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RARE SPECIES OF ORCHIDS (ORCHIDACEAE) IN THE FLORA OF VIETNAM

РЕДКИЕ ВИДЫ ОРХИДНЫХ (ORCHIDACEAE) ВО ФЛОРЕ ВЬЕТНАМА

New localities of 283 orchid species (Orchidaceae), which belong to 87 genera, are reported in the paper. All discoveries are based on herbarium materials collected on the territory of Vietnam during field works of 1999–2002 years as well as on herbarium and living samples that were found in Herbaria and private collections in Vietnam. Among reported orchids 3 genera (*Didymoplexiella*, *Plocoglottis*, *Tuberolabium*) and 32 species (*Anoectochilus repens*, *Bulbophyllum clipeibulbum*, *B. funingense*, *B. penicillium*, *B. smitinandii*, *Coelogyne ecarinata*, *C. huettneriana*, *Cyrtosia integra*, *Dendrobium brymerianum*, *D. chittimae*, *D. cruentum*, *D. hancockii*, *Didymoplexiella siamensis*, *Eria bilobulata*, *E. spicata*, *Habenaria amplexicaule*, *Hetaeria biloba*, *Kingidium minus*, *Liparis aurita*, *Luisia thailandica*, *Malaxis calophylla*, *Nervilia macroglossa*, *Oberonia pumilio*, *Phalaenopsis braceana*, *Ph. honghensis*, *Ph. sumatrana*, *Ph. wilsonii*, *Plocoglottis bokorensis*, *P. javanica*, *Porpax reticulata*, *Schoenorchis seidenfadenii*, *Tuberolabium rhopalorrhachis*) were found in Vietnam at first and represent new additions to the orchid flora of the country. Valid names are accepted for 5 species, one of them proposed as a new for science (*Eria pachyphylla* Tsi et S.C. Chen ex Aver., nom. nov.). They are *Bulbophyllum longibrachiatum* (= *B. purpureifolium*.), *Cephalantheropsis obcordata* (= *C. gracilis*), *Cheirostylis takeoi* (= *Ch. eglandulosa*), *Eria lasiopetala* (= *E. albidotomentosa*, *E. pubescens*), *Eria pachyphylla* (*E. crassifolia*).

The paper continues our publications of new localities of rare orchid species collected by the author and his colleagues in remote unstudied mountain areas of Vietnam (Averyanov, 1988a,б, 1989, 1998, 1999, 2000a,б; Averyanov, Averyanova, 2000; Averyanov, Vu Ngok Long, 1989; Averyanov, Duong Duc Huyen, 1989, 1990, 1993). Field exploration works, results of which are presented in this publication, were supported in different parts from investigation programs of **American Orchid Society** (grants «*Exploration of endangered calcium dependent orchid flora in inaccessible rocky limestone areas of the North Vietnam*» and «*Population studies of endemic Paphiopedilum species in northern Viet Nam*»), **U.S.A. National Geographic Society** (grants # 5094-93, 5803-96, 6383-98 «*Flora of Highlands of South Vietnam*», # 6300-98 «*Limestone flora of Cao Bang province of North Viet Nam*» and # 6733-00, «*Botanical inventory of unexplored areas in Viet Nam: the north*»), **U.S.A. National Science Foundation** (# DEB-9870231 «*Collaborative Research: A Multi-Taxa Inventory of Threatened Conservation areas in Viet Nam*»), **Basic Research program in Biology of Viet Nam** (# 611001 «*Threatened conifers and cycads of Vietnam*»), **Fauna & Flora International** (FFI, Vietnam Program «*Community-based Conservation of the Hoang Lien Mountain Ecosystem, Vietnam*») and **International Cooperative Biodiversity Groups** (# 1-UO1-TW01015-01, the *National Institutes*

of Health, National Science Foundation, and the Foreign Agriculture Research Service of the United States Department of Agriculture, U.S.A.)

