy. Bot. Gard. (Calcutta) 5: 22.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 975* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1332* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1393* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1231* (HNL, FOF, LE).

Creeping epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, 800–1450 m. Fl. November – February. Very common, particularly on rocky limestone.

NE. India, Nepal, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Borneo. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Phongsali, Vientiane, Xiangkhouang.

*Cheirostylis* Blume

<sup>1</sup>*C. pusilla* Lindl.,

1840, Gen. Sp. Orch. Pl.: 489; Aver., 2015, Wulfenia 22: 150.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1335* (HNL, FOF, LE).

Miniature creeping lithophyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, 1050–1150 m. Fl. September – October. Rare.

NE. India, SW. China (S. Yunnan), Thailand, Vietnam, Malacca Peninsula.

The early record of this species for Laos (Averyanov, 2013: 32, fig. 1, I – *E. Konstantinov et al., 14bOR-L-GPS018*) belongs to another, not yet described species.

*Cleisostoma* Blume

*C. arietinum* (Rchb. f.) Garay,

1972, Bot. Mus. Leaflet 23: 169; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 258; Schuit. et al., 2008, Nord. Journ. Bot. 26: 274.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1081* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 996* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1500* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1305* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1428* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous dry open forests on any kind of soil, 700–1450 m. Fl. January, March – April. Common, particularly in open dipterocarp and limestone forests.

NE. India, Myanmar, Thailand, Cambodia, Vietnam, Malacca Peninsula. Laos: Champasak, Houaphan, Xiangkhouang.

*C. birmanicum* (Schltr.) Garay

1972, Bot. Mus. Leaflet 23: 170; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 258; Schuit. et al., 2008, Nord. Journ. Bot. 26: 274.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1082* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on any kind of soil, 1200–1400 m. Fl. June – July. Occasional.

Myanmar, China, Thailand, Vietnam. Laos: Champasak, Khammouan, Xiangkhouang.

***C. fuerstenbergianum*** Kraenzl.

1909, Repert. Spec. Nov. Regni Veg. 7: 39; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 259; Schuit. et al., 2008, Nord. Journ. Bot. 26: 275; Aver., 2013, Turczaninowia 16, 4: 33.

Central Laos, Khammouan province, Lak Sao town area, 31 October 2013, *E. Konstantinov, K-220* (LE). Central Laos, Khammouan province, Thakhek town area, Pha In Cave, 3 November 2013, *E. Konstantinov, K-234* (LE). Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 926* (HNL, FOF, LE).

Epiphyte. Primary and secondary evergreen and semideciduous broad-leaved open dipterocarp and limestone forests, particularly on hill and mountain tops, 100–1240 m. Fl. June – December. Not rare.

S. China, Thailand, Cambodia, Vietnam. Laos: Attapu, Bolikhamxai, Champasak, Khammouan, Louangphrabang, Phongsali, Vientiane, Xiangkhouang.

<sup>1</sup>***C. melanorachis*** Aver. et Averyanova,  
2006, Komarovia 4: 8.  
4F, G.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1320* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1429* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1176* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on hill and mountain tops, 600–1200 m. Fl. March – May. Locally common.

N. Vietnam. Laos: Houaphan.

***C. simondii*** (Gagnep.) Seidenf.,  
1975, Dansk Bot. Ark. 29, 3: 66; Newman et al.,

2007, Checklist Vasc. Pl. Lao PDR: 259; Schuit. et al., 2008, Nord. Journ. Bot. 26: 275; Aver., 2013, Turczaninowia 16, 4: 33.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 924* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 987* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous dry forests on any kind of soil, often open limestone forests, 1200–1850 m. Fl. October – December. Occasional.

NE. India, China, Thailand, Vietnam. Laos: Champasak, Khammouan, Louangphrabang, Xiangkhouang.

<sup>1</sup>***C. subulatum*** Blume,

1825, Bijdr.: 363; Aver., 2015, Taiwania 60, 3: 115.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 977* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1399* (HNL, FOF, LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, 1000–1450 m. Fl. December – January, March – July. Locally common.

NE. India, Bhutan, S. Myanmar, Thailand, Vietnam, Cambodia, Malacca Peninsula, Indonesia, Philippines. Laos: Houaphan, Xiangkhouang.

<sup>1</sup>***C. williamsonii*** (Rchb. f.) Garay,

1972, Bot. Mus. Leaflet Harv. Univ. 23, 4: 176.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 960* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1197* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1290* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, 600–1450 m. Fl. April – May. Locally common.

NE. India, Bhutan, Myanmar, Thailand, S. China, Vietnam, Malacca Peninsula, Sumatra, Java, Kalimantan. Laos: Houaphan, Xiangkhouang.



***Coelogyne* Lindl.*****C. assamica* Linden et Rehb.f.,**

1857, Allg. Gartenzeitung 25: 403; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 259; Schuit et al., 2008, Nord. Journ. Bot. 26: 275.

= *C. siamensis* Rolfe, 1914, Bull. Misc. Inform. Kew 1914: 373.

= *C. annamensis* Rolfe, 1914, Bull. Misc. Inform. Kew 1914: 211.

= *C. dalatensis* Gagnep., 1930, Bull. Mus. Natl. Hist. Nat. 2, 2: 423.

= *Cymbidium evrardii* Guillaumin, 1930, Bull. Soc. Bot. France 77: 339.

= *Coelogyne saigonensis* Gagnep., 1938, Bull. Mus. Natl. Hist. Nat. 2, 10: 435.

= *C. dichroantha* Gagnep., 1950, Bull. Mus. Natl. Hist. Nat. 21, 22: 506.

Southwestern Laos, Champasak province, Bolaven Plateau, Tad Gneuang Waterfall, 9 December 2014, *E. Konstantinov*, K-357 (LE).

Epiphyte. Primary and secondary evergreen broad-leaved forests, 1000–1200 m. Fl. November – December. Not common. Ornamental.

NE. India, Bhutan, SW. China (Yunnan), Thailand, Vietnam. Laos: Champasak.

***C. calcicola* Kerr,**

1933, Journ. Siam Soc., Nat. Hist. Suppl. 9: 233; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 259; Schuit et al., 2008, Nord. Journ. Bot. 26: 276.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1068 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1447 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on rocky limestone, commonly on mountain tops, 1000–1500 m. Fl. April – May, July. Locally common. Ornamental.

Myanmar, SW. China (Yunnan), Vietnam. Laos: Champasak, Houaphan, Xiangkhouang.

**<sup>1</sup>*C. eberhardtii* Gagnep.,**

1930, Bull. Mus. Hist. Nat. (Paris) 2 ser. 2, 4: 423.

Southwestern Laos, Champasak province, Pakse district, Bolaven Plateau, road Paksong – Ban Houay Kong, 26 November 2015, *E. Konstantinov*, *T. Vongsa*, K-390 (LE).

Epiphyte. Primary evergreen broad-leaved, mixed and coniferous humid forests preferably on

granite and gneiss, 1100–1200 m. Fl. September – October. Not common. Ornamental.

S. Vietnam. Laos: Champasak.

***C. flaccida* Lindl.,**

1830, Gen. Sp. Orch. Pl.: 39; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 259; Schuit et al., 2008, Nord. Journ. Bot. 26: 276; Aver., 2013, Turczaninowia 16, 4: 33.

= *Coelogyne lactea* Rehb. f., 1885, Gard. Chron. n.s., 1885, 1: 692.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 995 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1328 (HNL, FOF, LE).

Lithophyte and occasionally epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, often on exposed rocks, 500–1750 m. Fl. March – April. Locally common. Ornamental.

NE. India, Nepal, Myanmar, Thailand, China. Laos: Houaphan, Vientiane, Xiangkhouang.

**<sup>1</sup>*C. leucantha* W. W. Sm.,**

1921, Notes Roy. Bot. Gard. Edinburgh 13: 198; Aver. et al., 2015, Wulfenia 22: 152.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 931 / TM 1221 (HNL, FOF, LE).

Creeping epiphyte. Primary broad-leaved mixed and coniferous evergreen humid forests on shale sandstone, commonly on tall mossy trees near mountain tops, 1750–1850 m. Fl. March – May (June). Locally common.

N. Myanmar, S. China, N. Vietnam. Laos: Xiangkhouang.

Recently also found in Vietnam (Averyanov et al., 2015).

**<sup>1</sup>*C. ovalis* Lindl.,**

1838, Bot. Reg. 24, Misc.: 91.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1462 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone near mountain tops, 1000–1200 m. Fl. August – November. Occasional.

NE. India, Bhutan, Nepal, Myanmar, S. China, Vietnam. Laos: Houaphan.

***C. trinervis*** Lindl.,

1830, Gen. Sp. Orch. Pl.: 41; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 260; Schuit. et al., 2008, Nord. Journ. Bot. 26: 277.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1395 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1245 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved evergreen open dry dipterocarp and limestone forests, 350–1200 m. Fl. September – December. Locally common. Ornamental.

Myanmar, Thailand, Vietnam, Cambodia, Malacca Peninsula, Sumatra, Java, Lesser Sunda Islands. Laos: Attapu, Bolikhamxai, Champasak, Houaphan, Khammouan, Savannakhet, Vientiane, Xaisomboun.

***C. viscosa*** Rchb. f.,

1856, Allg. Gartenzeitung 24: 218; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 260; Schuit. et al., 2008, Nord. Journ. Bot. 26: 277; Aver., 2013, Turczaninowia 16, 4: 33.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1052 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1327 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1448 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous open dry forests on rocky limestone, particularly on hill and mountain tops and along streams, 300–1400 m. Fl. December – February. Locally common.

NE. India, Myanmar, S. China, Thailand, Vietnam, Malacca Peninsula. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Phongsali, Vientiane, Xaisomboun, Xiangkhouang.

***Corymborkis*** Thouars

***C. veratrifolia*** (Reinw.) Blume,

1859, Coll. Orch.: 125; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 260; Schuit. et al.,

2008, Nord. Journ. Bot. 26: 277; Aver., 2013, Turczaninowia 16, 4: 33.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1203 (HNL, FOF, LE).

Terrestrial semi-woody herb. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, usually in humid shady depressions and stream valleys with rich soil, 300–800 m. Fl. May – July. Occasional.

Tropical Asia and Australia, tropical Pacific islands. Laos: Bolikhamxai, Houaphan, Louang Namtha, Saravan, Vientiane.

***Cymbidium*** Sw.

***C. aloifolium*** (L.) Sw.,

1799, Nova Acta Regiae Soc. Sci. Upsal. 6: 73; Seidenf., 1992, Opera Bot.: 338; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 260; Schuit. et al., 2008, Nord. Journ. Bot. 26: 278; Aver., 2013, Turczaninowia 16, 4: 33.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Island in Siam Gulf, 19 November 2011, *T. Maisak, M. Telepova, L. Osinovetz*, 845 (LE). Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1072 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1179 (HNL, FOF, LE).

Epiphyte and lithophyte. Occurs in any kind of plant communities, 20–1400 m. Fl. March – May. One of the most common orchids in Cambodia and Laos.

Sri Lanka, India, Andaman Islands, Nepal, Bangladesh, China, Myanmar, Thailand, Vietnam, Malacca Peninsula, Java. Cambodia: Kampong Chhnang, Sihanoukville. Laos: Attapu, Houaphan, Khammouan, Louangphrabang, Vientiane, Xaignabouri, Xiangkhouang.

***Dendrobium*** Sw.

***D. aphyllum*** (Roxb.) C. E. C. Fisch.,

1928, Fl. Madras: 1416; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 279.

≡ *Limodorum aphyllum* Roxb., 1795, Pl. Coromandel 1: 34.

= *Dendrobium pierardii* Hook., 1822, Exot. Fl. 1, t. 9.

= *D. oxyphyllum* Gagnep., 1950, Bull. Mus. Natl. Hist. Nat. 2, 21: 743.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1049 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1080 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 957 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1465 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1323 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1177 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1269 (HNL, FOF, LE).

Epiphyte or occasionally lithophyte. Primary and secondary broad-leaved and mixed evergreen and semideciduous dry open forests on any kind of soil, preferably on rocky limestone, 150–1400 m. Fl. February – July. Occasional. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Thailand, Cambodia, Vietnam, Malacca Peninsula. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Phongsali, Vientiane, Xaignabouri, Xiangkhouang.

***D. christyanum*** Rchb. f.,

1882, Gard. Chron. 1882 (1): 178; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 280.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 922 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen humid mossy forests on shale and sandstone on mountain tops, 1200–1900 m. Fl. May – July. Rare. Ornamental.

Thailand, Vietnam. Laos: Champasak, Xiangkhouang.

***D. chrysanthum*** Wall.,

1830, Bot. Reg. 15, t. 1299; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 280.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1304 (HNL, FOF, LE).

Lithophyte and epiphyte. Primary and secondary broad-leaved evergreen dry open forests preferably on rocky limestone, particularly on mossy exposed rocks on hill and mountain tops, 1050–1700 m. Fl. April – September.

India, Nepal, Bhutan, Myanmar, China, Thailand, Vietnam. Laos: Champasak, Houaphan, Savannakhet, Xaisomboun, Xiangkhouang.

***D. chryseum*** Rolfe,

1888, Gard. Chron. 3, 3: 233; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 280.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1030 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests preferably on rocky limestone, 1100–1400 m. Fl. March – April. Rare. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Taiwan, Thailand, Vietnam. Laos: Vientiane, Xiangkhouang.

***D. chrysotoxum*** Lindl.,

1847, Bot. Reg. 33, t. 19; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 280.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1092 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 985 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1295 (HNL, FOF, LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests preferably on rocky limestone, particularly on mountain tops, 300–1400 m. Fl. January – May. Locally common. Ornamental.

NE. India, Nepal, Bhutan, Myanmar, China, Thailand, Vietnam. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Phongsali, Savannakhet, Vientiane, Xaisomboun, Xiangkhouang.

***D. concinnum*** Miq.,

1859, Fl. Ned. Ind. 3: 644; Seidenf., 1992, Opera Bot.: 252.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Island in Siam Gulf, 29 November 2012, *T. Maisak et al.*, 1047 (LE).

Epiphyte. Primary and secondary evergreen dry lowland forests on low hills, 50–100 m. Fl. March – May. Locally common.

Myanmar, Thailand, Malacca Peninsula, Vietnam, Sumatra, Java, Kalimantan. Cambodia: Kampot, Sihanoukville.

***D. crepidatum*** Lindl. et Paxton,

1850, Fl. Gard. 1: 63; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 262; Schuit. et al., 2008, Nord. Journ. Bot. 26: 281; Aver., 2013, Turczaninowia 16, 4: 34.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1406 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous open dry forests on any kind of soil, preferably on rocky limestone, 500–1200 m. Fl. March – May. Not common. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Thailand, Cambodia, Vietnam. Laos: Attapu, Bolikhamxai, Champasak, Houaphan, Khammouan, Phongsali, Vientiane.

***D. dixanthum*** Rchb. f.,

1865, Gard. Chron. 1865: 674; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 263; Schuit. et al., 2008, Nord. Journ. Bot. 26: 282; Aver., 2012, Taiwania, 57, 2: 130, fig. 6.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1415 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone, commonly on hill and mountain tops, 1000–1200 m. Fl. March – April. Not common. Ornamental.

Myanmar, China, Thailand, Vietnam. Laos: Houaphan.

***D. ellipsophyllum*** Tang et F. T. Wang,

1951, Acta Phytotax. Sin. 1: 81; Seidenf., 1992, Opera Bot.: 238.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Island in Siam Gulf, 20 November

2011, *T. Maisak, L. Osinovetz, M. Telepova*, 829 (LE). Southwestern Cambodia, Koh Kong province, Koh Rong Island, 2013, *E. Konstantinov, Chulisov s.n.* (LE).

Epiphyte. Primary and secondary evergreen broad-leaved dry lowland forests on low hills, 2–150 m. Fl. April – June. Locally common.

Myanmar, S. China (SE. Yunnan), Thailand, Vietnam, Laos. Cambodia: Kampot, Sihanoukville, Stung Treng.

**<sup>L</sup>*D. eriiflorum*** Griff.,

1851, Ic. Pl. Asiat. 3: 316.

**Fig. 4H, I.**

Southwestern Laos, Champasak province, Pakse district, Bolaven Plateau, road Paksong – Ban Houay Kong, 26 November 2015, *E. Konstantinov, T. Vongsa, K-391* (LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous forests, 1100–1200 m. Fl. October – December. Rare.

N. India, Nepal, Bhutan, Myanmar. Laos: Champasak.

**<sup>L</sup>*D. falconeri*** Hook.,

1856, Bot. Mag. 82, t. 4944.

Central Laos, Xiangkhouang province, Peak district, Oran village, 1750–1850 m, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 927 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forest on shale sandstone, commonly on mountain tops and ridge edges, 1700–1900 m. Fl. April – June. Locally common. Ornamental.

NE. India, Bhutan, China, Taiwan, Myanmar, N. Thailand, N. Vietnam. Laos: Xiangkhouang.

A great amount of this species specimens observed in Vietnamese street markets in 2014–2016 originated certainly from northern Laos where it may be still very common. In Vietnam, this species is extremely rare and stands on the verge of full extinction.

***D. fimbriatum*** Hook.,

1823, Exot. Fl. 1, t. 71; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 263; Schuit. et al., 2008, Nord. Journ. Bot. 26: 282.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 942 (LE – photo). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN

1150 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1153 (HNL, FOF, LE).

Lithophyte and epiphyte. Primary and secondary broad-leaved evergreen and semideciduous forests on rocky limestone, commonly on mossy exposed rocks on hill and mountain tops, 350–1500 m. Fl. March – May. Not rare. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Thailand, Vietnam. Laos: Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Vientiane, Xiangkhouang.

***D. findleyanum*** Par. et Rchb.f.,

1874, Trans. Linn. Soc. London 30: 149; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 263; Schuit. et al., 2008, Nord. Journ. Bot. 26: 282; Aver., 2013, Turczaninowia 16, 4: 34.

Central Laos, Xiangkhouang province, Peak district, Khoang village, Pa Khao mt., 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 958 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1416 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1253 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen dry forests preferably on rocky limestone, 700–1600 m. Fl. (January) March – May. Not common. Ornamental.

Myanmar, Thailand, Vietnam. Laos: Champasak, Houaphan, Louang Namtha, Vientiane, Xiangkhouang.

A great amount of this species specimens observed in Vietnamese street markets in 2014–2016 originated certainly from northern Laos where it may be still very common. In Vietnam, this species is extremely rare and stands on the verge of full extinction.

***D. gratiosissimum*** Rchb. f.,

1865, Bot. Zeitung (Berlin) 23: 99; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 263; Schuit. et al., 2008, Nord. Journ. Bot. 26: 283; Aver., 2013, Turczaninowia 16, 4: 34.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1075 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T.*

*Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1097 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1250 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on any kind of soil preferably on rocky limestone, 1000–1400 m. Fl. March – May. Occasional. Ornamental.

NE. India, Myanmar, China, Thailand, Vietnam. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Phongsali, Vientiane, Xiangkhouang.

***D. jenkinsii*** Wall.,

1839, Bot. Reg. 25, t. 37; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 264; Schuit. et al., 2008, Nord. Journ. Bot. 26: 284.

= *D. marseillei* Gagnep., 1934, Bull. Mus. Natl. Hist. Nat. 2, 6: 119.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1055 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 994 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1104 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1251 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen humid forests on mountain tops, particularly on rocky limestone, 900–1450 m. Fl. March – April. Locally common. Ornamental.

NE. India, Bhutan, Myanmar, China, Thailand, Vietnam. Laos: Houaphan, Khammouan, Phongsali, Xiangkhouang.

***D. lagarum*** Seidenf.,

1985, Opera Bot. 83: 187; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 264; Schuit. et al., 2008, Nord. Journ. Bot. 26: 284; Aver., 2010, Taiwaniana 55, 1: 4.

Central Laos, Khammouan province, Thakhek town area, Pha In Cave, *E. Konstantinov, K-238* (LE).

Epiphyte. Primary and secondary evergreen broad-leaved forests on rocky limestone, 100–200 m. Fl. January. Not common.

Thailand, Vietnam. Laos: Champasak, Khammouan.

***D. loddigesii*** Rolfe,

1887, Gard. Chron. 3, 2: 155; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 264; Schuit. et al., 2008, Nord. Journ. Bot. 26: 284.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 955 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1317 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1249 (HNL, FOF, LE).

Epiphyte at base of trees and lithophyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, 1100–1450 m. Fl. March – May. Locally common. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Thailand, Cambodia, Vietnam. Laos: Houaphan, Xiangkhouang.

***D. nobile*** Lindl.,

1830, Gen. Sp. Orch. Pl.: 79; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 264; Schuit. et al., 2008, Nord. Journ. Bot. 26: 285.

= *D. chlorostylum* Gagnep., 1950, Bull. Mus. Natl. Hist. Nat. 2, 21: 739.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1035 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1000 (HNL, FOF, LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved and coniferous evergreen and semideciduous dry forests on mountain tops preferably on rocky limestone, 1200–1450 m. Fl. March – May. Not rare. Ornamental.

India, Nepal, Bhutan, Myanmar, China, Taiwan, Thailand, Vietnam. Laos: Bolikhamxai, Saravan, Vientiane, Xaignabouri, Xaisomboun, Xiangkhouang.

***D. minusculum*** Aver., **sp. nov.**

Described from northeastern Laos (“Xiangkhouang province, Peak district, Oran village, primary and secondary broad-leaved evergreen dry forest on shale sandstone slopes and along ridge edge at elevation 1750–1850 m a.s.l., clustering epiphyte on tall tree, rare”). **Type** (“2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang,*

*N. Q. Hieu, T. Maisak, Pheng Phengsintham, LA-VN 925*”) – LE (holotype), HNL, FOF (isotypes). **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA 0253/LA-VN 925.

**Fig. 5; 6** (d-EXSICCATES OF VIETNAMESE FLORA 0253/LA-VN 925).

Species epithet refers minuscule plant habit.

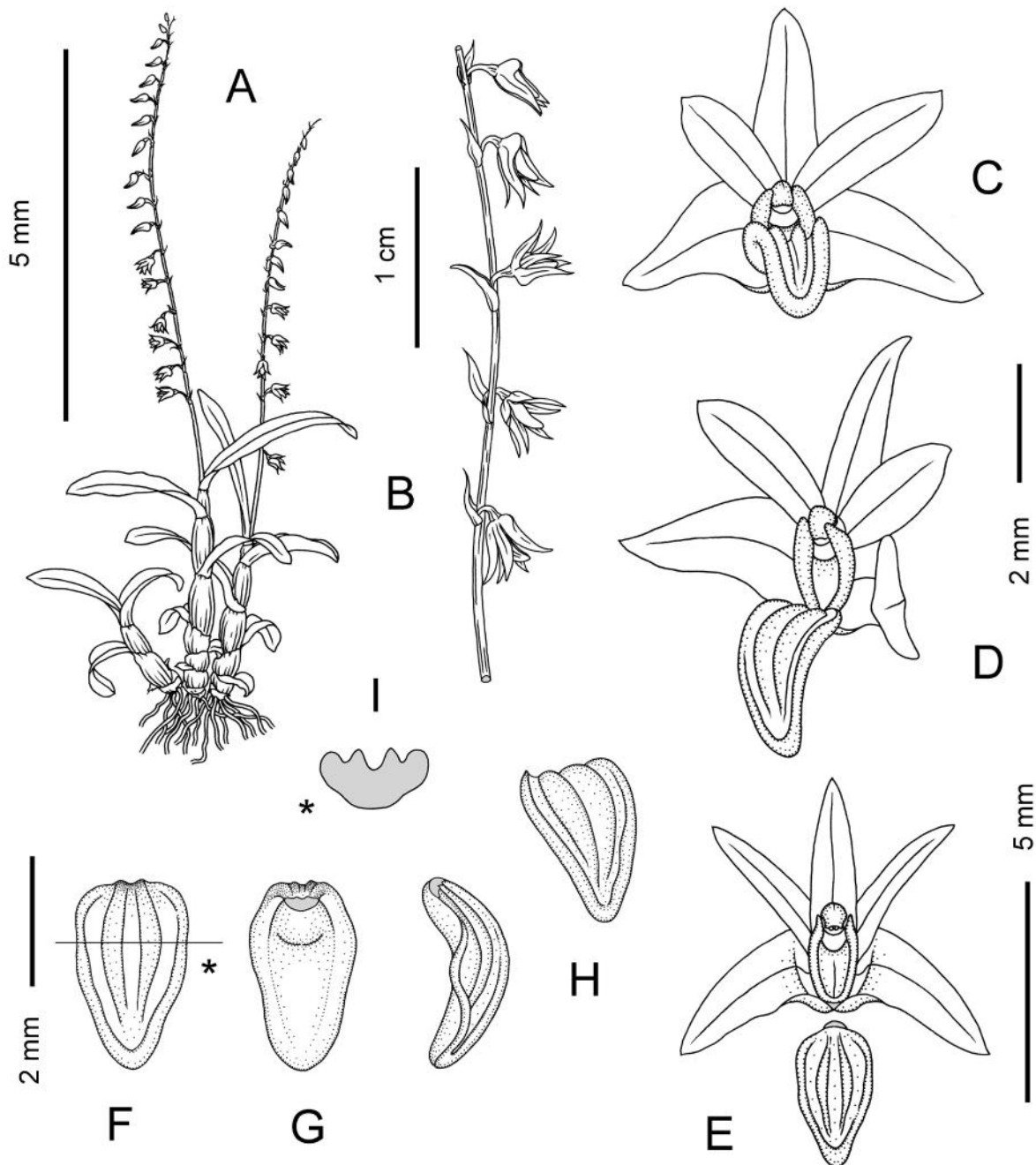
Perennial clustering sympodial miniature epiphytic herb. Rhizome very short, negligible. Stems densely clustering, pseudobulbous, erect, with (2)3–4(5) nodes, globose to ovoid and narrowly ovoid, (0.4)0.5–1.5(2) cm tall, (2.5)3–4(5) mm in diam., with (1)2–3(4) leaves, young stems glossy green, enveloped by white to light greenish hyaline leaf sheaths, old finely rough, dark green to brown, naked or with light brownish scarious sheath remains at nodes. Leaves, distichous, sessile, sheathed; sheath tubular, as long as internode, completely disintegrating or remaining in form of insignificant scarious, papyraceous remnants on second-year stems; leaf blade conduplicate, with prominent median vein, suberect or recurved, rather thin, herbaceous, oblong lanceolate, (0.6)1–2(2.2) cm long, (2)3–5(5.5) mm wide, obtuse, sometime shortly unequally bilobulate at apex. Inflorescence 1–2, synanthous, arising from the apical part of young leafy stem, suberect, lax, many flowered raceme (1)1.5–5(6) cm tall; scape and rachis light green, straight, scape short (4)5–10(12) mm long, naked or with 1–2 small sterile bracts. Scape bracts and floral bracts, light greenish, narrowly triangular, straight, conduplicate, tapering and acute at apex, (1.5)2–4(4.5) mm long, (0.5)0.8–1(1.2) mm wide. Pedicel and ovary light green, glabrous, (1)1.2–1.6(1.8) mm long, bent down at apex; pedicel cylindrical, ovary obconoid, slightly longitudinally grooved. Flowers nodding, not much widely opening, light greenish, lip apical half light green, (3.2)3.5–4.5(5) mm across. Sepals spreading, narrowly ovate to broadly lanceolate, obtuse, (2.8)3–3.4(3.6) mm long, (0.7)0.8–1(1.2) mm wide, lateral sepals at the base oblique broadening to 1.8–2 mm wide, forming short broad saccate mentum 0.8–1 mm long, 1.2–1.5 mm wide. Petals spreading, oblong broadly lanceolate, obtuse, little shorter and narrower than sepals. Lip more or less movable, entire, narrowly ovate, (2.2)2.4–2.6(2.8) mm long, (1)1.2–1.4(1.6) mm wide, fleshy, glabrous, recurved, blunt to round at apex, with 2 low simple fleshy keels running from the lip base to the epichile. Column light green, very short, erect, stout, shortly cylindrical, 0.5–0.6 mm tall, 0.8–1 mm wide, at front with prominent wing-like purple stelidia 0.6–0.8 mm tall, exceeding

operculum; stigma large, sub-circular, concave; rostellum in form of small, thin, truncate plate; column foot twice longer than the column proper, thick, concave, shortly cymbiform, 1.2–1.4 mm long, 0.8–1 mm wide, forward curved. Anther cap light yellow, simple, conical hemispheric, smooth, 0.3–0.4 mm tall and wide, at front with broad truncate beak. Pollinia 4, lens-shaped, in two pair, yellow, oblong ovoid, 0.2–0.25 mm long.

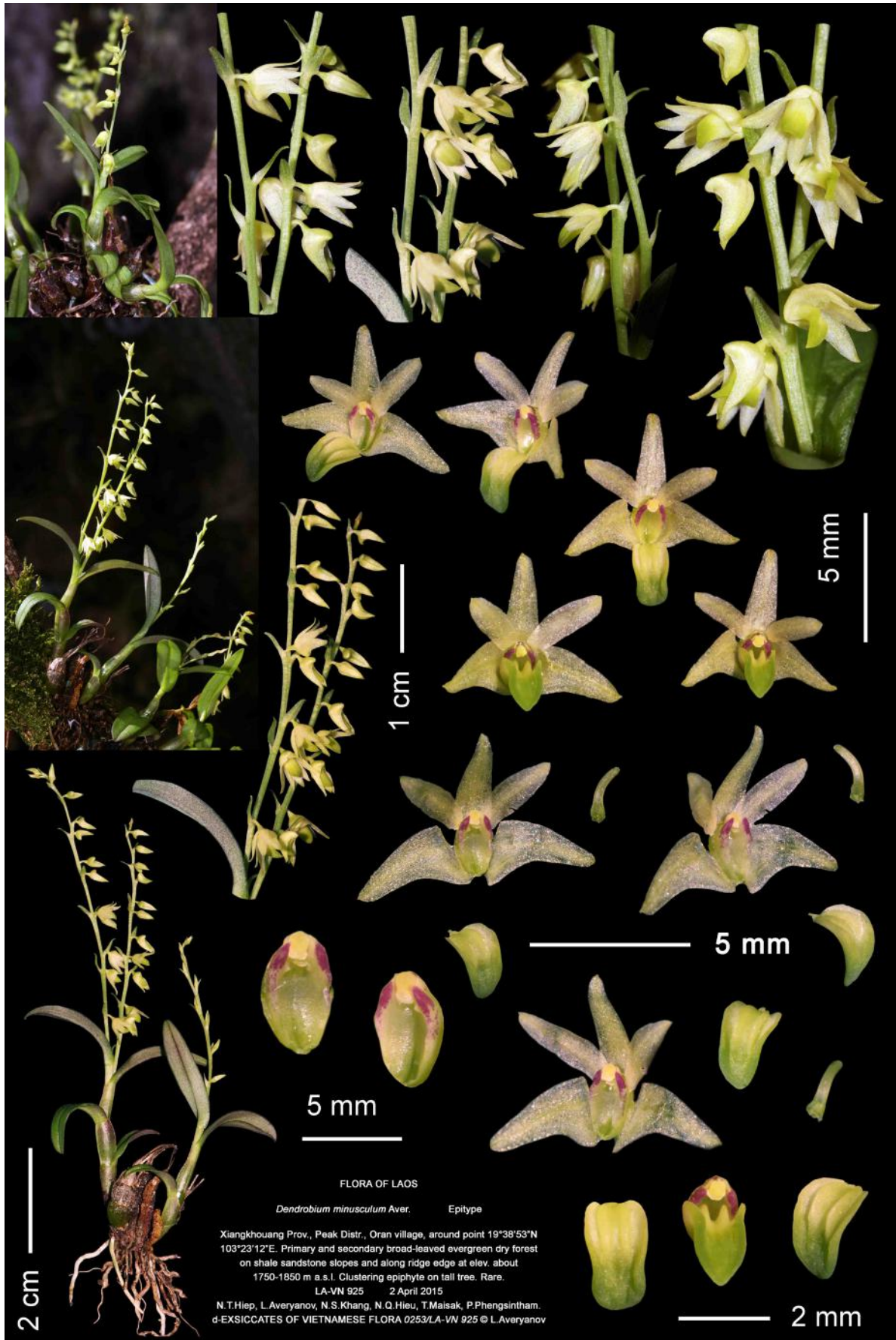
Miniature branch and trunk epiphyte. Primary montane evergreen, broad-leaved forests on shaly sandstone, 1750–1850 m. Fl. August – September. Rare.

Laos: Xiangkhouang. Endemic.

Morphologically new species is most close to *Dendrobium caespitosum* King et Pantl., *D. mucronatum* Seidenf. and *D. porphyrochilum* Lindl., from which differs in smaller uniform pale green flowers



**Fig. 5.** New and rare orchids in the flora of Cambodia and Laos. *Dendrobium minusculum* Aver. A – Flowering plant. B – Portion of inflorescence. C, D – Flower, half side view. E – Flattened flower, frontal view. F – Lip, view from above. G – Lip, view from below. H – Lip, side and half side views. I – Transversal section of the lip along line marked in figure F by asterisk (\*). All drawn from the type – LA-VN 925 by L. Averyanov and T. Maisak.