Field studies of the flora and vegetation according to mentioned investigation programs were connected with extensive collection of herbarium materials, which represent voucher materials for all published reports of species localities. Collected herbarium samples in a number of duplicate sets are housed mainly at Herbaria of the Institute of Ecology and Biological Resources of the National Center for Natural Sciences and Technology of Vietnam (HN), Cuc Phuong National Park, Komarov Botanical Institute of the Russian Academy of Science (LE) and Missouri Botanical Garden (MO).

The orchid names in the list are arranged in alphabetic order. Abbreviated and unified text of the herbarium labels are reported for each collecting numbers. In the text are used next abbreviations: Prov. (Province), Distr. (District), Mun. (Municipality), vic. (vicinity, vicinities), elev. (elevation, elevations), mt. (mountain, mountains). The names of orchid species and genera reported for Vietnam at first are marked with asterisk (*). Prefixes at the collecting numbers represent next abbreviations:

CB, CBL – Caobang Limestone (collections on program of U.S.A. National Geographic Society «Limestone flora of Cao Bang province of North Viet Nam», Principal Investigator Dr. Nguyen Tien Hiep),

CP – collections in Cuc Phuong National Park (commonly without indication of collectors),

DKH – Dr. D. Harder (collections according to expeditions with this person as Principal Investigator),

HAL – Dr. Nguyen Tien Hiep, Prof. L. Averyanov, Prof. Phan Ke Loc (collections in collaborative explorations of these persons),

LX-VN – collections of Soviet-Vietnamese Expedition (without exact indication of collectors),

NMC – collections of staff member of Cuc Phuong National Park – Mr. N.M. Cuong on the territory of the national park.

NTH – Dr. Nguyen Tien Hiep (collections in expeditions with this person as Principal Investigator),

P – Prof. Phan Ke Loc (collections in expeditions with this person as Principal Investigator),

TD – Tam Dao (collections in exploration trip of Dr. Nguyen Tien Hiep, Prof. L. Averyanov and Prof. Phan Ke Loc in Tam Dao ridge, Vinh Phuc Province),

VH – Vietnamese Highlands (collections on program of U.S.A. National Geographic Society “Flora of Highlands of South Vietnam”, Principal Investigator Prof. L. Averyanov).

In the paper were also included some other occasional herbarium collections of different collectors housed in Herbaria of the Institute of Ecology and Biological Resources (HN) and Cuc Phuong National Park.

New data for distribution of rare orchid species in Vietnam

1. *Acampe* Lindley

1.1. *A. rigida* (Buch.-Ham. ex J.E. Smith) P.F. Hunt – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr. at Sin Suoi Ho village and river, 23°06'57"N 105°01'48"E, 514–900 m. Ridge top of exposed limestone under light canopy on north and east facing slopes. Shrublet to 1 m. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4835**.

2. *Acanthephippium* Blume

2.2. *A. striatum* Lindley – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved and mixed (with *Dacrydium* and *Dacrycarpus*) evergreen dry mt. forest on sandstone. Terrestrial herb in shady steep slope. Rare. 21 IV 2000, *L. Averyanov et al.*, **VH 5532**.

3. *Acriopsis* Reinw. ex Blume

3.3. *A. indica* Wight – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8615**.

4. *Aerides* Lour.

4.4. *A. odorata* Lour. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8029, P-8216**.

4.5. *A. rosea* Lodd. ex Lindley et Paxt. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N 105°01'48"E, 514–900 m. Ridge top of exposed limestone under light canopy on north and east facing slopes. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, DKH 4836*; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N 105°01'48"E, 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophytic shrublet to 1 m. Locally frequent. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, DKH 4918*.

5. *Agrostophyllum* Blume

5.6. *A. brevipes* King et Pantl. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8456a**.