**Fig. 6.** New and rare orchids in the flora of Cambodia and Laos. *Dendrobium minusculum* Aver. Digital epitype – d-EXSICCATES OF LAOTIAN FLORA 0253/LA-VN 925. Photos, design and image correction by L. Averyanov and T. Maisak.



and very fleshy, strongly recurved lip with two fat keels separated by deep groove. This tiny epiphyte grows in canopies of tall trees, hence its occurrence is difficult to indicate in intact habitats. It was documented until now from lone locality.

<sup>c</sup>*D. pachyphyllum* (Kuntze) Bakh. f.,  
1963, *Blumea* 12: 69.

Southwestern Cambodia, eastern part of Cardamom Mountains, Phnom Aural mountain, 23 November 2012, *T. Maisak et al.*, 953a (LE).

Epiphyte. Primary and secondary evergreen and semideciduous dry open lowland forests. Fl. March – May. Not common.

NE. India, Myanmar, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Kalimantan. Cambodia: border of Pursat and Kampong Speu provinces.

*D. parciflorum* Lindl.,

1858, *Journ. Proc. Linn. Soc., Bot.* 3: 4; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 264; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 285.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 991 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on any kind of soil, preferably on rocky limestone, 1000–1450 m. Fl. August – September. Not common.

NE. India, S. China, Thailand, Vietnam. Laos: Champasak, Khammouan, Louangphrabang, Saravan, Vientiane, Xiangkhouang.

*D. porphyrochilum* Lindl.,

1858, *Journ. Proc. Linn. Soc., Bot.* 3: 18; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 286.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 921/TM 1229 (HNL, FOF, LE).

Epiphyte on tall trees. Primary and secondary broad-leaved evergreen dry forests on shale sandstone along ridge edges, 1750–1850 m. Fl. July. Rare.

India, Nepal, Bhutan, Myanmar, China, Thailand. Laos: Champasak, Xiangkhouang.

*D. salaccense* Lindl.,

1830, *Gen. Sp. Orch. Pl.*: 86; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 265; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 286.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep,*

*L. Averyanov, N. S. Khang et al.*, LA-VN 1294 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and deciduous dry dipterocarp and limestone forests, often in humid shady wet places, 300–1150 m. Fl. April – October. Occasional.

Myanmar, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Borneo. Laos: Bolikhamxai, Houaphan, Khammouan.

*D. senile* Rchb. f.,

1865, *Gard. Chron.* 1865: 434; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 265; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 287; Aver., 2012, *Taiwania* 57, 2: 131.

**Fig. 7A.**

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 158a* (LE – photo). Southwestern Laos, Champasak province, Pakse district, Bolaven plateau, along road Paksong – Ban Houay Kong, 26 November 2015, *E. Konstantinov, T. Vongsa, K-400* (LE – photo).

Epiphyte and lithophyte. Primary and secondary evergreen broad-leaved and coniferous dry open forests and woodlands, commonly on sandstone along streams and rivers, 200–1500 m. Fl. January – April. Rare. Ornamental.

Burma, Thailand, Vietnam. Laos: Bolikhamxai, Champasak, Vientiane, Xiangkhouang.

A great amount of this species specimens observed in Vietnamese street markets in 2014–2016 was originated certainly from northern Laos where it may be still very common. In Vietnam this species is extremely rare and stands on the verge of full extinction (Averyanov, 2012).

*D. thyrsiflorum* B. S. Williams,

1871, *Orch.-Grow. Man. ed.* 4: 172; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 265; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 288.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1058 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 970 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1237 (HNL, FOF, LE).



**Fig. 7.** New and rare orchids in the flora of Cambodia and Laos. A – *Dendrobium senile* Rchb.f. (AL 158a). B, C – *D. trantuanii* Perner et X.N. Dang (LA-VN 1402). D, E – *D. williamsonii* Day et Rchb.f. (CPC 2429). F, G – *Epigeneium fuscescens* (Griff.) Summerh. (K-98). H, I – *Eria apertiflora* Summerh. (LA-VN 974 / TM 1247). Photos by L. Averyanov (A, D, E, H, I), K. S. Nguyen (B, C) and E. Konstantinov (F, G).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen and deciduous dry forests on any kind of soil, commonly along stream valleys and on mountain tops, 700–1450 m. Fl. March – May. One of the most frequent epiphytic orchids in Laos. Ornamental.

NE. India, Myanmar, S. China, Thailand, Vietnam. Laos: Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Phongsali, Vientiane, Xiangkhouang.

Almost all collections from Laos belong to small-flowered variety – *D. thyrsiflorum* var. *minutiflorum* Aver., 2012, *Taiwania* 57, 2: 131.

<sup>1</sup>*D. trantuanii* Perner et X. N. Dang, 2003, *Orchidee* (Hamburg) 54: 220.

= *D. tuanhii* Aver., 2004, *Orchids* (West Palm Beach) 73: 134.

**Fig. 7B, C.**

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1402 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone, 1000–1200 m. Fl. March – May. Very rare. Ornamental.

NW. Vietnam. Laos: Houaphan.

*D. trigonopus* Rchb. f.,

1887, *Gard. Chron.* 1887, 2: 682; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 265; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 288.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1095 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on rocky limestone, commonly on mountain tops, 1200–1800 m. Fl. March – May. Not common. Ornamental.

Myanmar, China, Thailand, Vietnam. Laos: Khammouan, Vientiane, Xiangkhouang.

<sup>1</sup>*D. williamsonii* Day et Rchb. f., 1869, *Gard. Chron.* 1869: 78.

= *D. cariniferum* auct. non Rchb. f.: Aver., 2013, *Turczaninowia* 16, 4: 34.

**Fig. 7D, E.**

Northern Laos, Phongsali province, Muong May district, 22 April 2011, *L. Averyanov, P.V. The, CPC 2429* (LE – photo). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11

April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1227, 1290a (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, commonly on mountain tops and along ridge edges, 1100–1400 m. Fl. March – May. Locally common. Ornamental.

NE. India, Myanmar, S. China, Vietnam. Laos: Phongsali, Houaphan.

<sup>1</sup>*Didymoplexis* Griff.

<sup>1</sup>*D. pallens* Griff.,

1844, *Calcutta Journal Nat. Hist.*, 4: 383; id., 1845, *ibid.*, 5, pl. 17.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 930 (HNL, FOF, LE).

Miniature terrestrial achlorophyllous mycotrophic herb. Primary and secondary broad-leaved evergreen dry forests on shale sandstone along ridge edges on rich soil, 1750–1850 m. Fl. May – June. Very rare.

Tropical and subtropical mainland Asia, Ryukyu Islands, Malay Archipelago to New Guinea. Laos: Xiangkhouang.

*Doritis* Lindl.

*D. pulcherrima* Lindl.,

1833, *Gen. Sp. Orch. Pl.*: 178; Aver., 2013, *Turczaninowia* 16, 4: 36.

≡ *Phalaenopsis pulcherrima* (Lindl.) J. J. Sm., 1933, *Repert. Spec. Nov. Regni Veg.* 32: 366; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 277; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 305.

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 159c* (LE – photo).

Lithophyte on exposed rocks commonly along streams, rarely terrestrial or epiphyte in dry open semideciduous and deciduous forests, 300–1300 m. Fl. June – September. Not rare. Ornamental.

NE. India, Myanmar, S. China, Thailand, Cambodia, Vietnam, Malacca Peninsula, Sumatra, Borneo. Laos: Bolikhamxai, Champasak, Khammouan, Savannakhet, Vientiane.

*Epigeneium* Gagnep.

*E. amplum* (Wall.) Summerh.,

1957, *Kew Bull.* 12: 260; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 289.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep,*

*L. Averyanov, N. S. Khang et al., LA-VN 986* (HNL, FOF, LE).

Creeping epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, preferably on rocky limestone, commonly on mountain tops, 1200–1450 m. Fl. October – December. Occasional.

NE. India, Nepal, Bhutan, Myanmar, China, Thailand, Vietnam. Laos: Louang Namtha, Xiangkhouang.

<sup>1</sup>*E. fuscescens* (Griff.) Summerh., 1957, Kew Bull. 12: 262.

**Fig.** 7F, G.

Central Laos, Vientiane province, Kasi district, Namken village, 24 March 2013, *L. Averyanov, N. S. Khang, S. Lorphengsy, LA-VN 798* (HNL, FOF, LE). Central Laos, Vientiane province, Kasi district, Thong Mout village, pass on new road to Louangphrabang, 21 October 2013, *E. Konstantinov et al., K-98* (LE).

Creeping epiphyte and occasionally lithophyte. Primary broad-leaved evergreen forests on rocky limestone, commonly on mountain tops, 1500–1800 m. Fl. September – November. Locally common.

NE. India, Bhutan, Nepal, S. China. Laos: Vientiane.

*Eria* Lindl.

*E. acervata* Lindl.,

1851, Journ. Hort. Soc. London 6: 57; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 267; Schuit. et al., 2008, Nord. Journ. Bot. 26: 289.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1307* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on mountain tops, 1050–1150 m. Fl. May – June. Not common.

NE. India, Nepal, Bhutan, Myanmar, China, Thailand, Cambodia, Vietnam. Laos: Champasak, Houaphan, Louangphrabang.

<sup>1</sup>*E. apertiflora* Summerh., 1929, Bull. Misc. Inform. Kew 1929: 9.

**Fig.** 7H, I.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1093a / TM 1262* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April

2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 974 / TM 1247* (HNL, FOF, LE).

Epiphyte on tall trees. Primary and secondary broad-leaved evergreen and semideciduous dry forests on rocky limestone, 1200–1450 m. Fl. August – October. Locally very common.

NE. India, Nepal, Myanmar, Thailand, Vietnam. Laos: Xiangkhouang.

<sup>1</sup>*E. bambusifolia* Lindl.,

1858, Journ. Proc. Linn. Soc., Bot. 3: 61.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1162* (HNL, FOF, LE).

Lithophyte and occasionally epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on shady mossy rocks on mountain tops, 600–700 m. Fl. September – November. Rare.

India, Bhutan, Myanmar, SW. China (Yunnan), Thailand, Vietnam. Laos: Houaphan.

*E. lasiopetala* (Willd.) Ormerod,

1995, Opera Bot. 124: 22; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 268; Schuit. et al., 2008, Nord. Journ. Bot. 26: 290; Aver., 2013, Turczaninowia 16, 4: 37.

= *E. albidotomentosa* (Blume) Lindl., 1830, Gen. Sp. Orch. Pl.: 66.

= *E. pubescens* (Hook.) Lindl., 1830, Hort. Brit.: 372.

**Fig.** 8A, B.

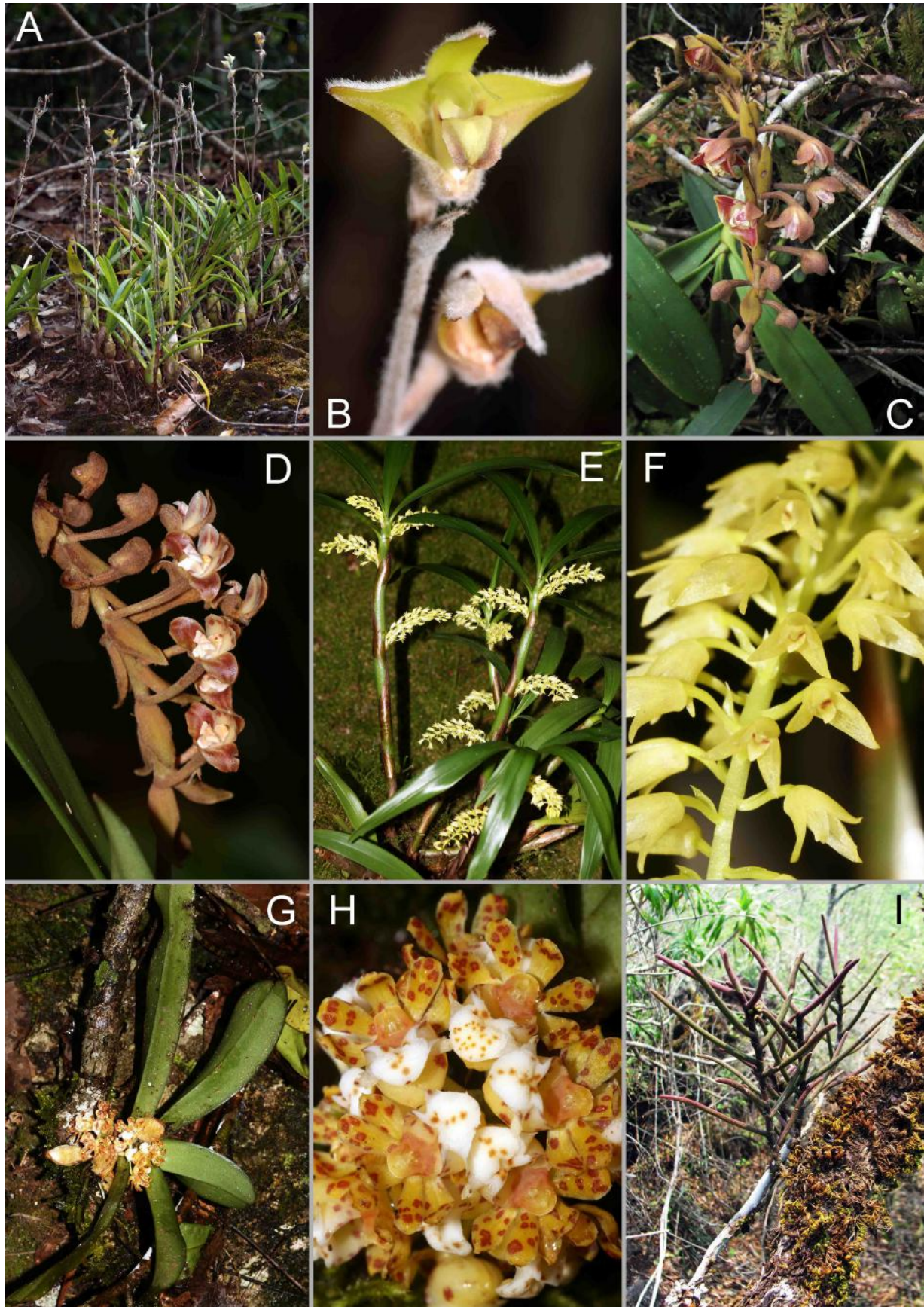
Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 159b* (LE – photo). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1461* (HNL, FOF, LE).

Creeping epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and deciduous open dry forests on any kind of soil, often on mountain tops, in gallery forests and on exposed mossy stream rocks, 300–1200 m. Fl. February – April, September – December. Not rare.

NE. India, Nepal, Bhutan, Myanmar, S. China, Thailand, Vietnam, Cambodia, Malacca Peninsula, Sumatra, Java. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Saravan, Vientiane.

*E. muscicola* (Lindl.) Lindl.,

1858, Journ. Proc. Linn. Soc., Bot. 3: 47; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR:



**Fig. 8.** New and rare orchids in the flora of Cambodia and Laos. A, B – *Eria lasiopetala* (Willd.) Ormerod (AL 159b). C, D – *E. pachyphylla* Aver. (LA-VN 1208). E, F – *E. tenuiflora* Ridl. (T. Maisak et al., 931). G, H – *Gastrochilus suavis* Seidenf. (LA-VN 1131). I – *Luisia ramosii* Ames (LA-VN 1098). Photos by L. Averyanov (A, B, D–H) and K. S. Nguyen (C, I).

268; Schuit. et al., 2008, Nord. Journ. Bot. 26: 291; Aver., 2013, Turczaninowia 16, 4: 37.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1268 (HNL, FOF, LE).

Epiphyte on tall trees. Primary and secondary broad-leaved evergreen forests on shaly limestone, 1100–1500 m. Fl. August. Rare.

India, Nepal, Bhutan, Myanmar, SW. China (Yunnan), Thailand, Cambodia, Vietnam. Laos: Houaphan, Vientiane.

<sup>L</sup>*E. pachyphylla* Aver.,

2002, Turczaninowia 5, 4: 77.

= *E. crassifolia* Z. H. Tsi et S. C. Chen, 1994, Acta Phytotax. Sin. 32: 561, not Ridley, 1915.

**Fig.** 8C, D.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1208 (HNL, FOF, LE).

Lithophyte and occasionally epiphyte. Primary and secondary broad-leaved evergreen dry open forests on rocky limestone, commonly on mossy hill and mountain tops, 600–700 m. Fl. March – May. Not common.

S. China, N. Vietnam. Laos: Houaphan.

*E. paniculata* Lindl.,

1830, Pl. Asiat. Rar. 1: 32; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 268; Schuit. et al., 2008, Nord. Journ. Bot. 26: 291; Aver., 2013, Turczaninowia 16, 4: 37.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 982 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1283 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, commonly on mountain tops, solid rocky highly eroded limestone, 1000–1750 m. Fl. March – June. Not rare.

NE. India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Cambodia, Vietnam. Laos: Attapu, Champasak, Houaphan, Saravan, Vientiane, Xiangkhouang.

*E. pannea* Lindl.,

1842, Bot. Reg. 28 Misc.: 64; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 268; Schuit. et

al., 2008, Nord. Journ. Bot. 26: 291; Aver., 2013, Turczaninowia 16, 4: 37.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1093 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 989 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1330 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1458 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1238 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved and coniferous evergreen and deciduous open forests and woodlands on any kind of soil, commonly on tall trees and on mountain tops, 150–1500 m. Fl. March – June (July). One of the commonest epiphytic orchid in Laos.

NE. India, Myanmar, S. China, Thailand, Cambodia, Vietnam, Malacca Peninsula, Sumatra, Borneo. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Phongsali, Saravan, Vientiane, Xiangkhouang.

<sup>C</sup>*E. tenuiflora* Ridl.,

1896, Journal. Linn. Soc., Bot. 32: 291.

**Fig.** 8E, F.

Southern Cambodia, Kampot province, Bokor National Park, Bokor mt., 24 November 2012, *T. Maisak, M. Telepova, L. Osinovetz, I. Kutuzova*, 931 (LE). Southern Cambodia, Kampot province, Bokor National park, 1 December 2014, *E. Konstantinov, K-364* (LE). Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Island in Siam Gulf, 28 November 2012, *T. Maisak, M. Telepova, L. Osinovetz, I. Kutuzova*, 1012 (LE).

Epiphyte. Primary and secondary evergreen broad-leaved dry lowland forest on low hills to humid cloud forests on mountain tops, 50–1050 m. Fl. November – January. Not common.

Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Kalimantan. Cambodia: Kampot, Sihanoukville.

*E. tomentosa* Hook. f.,

1890, Fl. Brit. India 5: 803; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 268; Schuit. et al.,

2008, Nord. Journ. Bot. 26: 292.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1234* (HNL, FOF, LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, 150–1200 m. Fl. May – June. Not common.

NE. India, Myanmar, Thailand, Vietnam. Laos: Champasak, Houaphan, Louangphrabang, Phongsali, Xaignabouri, Xiangkhouang.

***Flickingeria*** A. D. Hawkes

***F. angustifolia*** (Blume) A. D. Hawkes,

1965, Orquidea (Rio de Janeiro) 27: 301; Aver., 2013, Turczaninowia 16, 4: 37.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1133* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1187* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on any kind of soil, preferably on rocky limestone, 500–1350 m. Fl. June – September. Locally very common.

S. China, Thailand, Vietnam, Malacca Peninsula, Indonesia. Laos: Houaphan, Saravan, Vientiane.

<sup>1</sup>***F. fimbriata*** (Blume) A. D. Hawkes,

1965, Orquidea (Rio de Janeiro) 27: 303.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 997* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1297* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1326* (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on mossy mountain tops, 1000–1450 m. Fl. April – June. Locally common.

Nicobar and Andaman Islands, S. China, Thailand, Vietnam, Malacca Peninsula, Indonesia, Philippines. Laos: Houaphan, Xiangkhouang.

***Gastrochilus*** D. Don.

<sup>1</sup>***G. suavis*** Seidenf.,

1988, Opera Bot. 95: 298.

= *G. obliquus* (Lindl.) Kuntze var. *suavis* (Seidenf.) Z. H. Tsi, 1996, Guihaia 16: 141.

**Fig. 8G, H.**

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1301* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1131* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on shady humid places on hill and mountain tops, 800–1200 m. Fl. March – May. Not common. Ornamental.

Thailand, Vietnam. Laos: Houaphan.

This species regarded earlier as endemic of Thailand (Seidenfaden, 1988) was recently also found in northern Vietnam: Quang Binh province, Minh Hoa district, Thuong Hoa municipality, environs of Mo O O O village, *L. Averyanov et al., CPC 3661* (LE); Thanh Hoa province, Thuong Xuan district, Van Xuan Municipality, Xuan Lien Natural Reserve, *L. Averyanov et al., CPC 6932* (LE).

***Goodyera*** R. Br.

***G. procera*** Hook.,

1823, Exot. Fl. 1, t. 39; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 270; Schuit. et al., 2008, Nord. Journ. Bot. 26: 293.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1390* (HNL, FOF, LE).

Terrestrial and occasionally lithophytic herb in open wet mossy places on any kind of soil and in any plant communities, commonly along sandy banks of streams, wet rocks and rocky waterfalls, 400–900 m. Fl. March – May. Not rare.

Sri Lanka, India, Nepal, Bhutan, Myanmar, China, Taiwan, Japan, Thailand, Cambodia, Vietnam, Malacca Peninsula, Sumatra, Java, Borneo, Lesser Sunda Islands, Philippines. Laos: Attapu, Houaphan, Louangphrabang, Xiangkhouang.

***Hetaeria*** Blume

***H. affinis*** (Griff.) Seidenf. et Ormerod,

2001, Oasis Suppl. 2: 9; Aver., 2013, Turczaninowia 16, 4: 38.

= *Goodyera affinis* Griff., 1851, Not. Pl. Asiat. 3: 391.

= *Hetaeria rubens* (Lindl.) Hook. f., 1890, Fl. Brit. India 6: 115.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1170* (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, usually in shady humid depressions on rich soil, 300–700 m. Fl. March – May. Not common.

NE. India, Nepal, Bhutan, Myanmar, S. China, Thailand, Vietnam. Laos: Houaphan, Vientiane.

***Holcoglossum*** Schltr.

***H. kimballianum*** (Rchb. f.) Garay,

1972, Bot. Mus. Leaflet 23: 182; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 272; Schuit. et al., 2008, Nord. Journ. Bot. 26: 295.

= *H. saprophyticum* (Gagnep.) Christenson, 1987, Notes Roy. Bot. Gard. Edinburgh 44: 255.

Central Laos, Vientiane province, Kasi district, Thong Mout village, 20 March 2013, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 606a* (LE).

Epiphyte. Primary broad-leaved evergreen forests on rocky limestone, 1550–1650 m. Fl. September – October. Rare. Ornamental.

Myanmar, SW. China (Yunnan), Thailand, Vietnam. Laos: Vientiane, Xiangkhouang.

***H. subulifolium*** (Rchb. f.) Christenson,

1987, Notes Roy. Bot. Gard. Edinburgh 44: 255; Aver., 2013, Turczaninowia 16, 4: 38.

= *Vanda watsonii* Rolfe, 1905, Gard. Chron. 1: 82.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 983* (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on mountain tops, 1200–1450 m. Fl. March – April. Rare. Ornamental.

Myanmar, S. China, Thailand, Vietnam. Laos: Khammouan, Xiangkhouang.

***Hygrochilus*** Pfitzer

***H. parishii*** Pfitzer,

1897, Nat. Pflanzenfam. Nachtr. 1: 112; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 272; Schuit. et al., 2008, Nord. Journ. Bot. 26: 295.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 992* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April

2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1194* (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen dry open forests preferably on rocky limestone, commonly on mountain tops, 600–1450 m. Fl. April – June. Occasional. Ornamental.

NE. India, Myanmar, Thailand, Vietnam. Laos: Champasak, Houaphan, Phongsali, Xiangkhouang.

***Liparis*** Rich.

***L. bootanensis*** Griff.,

1851, Not. Pl. Asiat. 3: 278; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 272; Schuit. et al., 2008, Nord. Journ. Bot. 26: 295; Aver., 2013, Turczaninowia 16, 4: 38.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 921a / TM 1228, 1235* (LE).

Epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen dry forests on any kind of soil, commonly on mountain tops, 1200–1850 m. Fl. March – July, September – October. Occasional.

NE. India, Bhutan, S. China, Taiwan, Myanmar, Japan, Thailand, Vietnam, Malacca Peninsula, Java, Kalimantan, Lesser Sunda Islands, Philippines. Laos: Khammouan, Phongsali, Xiangkhouang.

***L. caespitosa*** (Lam.) Lindl.,

1825, Bot. Reg. 11, t. 882; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 272; Schuit. et al., 2008, Nord. Journ. Bot. 26: 295.

≡ *Epidendrum caespitosa* Lam., 1783, Encycl. 1: 187.

= *Malaxis caespitosa* Thouars, 1822, Hist. Orchid., t. 90.

Central Laos, Xiangkhouang province, Peak district, Oran village, 2 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 921 / TM 1213* (HNL, FOF, LE).

Miniature clustering epiphyte. Primary and secondary broad-leaved evergreen montane forests on any kind of soil, 800–1850 m. Fl. August – October. Not rare.

Tropical area of the Old World extending to islands of western Pacific. Laos: Bolikhamxai, Champasak, Phongsali, Vientiane, Xiangkhouang.

<sup>1</sup>***L. mannii*** Rchb. f.,

1872, Flora 55: 275.

Northeastern Laos, Houaphan province, Hem district, Khon Nguua village, 15 April 2015, *N. T.*



*Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1464* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1141* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1196* (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on hill and mountain tops, 600–950 m. Fl. October – April. Locally common.

NE. India, Bhutan, S. China, Vietnam. Laos: Houaphan.

***L. pumila*** Aver.,

2003, Updated Checklist Orchids Vietnam: 42, 85, fig. 7; Aver., 2013, Turczaninowia 16, 4: 38.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1050* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 976* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1318* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1396* (HNL, FOF, LE).

Miniature clustering epiphyte. Primary and secondary broad-leaved evergreen and semideciduous forests on rocky limestone, 500–1450 m. Fl. February – April. Not rare.

S. China, Vietnam. Laos: Bolikhamxai, Houaphan, Vientiane, Xiangkhouang.

<sup>1</sup>***L. sootenzanensis*** Fukuy.,

1933, Ann. Rep. Taihoku Bot. Gard. 3: 84.

Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1499* (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen forests, sometime secondary bamboo thickets on rocky limestone, commonly in shady depressions on rich soil, 700–950 m. Fl. April – May. Rare.

Taiwan, Vietnam. Laos: Houaphan.

***L. viridiflora*** Lindl.,

1830, Gen. Sp. Orch. Pl.: 31; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 273; Schuit. et al., 2008, Nord. Journ. Bot. 26: 296; Aver., 2013, Turczaninowia 16, 4: 38.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1065* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1492* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1442* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1151* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1181* (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary evergreen and semideciduous forests, secondary shrubs on any kind of rocks, but more common on rocky limestone, 500–1650 m. Fl. October – January (April). Very common.

Tropical Asia, tropical islands of western Pacific. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Saravan, Vientiane, Xiangkhouang.

***Luisia*** Gaudich.

<sup>1</sup>***L. ramosii*** Ames,

1911, Philipp. Journ. Sci., C 6: 55.

**Fig. 8I; 10A.**

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1036* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1098* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1496* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1437* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov,*

*N. S. Khang et al.*, LA-VN 1105 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1247 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and semideciduous dry forests on rocky limestone, commonly on hill and mountain tops, 700–1450 m. Fl. March – May. Locally common.

S. China, Vietnam, Philippines. Laos: Houaphan, Xiangkhouang.

***L. zollingeri*** Rchb. f.,

1863, Ann. Bot. Syst. 6: 622; Schuit. et al., 2008, Nord. Journ. Bot. 26: 297.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1154 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, preferably on rocky limestone, commonly on hill and mountain tops, 600–900 m. Fl. March – May. Not rare.

Andaman Islands, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Borneo. Laos: Houaphan, Louang Namtha.

***Malleola*** Schltr.

***M. dentifera*** J. J. Sm.,

1927, Bull. Jard. Bot. Buitenzorg 3, 9: 191; Schuit. et al., 2008, Nord. Journ. Bot. 26: 298.

Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1174a / TM 1275 (LE).

Miniature epiphyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on hill and mountain tops, 300–700 m. Fl. June – August.

Thailand, Vietnam, Malacca Peninsula, Sumatra, Borneo. Laos: Houaphan, Vientiane.

***Nervilia*** Gaudich.

***N. aragoana*** Gaudich.

1829, Voy. Uranie 422; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 374; Schuit. et al., 2008, Nord. Journ. Bot. 26: 299.

= *N. fordii* (Hance) Schltr., 1911, Bot. Jahrb. Syst. 45: 403.

= *N. mekongensis* S. W. Gale, Schuit. et Suddee, 2016, Phytotaxa 247, 4: 268.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*,

*L. Averyanov*, *N. S. Khang et al.*, LA-VN 998 (HNL, FOF, LE).

Terrestrial tuberiferous ephemeroïd herb. Open places in primary and secondary broad-leaved evergreen forests and woodlands, secondary scrub, pastures, secondary grasslands along agricultural fields and roads, preferably on lime soil, 170–1450 m. Fl. March – May. Not rare.

Tropical and subtropical Asia, tropical islands of western Pacific. Laos: Bolikhamxai, Champasak, Saravan, Vientiane, Xiangkhouang.

Widespread and extremely variable species expanding easy into various secondary anthropogenic habitats.

***Oberonia*** Lindl.

***O. cavaleriei*** Finet,

1908, Bull. Soc. Bot. France 55: 334, pl. 10, 11–20; Aver., 2013, Turczaninowia 16, 4: 40.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 964 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1308 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1130 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1159 (HNL, FOF, LE).

Lithophyte. Primary and secondary broad-leaved and mixed evergreen forests on rocky limestone, commonly on shady vertical cliffs near hill and mountain tops, 500–1450 m. Fl. January – May. Not common.

NE. India, Nepal, Myanmar, S. China, Thailand, Vietnam. Laos: Houaphan, Vientiane, Xiangkhouang.

***O. ensiformis*** Lindl.,

1859, Fol. Orch. Oberonia: 4; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 275; Schuit. et al., 2008, Nord. Journ. Bot. 26: 300.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 969 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1400 (HNL, FOF, LE). Northeastern Laos, Houaphan province,

Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1102 (HNL, FOF, LE).

Lithophyte and rarely epiphyte. Primary and secondary broad-leaved and mixed evergreen forests on rocky limestone, commonly on shady vertical cliffs near hill and mountain tops, 800–1450 m. Fl. September – April. Locally common.

India, Nepal, Bhutan, Myanmar, S. China, Thailand, Vietnam. Laos: Champasak, Houaphan, Vientiane, Xiangkhouang.

***O. gammiei*** King et Pantl.,

1897, Journ. As. Soc. Bengal 66, 2: 578; Schuit et al., 2008, Nord. Journ. Bot. 26: 300.

Central Laos, Vientiane province, Kasi town area, 25 November 2014, *E. Konstantinov, K-291* (LE). Central Laos, Vientiane province, Vang Vieng district, Nathong village, 14 March 2013, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 424 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1423 (HNL, FOF, LE).

Miniature epiphyte. Primary and secondary broad-leaved evergreen and deciduous forests on any kind of soil, preferably on rocky limestone, 300–1200 m. Fl. September – November. Not common.

NE. India, Myanmar, S. China, Hainan, Thailand, Vietnam. Laos: Houaphan, Khammouan, Louangphrabang, Vientiane.

<sup>L</sup>***O. kwangsiensis*** Seidenf.,

1968, Dansk Bot. Ark., 25, 3: 31, fig. 14.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 990 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1252a (LE).

Lithophyte and epiphyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly in shady mossy places near hill and mountain tops, 1200–1450 m. Fl. October – November. Rare.

S. China, Thailand, Vietnam. Laos: Houaphan, Xiangkhouang.

<sup>L</sup>***O. maxima*** Hook. f.,

1888, Fl. Brit. India 5: 677.

**Fig. 10B, C.**

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015,

*N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1246 / TM 1284, LA-VN 1274 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky shale and limestone, 1100–1200 m. Fl. August – October. Rare.

NE. India, Myanmar, N. Thailand. Laos: Houaphan.

***O. mucronata*** (D. Don) Ormerod et Seidenf.,

1997, Contrib. Orch. Fl. Thailand 13: 20; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 275; Schuit et al., 2008, Nord. Journ. Bot. 26: 300.

= *Oberonia iridifolia* Lindl., 1830, Gen. Sp. Orch. Pl.: 15.

Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1468 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen and deciduous open forests on any kind of soil, often on rocky limestone, 170–1050 m. Fl. September – October. Not common.

India, Nepal, Bhutan, Bangladesh, Myanmar, S. China, Thailand, Malacca Peninsula, Philippines, Indonesia, islands of western Pacific. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Phongsali, Vientiane.

***O. simplex*** Aver., **sp. nov.**

Described from southern Cambodia (“Kampot province, Phnom Bokor national park, 10°37.923N, 104°01.143E, epiphyte in cloud short forest along small stream at elevation about 1000 m a.s.l.”). **Type** (“16 December 2014, *E. Konstantinov K-369*) – LE (holotype).