5.7. *A. callosum* Rchb. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte at the base of old mossy trees. Not common. 12 X 1999, *N.T. Hiep*,

L. Averyanov, *P. Cribb*, **NTH 3595**. **N.Vietnam**, **Lao Cai** Prov., **Than Uyen** Distr., Ho Mit Mun., 22°06'N, 103°52'E, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge), 1400–1500 m. Primary wet evergreen broad-leaved forest on very steep rocky slope. Epiphyte on mossy trees. Common. 21–22 V 1999, *N.T. Hiep*, *L. Averyanov et al.*, **NTH 2799**.

6. *Amitostigma* Schltr.

6.8. *A. bidupense* Aver. – **S.Vietnam**, **Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2000–2200 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Lithophyte on vertical mossy cliffs. Flowers pink-purple. Very common. 9 V 2000, *L. Averyanov*, *N.T. Hiep et al.*, **VH 6159**.

7. *Anoectochilus* Blume

7.9. *A. lylei* Rolfe – **S.Vietnam**, **Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 5 I 2000, *P.K. Loc et al.*, **P-7906a**.

7.10. *A. repens* (Downie) Seidenf. et Smitin.* – **N.Vietnam**, **Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, about 0.5 km W from Bong locality, 20°21'01"N, 105°35'38"E, 400–450 m. Primary closed evergreen seasonal broad-leaved lowland forest on steep rocky slopes of limestone hills. Lithophytic creeping herb on mossy rock outcrops on tops of hills. Leaves uniform light green. Rare. 20 V 2002, *L. Averyanov*, *P.K. Loc et al.*, **HAL 1670**.

7.11. *A. roxburghii* (Wallich) Lindley – **S.Vietnam**, **Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise station, 14°40'37"N, 108°23'52"E, in forest at elev. 1057–1220 m. Leaves very light green, outer petals dull red, lip white. Rare yet widespread. 2 III 2000, *D. Harder*, *N.T. Hiep*, **DKH 4696**.

8. *Apostasia* Blume

8.12. *A. odorata* Blume – **N.Vietnam**, **Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun., to the S of Rao An village, around point 18°20'50"N, 105°14'09"E, 900–1000 m. Primary evergreen submontane seasonal broad-leaved and mixed (with *Dacrycarpus*) forest along granite ridge. Terrestrial herb on very steep rocky slope. Flowers yellow. Rare. 28 IV 2002, *P.K. Loc*, *L. Averyanov et al.*, **HAL 1281**.

8.13. *A. wallichii* R.Br. – **S.Vietnam**, **Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forestry enterprise, 14°40'37"N, 103°23'52"E, 1057–1220 m. Terrestrial herb 75 cm tall, floral bracts white. Occasional. 2 III 2000, *D. Harder*, *N.T. Hiep*, **DKH 4690**; id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Terrestrial shrublet up to 1 m hg in shady slope. Flowers light yellow. Rare. 16 IV 2000, *L. Averyanov*, *P.K. Loc et al.*, **VH 5185**.

9. *Appendicula* Blume

9.14. *A. cornuta* Blume – **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1200 m. Primary wet mossy mt. coniferous forest on sandstone with *Pinus dalatensis*, *Fokienia hodginsii*, *Dacrydium elatum*, *Dacrycarpus imbricatus* along ridge tops. Epiphyte on mossy trees in wet shady place. Flowers white. Locally common. 18 IV 2000, *L. Averyanov, P.K. Loc et al.*, **VH 5311**. **N.Vietnam, Lao Cai Prov., Van Ban Distr.**, Khanh Yen Ha Mun., elev. from Na Nheo village to the S from 680 to 880 m, around point 21°58'28"N, 104°15'52"E, 800–880 m. Primary evergreen broad-leaved submontane forest on steep granite and quartzite slopes. Epiphyte on mossy trees. Very common. 14 III 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 2323**.