**Fig. 9; 10D, E.**

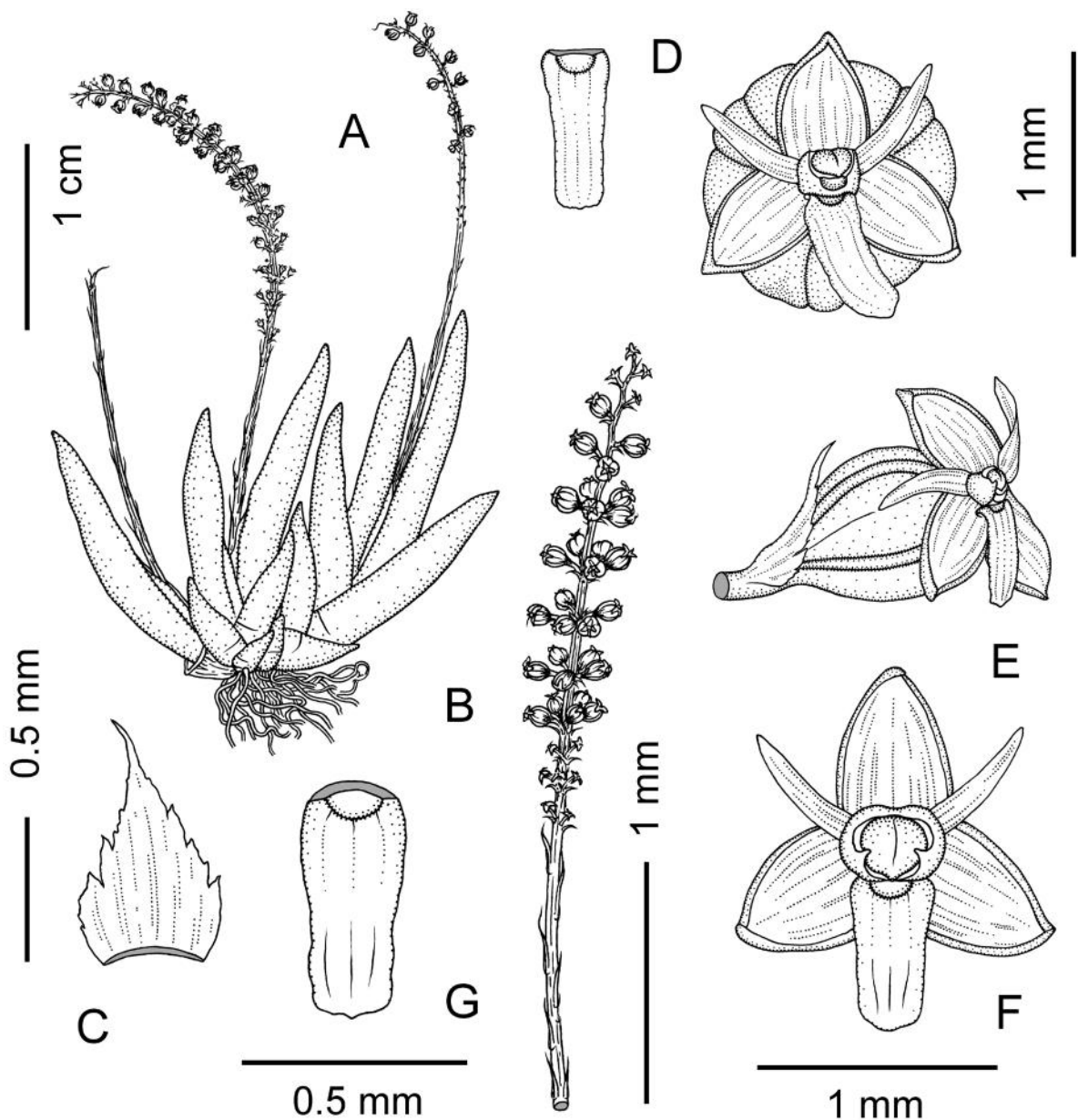
Species epithet refers simple, unlobed, rectangular-ligulate flower lip.

Perennial sympodial epiphytic miniature herb 1–2(2.5) cm tall. Stem abbreviate, very short, 1.5–2(3) mm long, completely covered by (3)4–6(7) imbricate leaves, with many thin, flexuose, dull yellowish gray roots at the base. Leaves distichous, fleshy, with more or less distinct articulation at the base, lanceolate, slightly oblique, triangular obtuse at apex, (0.6)1–1.8(2.2) cm long, (1.2)1.5–2.2(2.6) mm wide. Inflorescence subterminal, arching to almost straight raceme, (1.5)2–4(4.5) cm long, 2–3 mm in diam.; scape stout, erect, straight or slightly arching, (0.4)0.6–1.5(2) cm long, covered by many spirally arranged, overlapping, narrowly lanceolate to almost filiform aristate sterile bracts 1.5–2 mm long; rachis arching to almost straight, more or less

rigid, finely longitudinally ribbed, (0.8)1–2(2.5) cm long, 0.4–0.5 mm in diam. Floral bracts in basal part of raceme narrowly triangular, (0.8)1–1.2(1.4) mm, 0.2–0.3 mm wide, to the apex broadly ovate triangular, concave, (0.5)0.6–0.8(1) mm long by 0.5–0.7 mm, shortly acuminate, incise irregularly denticulate along the margin, during anthesis more or less recurved. Pedicel and ovary 0.4–0.5 mm long; pedicel shortly cylindrical 0.2–0.25 mm long, about 0.1 mm in diam.; ovary narrowly obovoid, 0.2–0.25 mm long, 0.2–0.3 mm broad; developing ovary and ripening fruit obovoid, (0.5)1–1.2 mm long, 0.6–0.8 mm in diam., longitudinally ribbed. Flowers (0.9)1–1.2(1.3) mm across, white to slightly yellowish.

Sepals broadly ovate, 0.6–0.7 mm long, 0.4–0.5 mm wide, concave, obtuse, slightly cucullate, with entire, often revolute margin. Petals narrowly lanceolate to almost linear, acute, straight and entire along the margin. Lip rather fleshy, simple, unlobed, oblong rectangular, slightly broadening to the base, truncate at apex, 0.6–0.7 mm long, 0.2–0.3 mm wide, straight along margin, at the base with shallow hemi orbicular fovea.

Miniature canopy and branch epiphyte. Submontane broad-leaved primary and old secondary humid cloud forest on granite, usually along small streams, 1000 m. Fl. February – December. Very rare.



**Fig. 9.** New and rare orchids in the flora of Cambodia and Laos. *Oberonia simplex* Aver. A – flowering and fruiting plant; B – inflorescence; C – floral bract; D – flower and lip at fruiting stage, half side and frontal view; E – flower at fruiting stage, side view; F – flower, frontal view; G – lip, frontal view. All drawn from the type specimen (*E. Konstantinov K-369*) by L. Averyanov and T. Maisak.

Cambodia: Kampot. Endemic.

Species differs from all its known congeners by ligulate unlobed lip, which represents unique character in the genus.

***Odontochilus* Blume**

***O. tortus* King et Pantl.,**

1896, Journ. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 125.

≡ *Anoetochilus tortus* (King et Pantl.) King et Pantl., 1898, Ann. Roy. Bot. Gard. (Calcutta) 8: 298; Schuit. et al., 2008, Nord. Journ. Bot. 26: 264.

= *Odontochilus repens* Downie, 1925, Bull. Misc. Inform. Kew 1925: 413.

≡ *Pristiglottis torta* (King et Pantl.) Aver., 1996, Bot. Journ. (Moscow & St. Petersburg) 81, 10: 78.

Central Laos, Vientiane province, Kasi town area, Nam Pong Noi River along new road to Louangphrabang town, 13 km from Kasi town, 1 December 2014, *E. Konstantinov, K-308* (LE).

Terrestrial creeping herb. Primary and secondary evergreen broad-leaved shady forests, commonly on humid river valley slopes, 800–1300. Fl. November–December. Rare.

N. India, Bhutan, S. China, Thailand, Vietnam. Laos: Champasak, Vientiane.

***Panisea* (Lindl.) Lindl.**

***P. tricallosa* Rolfe,**

1901, Bull. Misc. Inform. Kew 1901: 148; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 276; Schuit. et al., 2008, Nord. Journ. Bot. 26: 301.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 956* (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen forests, usually on rocky limestone, 1200–1500 m. Fl. March – May. Not common.

NE. India, Nepal, Thailand, S. China, Vietnam. Laos: Xaisomboun.

***P. uniflora* (Lindl.) Lindl.,**

1854, Fol. Orchid. 5: 2; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 276; Schuit. et al., 2008, Nord. Journ. Bot. 26: 301; Aver., 2013, Turczaninowia 16, 4: 40.

Laos, Khammouan province, Laksao town area, 31 November 2013, *E. Konstantinov, K-219* (LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and deciduous forests, usually in gallery forests and in forests on rocky

limestone, 400–1500 m. Fl. March – May, August, October. Not rare.

NE. India, Nepal, Bhutan, Myanmar, Thailand, Cambodia, Vietnam. Laos: Bolikhamxai, Bolikhamxai, Khammouan, Vientiane.

***Paphiopedilum* Pfitzer**

***P. concolor* (Bateman) Pfitzer,**

1888, Nat. Pflanzenfam. 2, 6: 84; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 276; Schuit. et al., 2008, Nord. Journ. Bot. 26: 302; Aver., 2013, Turczaninowia 16, 4: 41.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1048* (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 967* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1310* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1401* (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1277* (HNL, FOF, LE).

Lithophyte. Primary and secondary broad-leaved evergreen and semideciduous forests on rocky limestone, commonly near hill and mountain tops, (200)500–1450 m. Fl. March – May, occasionally flowers throughout the year. Locally common. Ornamental.

Myanmar, S. China, Thailand, Vietnam, Cambodia. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Vientiane, Xiangkhouang.

***P. dianthum* Tang et F. T. Wang,**

1940, Bull. Fan Mem. Inst. Biol. 10: 24; Schuit. et al., 2008, Nord. Journ. Bot. 26: 302; Aver., 2013, Turczaninowia 16, 4: 41.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1443* (HNL, FOF, LE).

Lithophyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly near hill and mountain tops, 1000–1750 m. Fl. September – November. Not common. Ornamental.

S. China, Vietnam. Laos: Bolikhamxai, Houaphan, Vientiane.

***Pelatantheria* Ridl.*****P. ctenoglossum* Ridl.,**

1896, Journ. Linn. Soc., Bot. 32: 372; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 277; Schuit. et al., 2008, Nord. Journ. Bot. 26: 303; Aver., 2013, Turczaninowia 16, 4: 41.

Central Laos, Khammouan province, Laksao town area, 31 October 2013, *E. Konstantinov*, K-221 (LE). Central Laos, Khammouan province, Thakhek town area, Pha In Cave, 3 November 2013, *E. Konstantinov*, K-235, K-240 (LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1472 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen open dry forests on rocky limestone, commonly on hill and mountain tops, 200–950 m. Fl. May – August. Not rare.

Thailand, Vietnam, Cambodia. Laos: Champasak, Houaphan, Khammouan, Phongsali, Savannakhet, Vientiane.

**<sup>l</sup>*P. insectifera* Ridl.,**

1896, Journ. Linn. Soc., Bot. 32: 373.

= *Sarcanthus rivesii* Guillaumin, 1930, Bull. Soc. Bot. France 77: 330.

= *S. tonkinensis* Guillaumin, 1930, Bull. Soc. Bot. France 77: 311 1930.

= *S. simondianus* Gagnep., 1951, Bull. Mus. Natl. Hist. Nat. 2, 22: 630.

= *Pelatantheria rivesii* (Guillaumin) Tang et F. T. Wang, 1951, Acta Phytotax. Sin. 1: 101; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 277; Schuit. et al., 2008, Nord. Journ. Bot. 26: 303.

**Fig. 10, F.**

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1142 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Xieng Luong village, 8 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1165 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen and semideciduous dry open forests on rocky limestone, commonly on hill and mountain tops, often on mossy exposed rocks, 600–1100 m. Fl. October – November. Locally abundant.

NE. India, Bangladesh, Andaman Islands, Myanmar, Thailand, S. China, Vietnam. Laos: Champasak, Houaphan, Louang Namtha, Phongsali.

The differences between *P. insectifera* and *P. rivesii* remains very unclear. It is obvious that last

one hardly desires species status and may be recognized only as an “eastern” variety of even form of widespread and variable *P. insectifera*.

***Phaius* Lour.*****P. flavus* Lindl.,**

1831, Gen. Sp. Orch. Pl.: 128; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 277; Schuit. et al., 2008, Nord. Journ. Bot. 26: 304; Aver., 2013, Turczaninowia 16, 4: 41.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1350 (HNL, FOF, LE).

Terrestrial and occasionally lithophytic herb. Primary and secondary broad-leaved evergreen forests on any kind of soil, preferably on rocky limestone, usually in shady humid depressions on rich soil, 600–1200 m. Fl. March – June. Not common.

Tropical Asia and tropical islands of western Pacific. Laos: Houaphan, Louangphrabang, Vientiane.

***Phalaenopsis* Blume**

**<sup>l</sup>*P. braceana* (Hook. f.) Christenson,**  
1986, Selbyana 9: 169 1986.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1054 (HNL, FOF, LE).

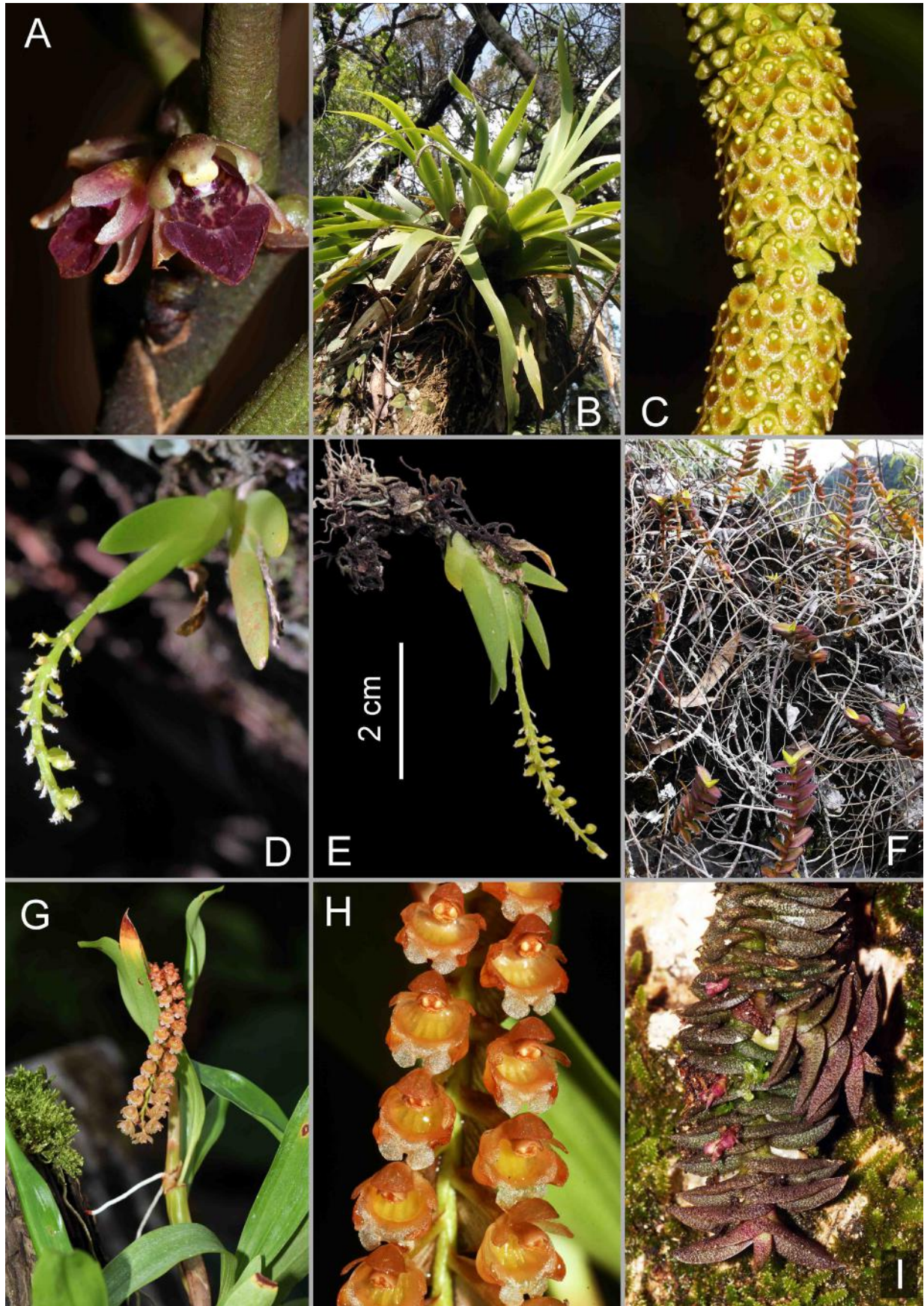
Epiphyte. Primary and secondary broad-leaved evergreen open forests on rocky limestone, commonly on hill and mountain tops, 1200–1400 m. Fl. April – June. Rare. Ornamental.

Bhutan, SW. China (Yunnan), N. Vietnam. Laos: Xiangkhouang.

***Pholidota* Lindl.*****P. articulata* Lindl.,**

1830, Gen. Sp. Orch. Pl.: 38; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 277; Schuit. et al., 2008, Nord. Journ. Bot. 26: 305; Aver., 2013, Turczaninowia 16, 4: 41.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 984 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1298 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1434 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai



**Fig. 10.** New and rare orchids in the flora of Cambodia and Laos. A – *Luisia ramosii* Ames (LA-VN 1098). B, C – *Oberonia maxima* Hook. f. (LA-VN 1246 / TM 1284). F – *Pelatantheria insectifera* Ridl. (LA-VN 1142). G, H – *P. recurva* Lindl. (T. Maisak et al., 907). I – *Schoenorchis scolopendria* Aver. (LA-VN 1174). Photos by L. Averyanov (A, C, F–I), T. Maisak (B) and E. Konstantinov (D, E).

village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1143 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1248 (HNL, FOF, LE).

Creeping epiphyte and occasionally lithophyte. Primary and secondary broad-leaved, mixed and coniferous evergreen and deciduous forests and woodlands on any kind of soil, preferably on rocky limestone, mostly on hill and mountain tops, (450) 500–1750 m. Fl. June – August. Not rare.

India, Nepal, Bhutan, Myanmar, SW. China (Yunnan), Thailand, Vietnam, Cambodia, Malacca Peninsula, Sumatra, Java, Kalimantan, Sulawesi, Philippines. Laos: Attapu, Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Phongsali, Saravan, Vientiane, Xiangkhouang.

***P. imbricata*** Lindl.,

1825, Exot. Fl. 2, t. 138; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 278; Schuit. et al., 2008, Nord. Journ. Bot. 26: 306; Aver., 2013, Turczaninowia 16, 4: 41.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1302 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1394 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1136 (HNL, FOF, LE). Northwestern Laos, Xiangkhouang province, Ban Thathom town area, 26 October 2013, *E. Konstantinov, K-169* (LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved, mixed and coniferous evergreen and deciduous forests and woodlands on any kind of soil, preferably on rocky limestone, mostly on hill and mountain tops, 200–1200 m. Fl. June – August. Not rare.

Tropical Asia, Australia, tropical Pacific islands. Laos: Attapu, Bolikhamxai, Champasak, Houaphan, Houaphan, Khammouan, Louang Namtha, Phongsali, Vientiane, Xaisomboun, Xiangkhouang.

***P. pallida*** Lindl.,

1835, Bot. Reg. 21, t. 1777; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 278; Schuit. et al., 2008, Nord. Journ. Bot. 26: 306; Aver., 2013, Turczaninowia 16, 4: 41.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1066 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 959 (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved and mixed evergreen and semideciduous forests on rocky limestone, mostly on hill and mountain tops, 1200–1750 m. Fl. June – August. Rare.

India, Nepal, Bhutan, Myanmar, SW. China (Yunnan), Thailand, Vietnam. Laos: Xiangkhouang, Vientiane.

***P. recurva*** Lindl.,

1830, Gen. Sp. Orch. Pl.: 37.

**Fig. 10G, H.**

Southern Cambodia, about 16 kilometers to the N of Sihanoukville town, Khan Prey Nup district, Kbal Chhay Waterfall, 5 December 2012, *T. Maisak, L. Osinovetz, M. Telepova, 907* (LE).

Creeping epiphyte. Primary and secondary evergreen, broad-leaved dry lowland forests on low hills. Fl. March – April. Not common.

NE. India, Nepal, Bhutan, Myanmar, Thailand, Vietnam, Laos. Cambodia: Sihanoukville.

***P. yunnanensis*** Rolfe,

1903, Journ. Linn. Soc., Bot. 36: 24.

Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1140 (HNL, FOF, LE).

Creeping lithophyte and epiphyte. Primary and secondary broad-leaved evergreen open forests on rocky limestone, commonly on hill and mountain tops, 800–950 m. Fl. September – October. Not common.

S. China, N Vietnam. Laos: Houaphan.

***Podochilus*** Blume

***P. oxystophylloides*** Ormerod,

2003, Taiwania 48: 143; Aver., 2013, Turczaninowia 16, 4: 42.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 963 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1397 (HNL, FOF, LE).



Lithophyte. Primary and secondary broad-leaved and mixed evergreen forests on rocky limestone, commonly on shady vertical cliffs near hill and mountain tops, 1200–1750 m. Fl. August – September. Rare.

S. China, Vietnam. Laos: Houaphan, Vientiane, Xiangkhouang.

***Polystachya* Hook.**

***P. concreta*** (Jacq.) Garay et H. R. Sweet,

1974, *Orquideologia* 9: 206; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 278; Schuit. et al., 2008, Nord. Journ. Bot. 26: 306.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1071 (HNL, FOF, LE). Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 999 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1284 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and coniferous evergreen and deciduous forests, woodlands and thickets, on any kind of soil, preferably on rocky limestone, 400–1450 m. Fl. June – September. Occasional.

Tropical areas all over the World. Laos: Champasak, Houaphan, Khammouan, Louang Namtha, Louangphrabang, Vientiane, Xiangkhouang.

***Pomatocalpa* Breda**

***P. spicatum*** Breda,

1829, *Gen. Sp. Orch. Asclep.* 3, t. 15; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 279; Schuit. et al., 2008, Nord. Journ. Bot. 26: 307.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 965 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1292 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen forests on any kind of soil, often along streams and on rocky limestone, 200–1450 m. Fl. February – April. Occasional.

Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Borneo, Lesser Sunda Islands, Philippines. Laos: Champasak, Houaphan, Houaphan, Louangphrabang, Phongsali, Vientiane, Xaisomboun, Xiangkhouang.

***Porpax* Lindl.**

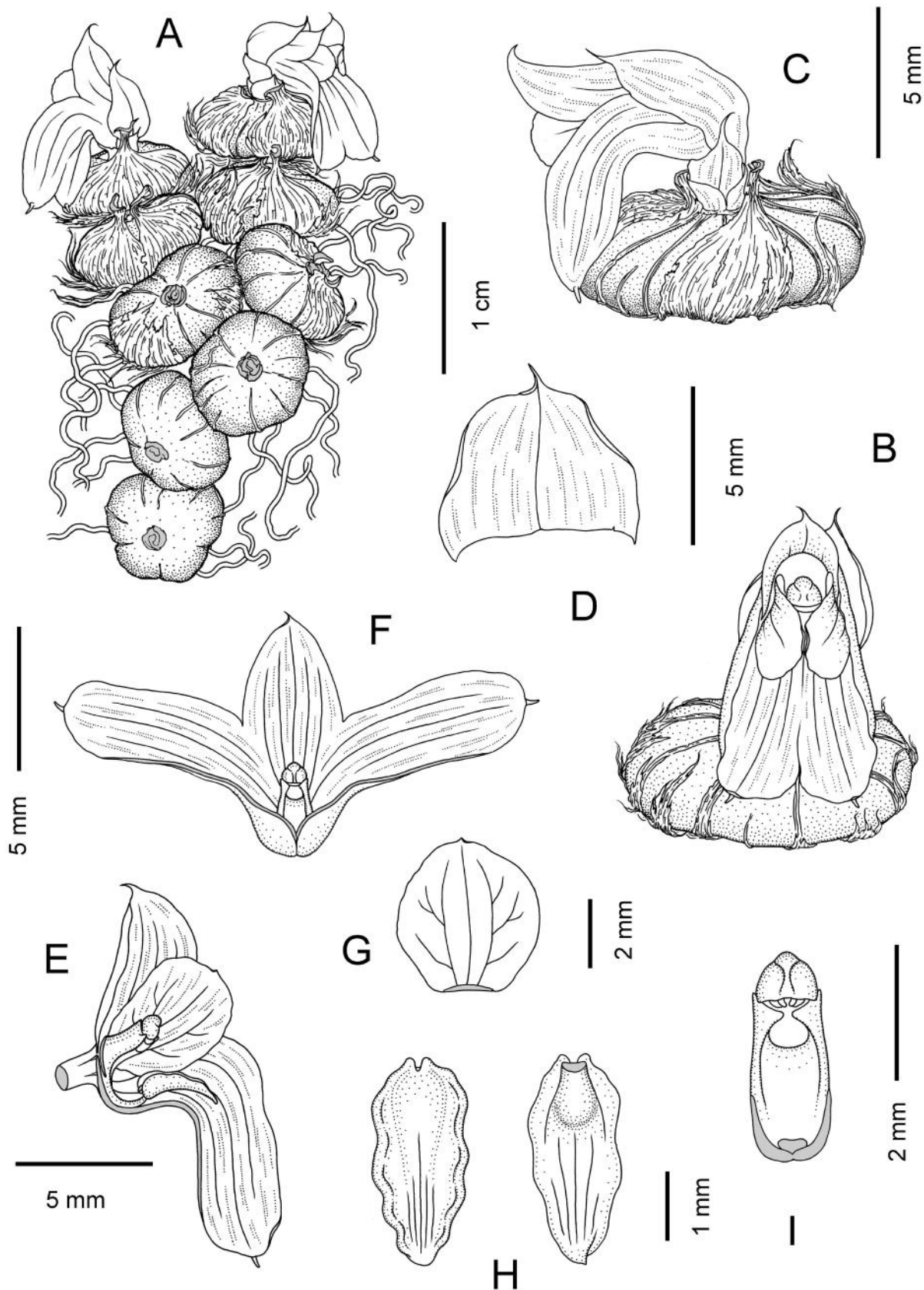
***P. capuccinorum*** Aver., **sp. nov.**

Described from southwestern Laos (“Khammouan prov., Thakhek district, Thakhek town area, near Pha Cave, branch epiphyte in canopy of lone tree 8–10 m tall, remnants of lowland broad-leaved woodlands at elev. about 156 m a.s.l. around point 17°29.540N, 105°09.917E”). **Type** (“3 November 2013, *E. Konstantinov K-239.*”) – LE (holotype). **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA 0248/K 239.

**Fig. 11; 12** (d-EXSICCATES OF VIETNAMESE FLORA 0248/K 239).

Species epithet refers resemblance of the flowers with traditional capuchin monk wear.

Perennial short creeping or clustering sympodial miniature epiphytic herb. Rhizome short, tiny, negligible. Stems pseudobulbous, densely touching each other, 2-leaved; young stems, grassy-green, enveloped by whitish or greenish, scarious, hyaline leaf sheaths; mature pseudobulbs fleshy, dull olive-green, flattened, oblate to discoid-lenticular, (5)7–1(1.2) cm across, (2)2.5–3(3.5) mm tall, early deciduous, covered by light brownish scarious sheath in form of membrane with prominent nerves disintegrating later into persistent fibrous remnants. Leaves 2, appearing in individual stem before flowering, sessile, sheathed; sheath tubular, later much broadening, enveloping pseudobulb; leaf blade conduplicate, with distinct median vein, horizontally recurved, bright green, rather thin, herbaceous, narrowly obovate, (1)1.5–2(2.2) cm long, (4.5)5–7(7.5) mm wide, obtuse, narrowing into short petiole-like base 1.5–2 mm long. Inflorescence one per stem, hysteroanthous, arising from the apex of mature leafless pseudobulb, 1-flowered; scape, pedicel and ovary, light dull green, (3.5)4–5(5.5) mm long, 0.8–1(1.2) mm in diam., bent at apex; peduncle with 3–4 sterile and 1 floral bracts. Scape and floral bracts, large, scarious, hyaline, light brownish or yellowish, broadly triangular, tubular at the base, shortly acuminate at apex, (2)3–5(5.5) mm long, being flattened (2)2.5–6(6.5) mm wide. Pedicel and ovary shortly cylindrical, (0.8)1–1.2(1.4) mm long. Flowers horizontally spreading, not widely opening, entirely bright red to red-brown, glabrous, (4)5–7(8) mm across. Sepals forward directed; median sepal narrowly ovate to ovate, (5)5.5–6(6.5) mm long, (2.8)3–3.2(3.5) mm wide, apically recurved, shortly attenuate, joined in lower half with lateral sepals; lateral sepals oblique falcate, strongly bent down, concave, (7)7.5–8(8.5) mm long, (2.4)2.6–2.8(3) mm wide, round and apiculate at apex, joined each



**Fig. 11.** New and rare orchids in the flora of Cambodia and Laos. *Porpax capuccinorum* Aver. A – Flowering plant. B – Flower and flowering pseudobulb, frontal view. C – Flower and flowering pseudobulb, side view. D – Floral bract. E – Flower with lateral sepal and petal removed, side view. F – Flattened sepals and column, frontal view. G – Flattened petal. H – Flattened lip, view from above and from below. I – Column, frontal view. All drawn from the type – K-239 by L. Averyanov and T. Maisak.



Fig. 12. New and rare orchids in the flora of Cambodia and Laos. *Porpax capuccinorum* Aver. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0248/K 248. Photos of E. Konstantinov and L. Averyanov, design and image correction by L. Averyanov.

other almost along all their length, forming at the base short, broad mentum (1.8)2–2.2(2.4) mm long and broad. Petals free, broadly obovate to almost round, finely irregularly crenulate along the margin, (3.8)4–4.2(4.4) mm across, somewhat incurved closing entrance to the flower. Lip simple, somewhat movable, entire, narrowly ovate, (2.8)3–3.2(3.4) mm long, (1.3)1.5–1.6(1.7) mm wide, glabrous, slightly recurved, narrowing to blunt apex, with no ornamentation, straight or slightly undulate along the margin, at the base with flat fleshy callus notched adaxially. Column red to orange-red, broad, erect, stout, shortly cylindrical, (2.6)2.8–3(3.2) mm tall, (1.4)1.6–1.8(2) mm wide, on sides with small, insignificant, erect, acute stelia; stigma concave; rostellum in form of small, thin, truncate plate; column foot short, thick, concave, 1 mm long, as wide as column base, slightly forward curved forming at apex short narrow stalk joined with lip base. Anther cap bright red, hemispheric, smooth, 0.8–1 mm tall and wide, truncate at front. Pollinia 8, yellow, in two groups, clavate, 0.2–0.3 mm long.

Miniature branch and trunk epiphyte. Primary and secondary dry semideciduous broad-leaved lowland forests on alluvial soils derived from limestone, 150–200 m. Fl. August – September. Rare.

Laos: Khammouan. Endemic.

Newly discovered plant belongs to group of species with hysteranthous inflorescence appearing from the apex of mature pseudobulb. From all representatives of this group new species strikingly differs in disproportionally long and broad lateral sepals (twice longer than median sepal) strongly bent down, almost round petals connivent with their apices at front of column and simple lip slightly undulate along the margin and notched at the base. Small population of this curious plant was found in canopy of lone remnant expiring tree remaining in almost completely deforested area, hence species should be regarded as critically endangered.

*P. elwesii* (Rchb. f.) Rolfe,

1908, *Orchid Rev.* 16: 8; Newman et al., 2007, *Checklist Vasc. Pl. Lao PDR*: 279; Schuit. et al., 2008, *Nord. Journ. Bot.* 26: 307; Aver., 2013, *Turczaninowia* 16, 4: 42.

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, *L. Averyanov, T. Maisak, AL 153* (LE).

Miniature lithophyte and occasionally epiphyte. Primary and secondary evergreen broad-leaved forests along rocky streams and rivers, commonly in

shady places on mossy boulders, 350–1500 m. Fl. October – December. Locally common.

India, Nepal, Bhutan, Vietnam, Malacca Peninsula. Laos: Bolikhamxai, Champasak, Khammouan, Vientiane.

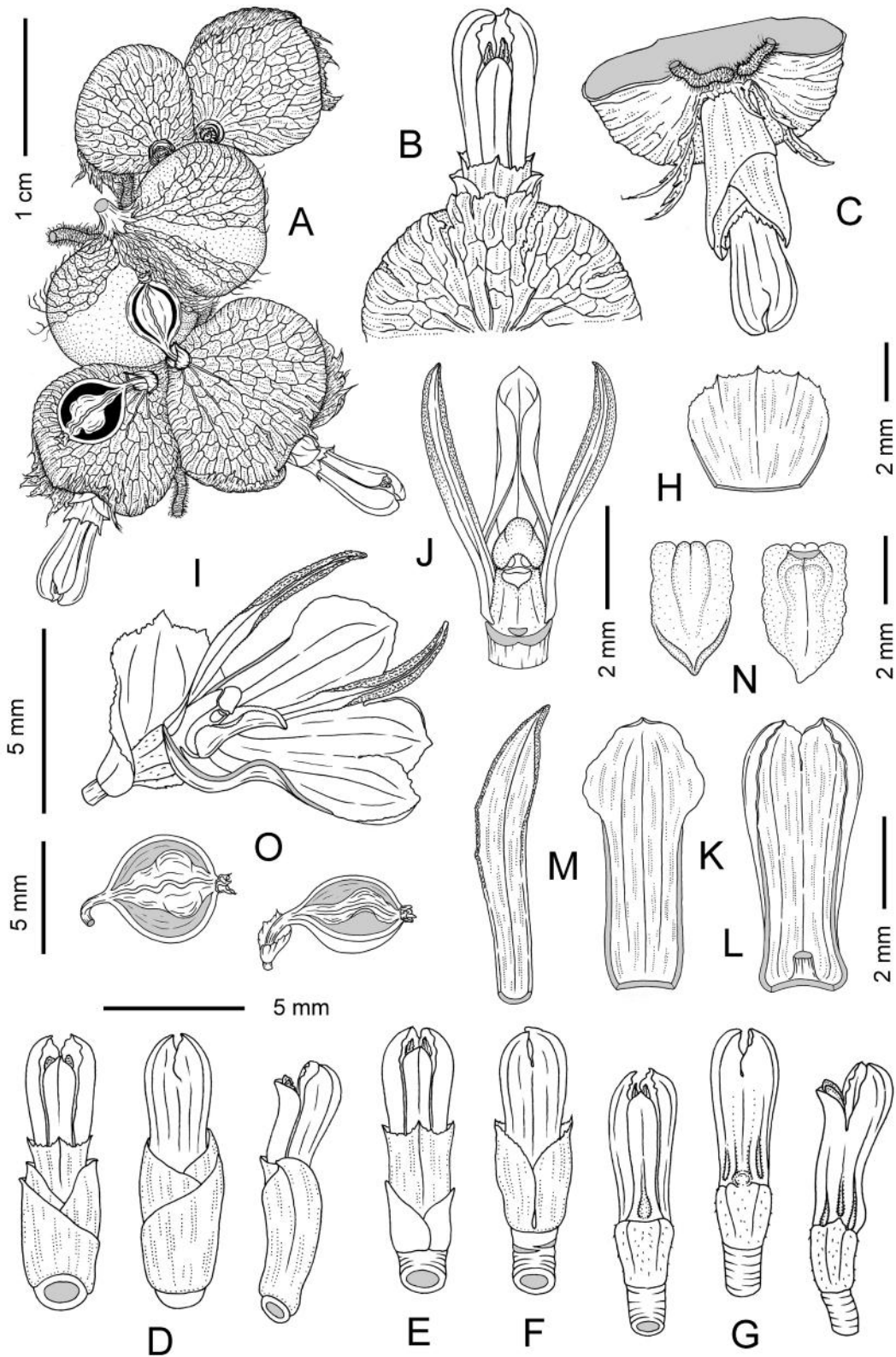
*P. laosensis* Aver., **sp. nov.**

Described from central Laos (“Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, dry evergreen primary and secondary forest along rocky stream on sandstone at elevation about 350 m a.s.l. ...”). **Type** (“9 December 2015, *L. Averyanov, T. Maisak, AL 159*”) – LE (holotype). **Epitype** – d-EXSICCATES OF VIETNAMESE FLORA 0247/AL 159.

**Fig.** 13, 14 (d-EXSICCATES OF VIETNAMESE FLORA 0247/AL 159).

Species epithet refers country of its origin.

Perennial short creeping or clustering sympodial miniature epiphytic or lithophytic herb. Rhizome short, tiny, negligible. Stems pseudobulbous, densely touching each other, 2-leaved; young shoot, arising from the base of mature pseudobulb, during anthesis grassy-green, (2)2.5–3(3.5) mm long, 1.5–2 mm in diam., enveloped by 3–4 white, scarious, hyaline, triangular-tubular bracts (3)3.5–5(5.5) mm long and wide (being flattened), bearing 2 juvenile sessile, cordate leaves (1.5)1.8–2.2(2.4) mm long and wide, and apical inflorescence; mature pseudobulbs fleshy, dull green, flattened, oblate to discoid-lenticular, broadly obovate of flabelliform in outline, (0.7)9–1.4(1.6) cm across, (2.2)2.5–3.5(4) mm thick, early deciduous, covered by brownish scarious sheath in form of reticulate, cage-like membrane with prominent nerves disintegrating later into reticular fibrous remnants, oldest pseudobulbs almost naked. Leaves 2, sessile, developing in individual shoot after flowering, caducous to the end of pseudobulb formation. Inflorescence proteranthous, one per stem, arising from the apex of young shoot, 1-flowered; scape, pedicel and ovary, white to greenish, (2)2.5–3(3.5) mm long, 0.8–1 mm in diam., straight or slightly ascending. Floral bract, large, scarious, hyaline, white, broadly obovate to almost subquadrate, (3.6)3.8–4.2(4.4) mm long, (4)4.2–4.5(4.7) mm wide, tubular, finely incise or denticulate along truncated apex, with more or less prominent central acute dent. Pedicel and ovary shortly cylindrical, (1.4)1.6–1.8(2) mm long, 1.2–1.5 mm in diam., glabrous or with few scarce scurfy hairs. Flowers horizontally spreading, entirely red-brown, glabrous, not widely opening, tubular, (1.8)2–2.2(2.4) mm across, (5)5.5–7(7.5) mm long. Sepals (5)5.5–6(6.5) long, forward directed,



**Fig. 13.** New and rare orchids in the flora of Cambodia and Laos. *Porpax laosensis* Aver. A – Flowering and fruiting plant. B – Flower, view from above. C – Flower, view from below. D – Peduncle and flower with intact scape and floral bracts, views from below, from above and side view. E – Peduncle and flower with intact juvenile leaves and floral bract (scape bracts removed), view from below. F – Peduncle and flower with intact floral bract (scape bracts and juvenile leaves removed). G – Peduncle, pedicel, ovary and flower (scape bracts, juvenile leaves and floral bract removed), views from above, from below and side view. H – Flattened floral bract. I – Flattened flower, side view with section between median and lateral sepals. J – Flattened flower, with lateral sepals and lip removed, frontal view. K – Flattened median sepal. L – Lateral sepals. M – Flattened petal. N – Flattened lip, views from above and from below. O – Fruit, view from above and half side view. All drawn from the type – *AL 159* by L. Averyanov and T. Maisak.



Fig. 14. New and rare orchids in the flora of Cambodia and Laos. *Porpax laosensis* Aver. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0247/AL 159. Photos, design and image correction by L. Averyanov.

concave, united, forming tube; median sepal joined with lateral sepals on 2/3 from the base, free part broadening, broadly ovate, (2)2.2–2.8(3) mm long and wide, obtuse, straight or finely undulate along the margin; lateral sepals cymbiform, straight, joined each other almost along all their length, with free lobes (0.8)1–1.5(1.6) mm long, (1.4)1.6–1.8(2) mm wide, finely undulate and cucullate at apex. Petals free, broadly lanceolate, oblique falcate, as long as sepals or little longer, 0.8–1.2 mm wide, acute, in apical half finely papillose and involute along the margin. Lip simple, somewhat movable, entire, rectangular with fleshy triangular apex, (3.2)2.5–3(3.2) mm long, (1.3)1.4–1.5(1.6) mm wide, glabrous, slightly recurved, at the base with flat insufficient callus obscurely notched adaxially, entire or finely crenulate along the margin, placed on short, narrow claw 0.5–0.6 mm long. Column red-brown, broad, erect, stout, shortly cylindrical, (1.4)1.6–1.8(2) mm tall, (0.7)0.8–1(1.2) mm wide; at the apex from both sides with small triangular stielidia; stigma concave; rostellum in form of small, thin, truncate plate; column foot insufficient, in form of forward curved stalk joined to the lip base. Anther cap red-brown, broadly conoid, globular at the apex, smooth, 0.5–0.6 mm tall and wide, at front broadly truncate. Pollinia 8, yellowish, in two groups, oblate, about 0.25 mm across. Fruit dark dirty brown to almost black, oblique, half-globular capsule (4.5)5–5.5(6) mm long and wide, ribbed on sides, opening by two splits on ventral flattened surface, placed on bent pedicel 1.5–2.5 mm long enveloped by scarious remnant of floral bract.

Miniature trunk epiphyte and lithophyte. Primary and secondary dry evergreen broad-leaved lowland forests on sandstone, commonly along streams and small rivers, 350–400 m. Fl. March – April. Locally common.

Laos: Vientiane. Endemic.

New plant belongs to group of species with proteranthous inflorescence appearing from the base of mature pseudobulb. From all species of this group new plant well differs in glabrous narrow flowers, free narrowly lanceolate finely papillulate petals involute along the margin and in short simple rectangular lip with acute-triangular apex. New species in its *locus classicus* was observed as common plant with large visually stable population.

***Robiquetia*** Gaudich.

***R. spathulata*** (Blume) J.J. Sm.,

1912, Natuurw. Tijdschr. Ned.–Indie 72: 114; Seidenf., 1992, Opera Bot.: 422.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Samloem Khong Island in Siam Gulf, 21 November 2011, *T. Maisak, L. Osinovetz, M. Telepova*, 721 (LE).

Epiphyte. Primary and secondary evergreen broad-leaved lowland forests on low hills, commonly in humid shady places along streams. Fl. January – February, May – June. Not common.

NE. India, Burma, S. China, Thailand, Vietnam, Laos, Malacca Peninsula, Sumatra, Java, Borneo, Moluccas, Philippines. Cambodia: Kampong Speu, Sihanoukville.

***Schoenorchis*** Blume

***S. scolopendria*** Aver.,

2012, Taiwaniana 57, 2: 134.

**Fig. 10I.**

Northeastern Laos, Houaphan province, Viengkay district, Xieng Luong village, 8 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1174 (HNL, FOF, LE).

Creeping miniature epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on shady cliffs near hill and mountain tops, 600–700 m. Fl. May – June. Very rare. Ornamental.

NW. Vietnam. Laos: Houaphan.

***S. tixieri*** (Guillaumin) Seidenf.,

1975, Contrib. Revis. Orchid Fl. Cambodia. Laos Vietnam 102.

**Fig. 16A, B.**

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 993/TM 1249 (HNL, FOF, LE).

Miniature epiphyte. Primary and secondary broad-leaved evergreen dry forests on rocky limestone, commonly on shady cliffs near hill and mountain tops, 1200–1450 m. Fl. May – June. Very rare. Ornamental.

SW. China (Yunnan), NW. Vietnam. Laos: Xiangkhouang.

***Smitinandia*** Holttum

***S. micrantha*** (Lindl.) Holttum,

1969, Gard. Bull. Singapore 25: 106; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 280; Schuit. et al., 2008, Nord. Journ. Bot. 26: 309; Aver., 2013, Turczaninowia 16, 4: 42.

Central Laos, Xiangkhouang province, Ban Thathom town area, 26 October 2013, *E. Konstantinov, K-175* (LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on hill and mountain tops, 200–600 m. Fl. January – June, October. Occasional.

India, Bangladesh, Nepal, Thailand, Cambodia, Vietnam, Malacca Peninsula, Kalimantan. Laos: Bolikhamxai, Champasak, Khammouan, Louangphrabang, Vientiane, Xiangkhouang.

***Spathoglottis* Blume**

***S. affinis* de Vriese,**

1855, Ill. Orchid. Ind. Orient. 3, t. 15; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 281; Schuit. et al., 2008, Nord. Journ. Bot. 26: 309; Aver., 2013, Turczaninowia 16, 4: 42.

**Fig. 16C, D.**

Central Laos, Vientiane province, Phou Khao Khouay National Protected Area to about 40 km NE of Vientiane, 9 December 2015, L. Averyanov, T. Maisak, AL 154b (LE – photo).

Terrestrial and lithophytic tuberiferous ephemeroïd herb. Open grassy places in any kind of habitat, particularly along streams and rivers, coniferous woodlands, open secondary scrub along agricultural fields, pastures and roadsides, 100–1000 m. Fl. August – December. Common. Ornamental.

Myanmar, Thailand, Vietnam, Cambodia, Malacca Peninsula, Java. Laos: Bolikhamxai, Champasak, Vientiane.

***Sunipia* Lindl.**

***S. scariosa* Lindl.,**

1833, Gen. Sp. Orch. Pl.: 179; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 281; Schuit. et al., 2008, Nord. Journ. Bot. 26: 310; Aver., 2013, Turczaninowia 16, 4: 42.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1232 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on hill and mountain tops, 1100–1750 m. Fl. April – May. Occasional.

NE. India, Bhutan, Myanmar, S. China (Yunnan), Thailand, Vietnam. Laos: Houaphan, Louangphrabang, Vientiane, Xiangkhouang.

***Taeniophyllum* Blume**

***T. filiferum* Aver., sp. nov.**

Described from NE. Laos (“Houaphan province, Viengxay district, Xieng Luong village, around point 20°22′06.1″N 104°17′18.6″E, 600–700 m

a.s.l.”). **Type** (“viscidium narrowly ovate, twice shorter.

Miniature canopy and branch epiphyte. Primary and old secondary lowland broad-leaved evergreen dry forests on rocky limestone, usually on old mossy trees in shady, humid places near mountain tops, 600–700 m. Fl. August – September. Rare.

Laos: Houaphan. Endemic.

Species may be close to *T. gracillimum* Schltr. distributed in Thailand, Kalimantan and Malacca Peninsula and *T. intermedium* described from Malacca Peninsula, but distinctly differs in numerous fasciculate, rather leathery roots, numerous persistent scapes, few-flowered racemes with only 1–3(4) white flowers and very large apical appendage of the lip apex. New species in its habit and appearance somewhat resembles also *T. fasciculatum* Aver., known from southern Vietnam, but differs in fleshy roots and lip forming prominent apical seta.

***Tainia* Blume**

**<sup>L</sup>*T. cordifolia* Hook.f.,**

1889, Icon. Pl. 19, t. 1861.

≡ *Mischobulbum cordifolium* (Hook. f.) Schltr., 1911, Repert. Spec. Nov. Regni Veg. Beih. 1: 98.

**Fig. 16G–I.**

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1377 (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen forest, sometime bamboo thickets on rocky limestone, usually in shady depressions, 700–900 m. Fl. April – May. Rare. Ornamental.

SE. China, Hong Kong, Taiwan, Thailand, Vietnam, Malacca Peninsula, Kalimantan. Laos: Houaphan.

***Thelasis* Blume**

**<sup>C</sup>*T. pygmaea* (Griff.) Lindl.,**

1858, Journ. Proc. Linn. Soc., Bot. 3: 63; Schuit. et al., 2008, Nord. Journ. Bot. 26: 311; Aver., 2013, Turczaninowia 16, 4: 43.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Island in Siam Gulf, 19 November 2011, T. Maisak, M. Telepova, L. Osinovetz, 912 (LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1444 (HNL, FOF, LE).

Miniature epiphyte and occasionally lithophyte. Primary and secondary broad-leaved evergreen forests on any kind of soil, often on rocky limestone



near mountain tops, 50–1200 m. Fl. April – August. Not rare.

India, Nepal, Myanmar, S. China, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java, Kalimantan, Sulawesi, Lesser Sunda Islands, Philippines, New Guinea, tropical Pacific islands. Laos: Bolikhamxai, Houaphan, Khammouan, Vientiane. Cambodia: Sihanoukville.

*Thrixspermum* Lour.

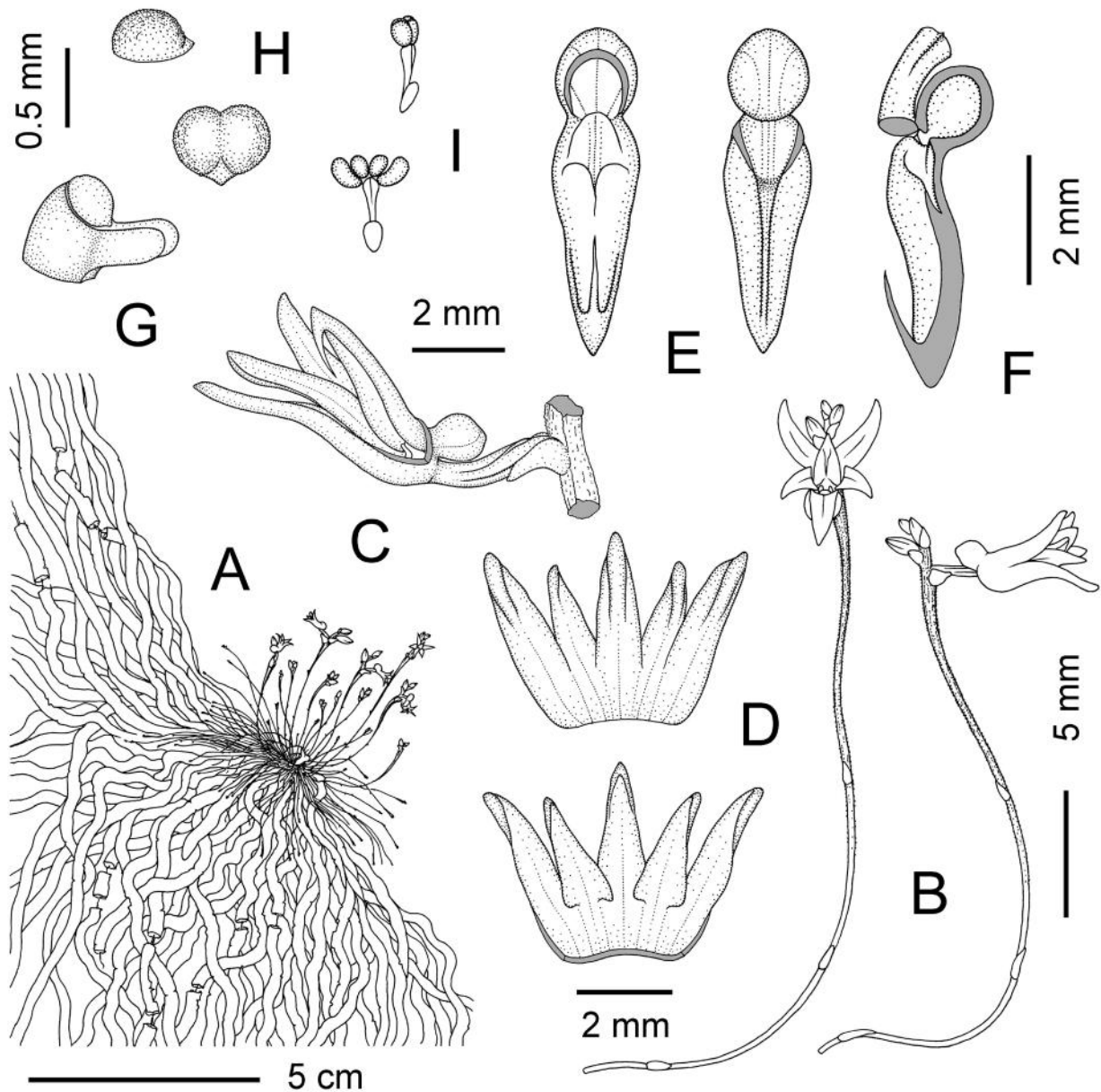
<sup>1</sup>*T. calceolum* (Lindl.) Rehb. f.,

1868, Xenia Orchid. 2: 122.

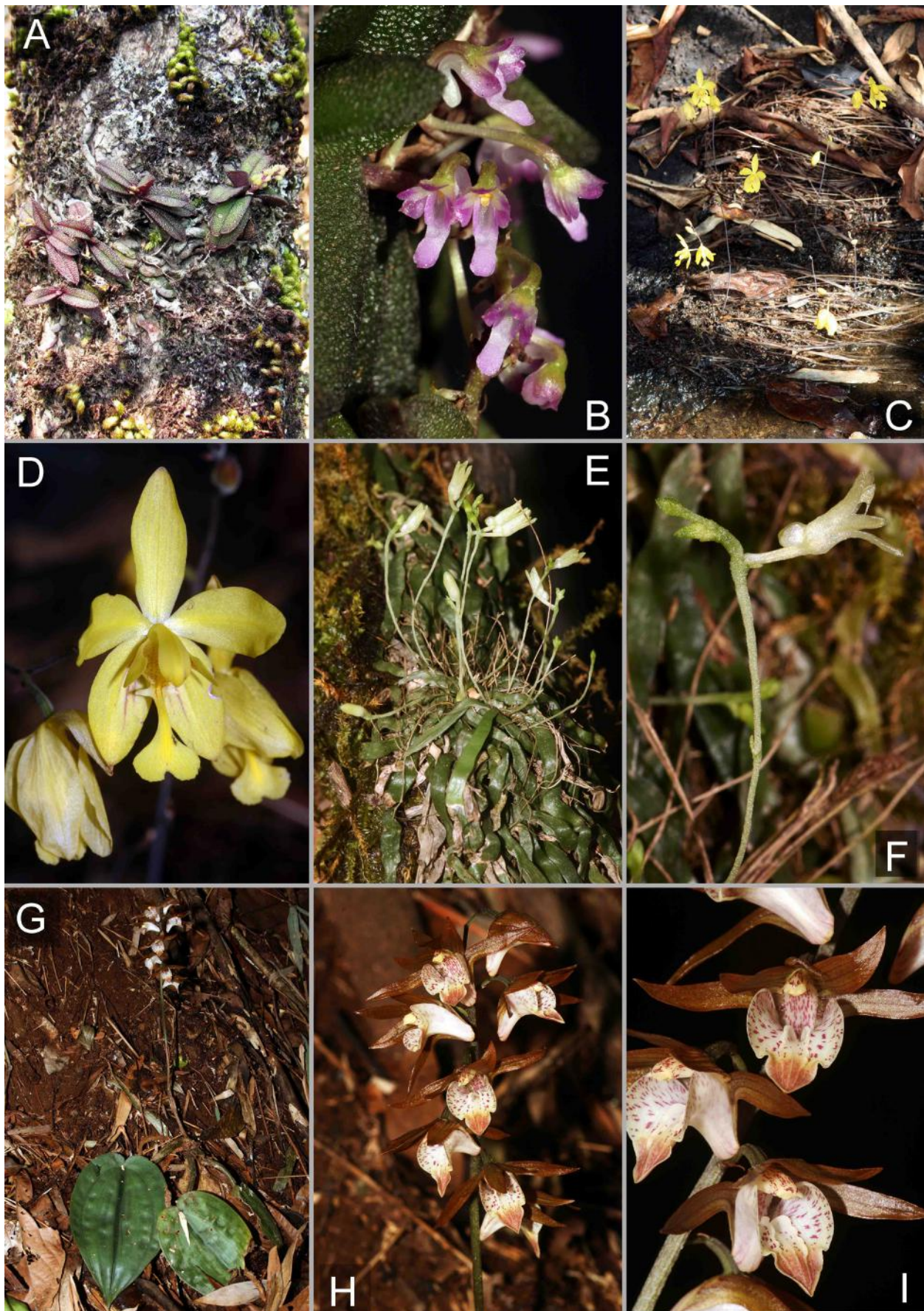
Northeastern Laos, Houaphan province, Viengxay district, Vieng Xai village, 7 April 2015, N. T. Hiep, L. Averyanov, N. S. Khang et al., LA-VN 1148a (HNL, FOF, LE).

Epiphyte and lithophyte. Primary and secondary broad-leaved evergreen open forests on rocky limestone, commonly on hill and mountain tops, 800–950 m. Fl. April – July. Rare.

Thailand, Vietnam, Malacca Peninsula, Sumatra, Borneo. Laos: Houaphan.



**Fig. 15.** New and rare orchids in the flora of Cambodia and Laos. *Taeniophyllum filiferum* Aver. A – Flowering plant. B – Inflorescences; C – Flower with lateral sepal and petal removed, side view. D – Flattened sepals and petals, abaxial and adaxial surface. E – Lip, view from above and from below. F – Lip, sagittal section. G – Column, side view. H – Operculum. I – Pollinarium, frontal and side views. All drawn from the type specimen – LA-VN 1174b / TM 1273 by L. Averyanov.



**Fig. 16.** New and rare orchids in the flora of Cambodia and Laos. A, B – *Schoenorchis tixieri* (Guillaumin) Seidenf. (LA-VN 993 / TM 1249). C, D – *Spathoglottis affinis* de Vriese (AL 154b). E, F – *Taeniophyllum filiferum* Aver. (LA-VN 1174b / TM 1273). G–I – *Tainia cordifolia* Hook.f. (LA-VN 1377). Photos by K. S. Nguyen (A) and L. Averyanov (B–I).

***T. centipeda*** Lour.,

1790, Fl. Cochinch. 520; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 282; Schuit. et al., 2008, Nord. Journ. Bot. 26: 311; Aver., 2013, Turczaninowia 16, 4: 43.

= *T. arachnites* (Blume) Rehb. f., 1868, Xenia Orchid. 2: 121.

Central Laos, Vientiane province, Kasi town area, 25 October 2014, *E. Konstantinov*, K-292 (LE). Northeastern Laos, Houaphan province, Hem district, Khon Ngua village, 15 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1501 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1267 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen and semideciduous forests on any kind of soil, preferably on rocky limestone, particularly along streams and on hill and mountain tops, 400–1200 m. Fl. May – June, September – December. Not rare.

NE. India, Myanmar, S. China, Thailand, Vietnam, Cambodia, Malacca Peninsula, Sumatra, Java, Kalimantan, Philippines. Laos: Bolikhamxai, Champasak, Houaphan, Khammouan, Louang Namtha, Savannakhet, Vientiane.

***Trias*** Lindl.***T. disciflora*** (Rolfe) Rolfe,

1896, Hand-List Orch. Cult. Roy. Gard. Kew: 35; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 282; Schuit. et al., 2008, Nord. Journ. Bot. 26: 312.

Laos, Champasak province, Bolaven Plateau, Tad Gneuung Waterfall, 9 December 2014, *E. Konstantinov*, K-358 (LE).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen and semideciduous forests, coniferous woodlands on any kind of soil, 500–1200 m. Fl. July – December. Not common.

NE. India, Thailand, Vietnam. Laos: Champasak, Khammouan, Vientiane.

***Trichoglottis*** Blume***T. lorata*** (Downie) Schuit.,

2007, Orchideen Journ. 14: 62; Schuit. et al., 2008, Nord. Journ. Bot. 26: 312.

≡ *Staurochilus loratus* (Rolfe ex Downie) Seidenf., 1988, Opera Bot. 95: 95; Aver., 2015, Wulfenia 22: 182.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L.*

*Averyanov, N. S. Khang et al.*, LA-VN 1410 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests preferably on rocky limestone, 700–1250 m. Fl. April – June. Rare.

Thailand, Vietnam. Laos: Houaphan, Louang Namtha.

***T. orchidea*** (J. Koenig) Garay,

1972, Bot. Mus. Leaflet. 23: 209; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 282; Schuit. et al., 2008, Nord. Journ. Bot. 26: 313; Aver., 2013, Turczaninowia 16, 4: 43.

≡ *Epidendrum orchideum* J. Koenig, 1791, Observ. Bot. 6: 48.

= *Trichoglottis cirrhifera* Teijsm. et Binn., 1853, Natuurk. Tijdschr. Ned.-Indië 5: 493.

Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1375 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1409 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen forests preferably on rocky limestone, 200–1200 m. Fl. January – May. Occasional.

Thailand, Nicobar Islands, Malacca Peninsula, Java. Laos: Bolikhamxai, Champasak, Houaphan, Louangphrabang, Vientiane.

***Trichotosia*** Blume***T. dasyphylla*** (Par. et Rehb.f.) Kraenzl.,

1911, Pflanzenr. IV, 50, 50: 138; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 282; Schuit. et al., 2008, Nord. Journ. Bot. 26: 313; Aver., 2013, Turczaninowia 16, 4: 43.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1236 (HNL, FOF, LE).

Creeping epiphyte. Primary and secondary broad-leaved and coniferous evergreen forests on any kind of soil, preferably on rocky limestone, 800–1350 m. Fl. April – July. Not rare.

NE. India, Nepal, Myanmar, Thailand, SW. China (Yunnan), Vietnam. Laos: Bolikhamxai, Houaphan, Khammouan, Louang Namtha, Saravan, Vientiane, Xaignabouri, Xiangkhouang.

***T. pulvinata*** (Lindl.) Kraenzl.,

1911, Pflanzenr. IV, 50, 50: 138; Seidenf., 1992, Opera Bot. 114: 164.

Southern Cambodia, to the N of Sihanoukville town, Kaoh Rong Samloem Khong Island in Siam Gulf, 21 November 2011, *T. Maisak*, *L. Osinovetz*, *M. Telepova s.n.* (LE).

Epiphyte. Primary and secondary evergreen broad-leaved lowland forests on low hills, commonly in shady humid places along streams. Fl. August – September. Occasional.

NE. India, Myanmar, S. China, Thailand, Laos, Vietnam. Cambodia: Kampong Speu, Sihanoukville, “*Kuang Krepeuh*”.

***Tropidia*** Lindl.

***T. angulosa*** Blume,

1859, Coll. Orchid.: 122; Schuit. et al., 2008, Nord. Journ. Bot. 26: 313; Aver., 2013, Turczaninowia 16, 4: 43.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1078 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Khon Nguav village, 15 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1469 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1411 (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on shady slopes and in humid depressions, 200–1400 m. Fl. April – July. Not rare.

India, Bangladesh, Bhutan, Myanmar, S. China, Taiwan, Thailand, Vietnam, Malacca Peninsula, Sumatra, Java. Laos: Houaphan, Khammouan, Louang Namtha, Vientiane, Xiangkhouang.

***T. curculigoides*** Lindl.,

1840, Gen. Sp. Orch. Pl.: 497; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 282; Schuit. et al., 2008, Nord. Journ. Bot. 26: 313; Aver., 2013, Turczaninowia 16, 4: 45.

Central Laos, Xiangkhouang province, Kham district, Huad village, 4 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1070 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1276 (HNL, FOF, LE).

Terrestrial herb. Primary and secondary broad-leaved evergreen forests on rocky limestone, commonly on shady slopes and in humid depressions, 900–1400 m. Fl. April – July. Not rare.

India, Myanmar, China, Taiwan, Thailand, Vietnam, Cambodia, Malacca Peninsula, Java, Borneo, Lesser Sunda Islands, Australia, New Guinea. Laos: Bolikhamxai, Houaphan, Khammouan, Louangphrabang, Xaignabouri, Xiangkhouang.

***Vanda*** R. Br.

***V. brunnea*** Rchb. f.,

1868, Xenia Orchid. 2: 138; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 283; Schuit. et al., 2008, Nord. Journ. Bot. 26: 313; Aver., 2012, Taiwania 57, 2: 137; id., 2013, Turczaninowia 16, 4: 45.

Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1270 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and coniferous evergreen forests on any kind of soil preferably on rocky limestone, 1100–1400 m. Fl. March – May. Occasional. Ornamental.

Myanmar, Thailand, NW. Vietnam. Laos: Houaphan, Oudomxai, Phongsali.

***V. denisoniana*** Benson et Rchb. f.,

1869, Gard. Chron. 1869: 528; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 283; Schuit. et al., 2008, Nord. Journ. Bot. 26: 314.

Northeastern Laos, Houaphan province, Hem district, Na Puok village, 11 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 1325 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved evergreen dry forests on any kind of soil, preferably on rocky limestone, (600)1000–1200 m. Fl. December – February. Not common. Ornamental.

Myanmar, S. China, Thailand, Vietnam. Laos: Champasak, Houaphan, Louangphrabang, Xiangkhouang.

***V. flavobrunnea*** Rchb. f.,

1886, Flora 69: 552; Schuit. et al., 2008, Nord. Journ. Bot. 26: 314.

= *V. pumila* Hook.f., 1890, Fl. Brit. India 6: 53; Newman et al., 2007, Checklist Vasc. Pl. Lao PDR: 283.

Central Laos, Xiangkhouang province, Peak district, Khoang village, 3 April 2015, *N. T. Hiep*, *L. Averyanov*, *N. S. Khang et al.*, LA-VN 971 (HNL, FOF, LE). Northeastern Laos, Houaphan province,

Hem district, Na Puok village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1303 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Hem district, Nacoc village, 12 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1454 (HNL, FOF, LE). Northeastern Laos, Houaphan province, Xon district, Nong Hua Pa Noi village, 11 April 2015, *N. T. Hiep, L. Averyanov, N. S. Khang et al.*, LA-VN 1273 (HNL, FOF, LE).

Epiphyte. Primary and secondary broad-leaved and mixed evergreen forests on any kind of soil, preferably on rocky limestone, commonly on hill and mountain tops, 700–1450 m. Fl. March – May. Not common. Ornamental.

India, Nepal, Myanmar, SW. China (Yunnan), Thailand, Vietnam. Laos: Houaphan, Louang Namtha, Phongsali, Xiangkhouang.

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