9.15. *A. hexandra* (Koen.) J.J. Smith – **S.Vietnam, Dak Lac Prov., Krong Bong Distr.**, Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 1000 m. Primary closed mt. broad-leaved evergreen forest on granite slopes along river canyon. Epiphyte on mossy trees along river in shady places. Flowers white, light yellowish. Common. 12 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6456**. **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river. Exposed limestone ridge top under light canopy on north and east facing slopes, 23°06'57"N, 105°01'48"E, 514–900 m. Occasional lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4827**. **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°40'37"N, 108°23'52"E, at elev. 1057–1220 m. On tree trunk. Widespread. 2 III 2000, *D. Harder, N.T. Hiep*, **DKH 4694**.

10. *Arachnis* Blume

10.16. *A. annamensis* (Rolfe) J.J. Smith – **S.Vietnam, Dak Lac Prov., Krong Bong Distr.**, Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 1700 m. Primary wet closed mt. broad-leaved and mixed forest on granites along very steep shady slopes of river. Epiphyte on high tree on very steep open slope of river canyon. Flowers red-purple. Rare. 11 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6427**.

11. *Biermannia* King et Pantl.

11.17. *B. calcarata* Aver. – **Vietnam, Ninh Binh Prov., Nho Quan Distr.**, Cuc Phuong National Park. Limestone evergreen broad-leaved forest near Bong locality. Epiphyte on tree. 12 XII 1999, *N.T. Hiep et al.*, **NTH 4103**.

12. *Bulbophyllum* Thouars.

12.18. *B. affine* Lindley – **S.Vietnam, Kon Tum Prov., Ngoc Hoi Distr.**, Sa Loong Mun., slope of Ea Ton watershed, granite, 14°37'N, 107°34'E 830 m. Primary closed evergreen seasonal broad-leaved submontane forest. Epiphyte. Flowers solitary,

pedicels about 10 cm long, tepals whitish with 3–5 longitudinal brownish red traces, lip yellowish. 15 V 2000, *P.K. Loc et al.*, **P-9310**.

12.19. *B. ambrosia* (Hance) Schltr. – **N.Vietnam, Ha Giang Prov., Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Epiphyte on tall trees. Occasional. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5103**. **S.Vietnam, Kon Tum Prov., Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8212**. **N.Vietnam, Vinh Phuc** Prov., **Tam Dao** Distr., Tam Dao town, Tam Dao National Park. Epiphyte in degraded forest. Flowers white with purple streaks, sweetly fragrant. 20 I 2000, *D. Harder, P.K. Loc, DKH 4549.*

12.20. *B. andersonii* (Hook. f.) J.J. Smith – **N.Vietnam, Ha Giang** Prov., **Meo Vac** Distr., Shung Cha Mun., vic. of Lo Loi Phin village, 23°11'N, 105°17'E, 1200 m. Secondary mossy shrubs and grasslands on open slopes. Creeping lithophyte vine on mossy open limestone rocks. Flowers dirty yellow with reddish marks, odorless. Abundant. 5 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3278**. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophytic and epiphytic creeping vine 0.5–1 m lg. Flowers dull yellowish pink-violet spotted. Abundant. 29 V 1999, *N.T. Hiep, P.H. Hoang, L. Averyanov, NTH 2973*.

12.21. *B. astelidum* Aver. – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2000–2200 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Epiphyte on mossy trees. Flowers yellowish-white, lip yellow. Not rare. 9 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6208**.

12.22. *B. bisetoides* Seidenf. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte and lithophyte. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4885**.

12.23. *B. catenarium* Ridley – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high mossy trees. Flowers yellow, lip deep red. Rare. 16 IV 2000, *L. Averyanov, P.K. Loc et al.*, **VH 5249**.

12.24. *B. clipeibulbum* J.J. Vermeulen* – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope). Primary closed wet broad-leaved and mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on steep granite slopes at 1450 m. Creeping epiphyte

on high trees. Inflorescence fleshy up to 0.6 m lg, flowers dirty brown-purplish. Not common. 7 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6256*. **S.Vietnam, Khanh Hoa Prov., Khanh Le Distr.**, about 8 km from Khanh Le village to the W along Lieng Ly river, 850 m. Open primary evergreen mt. forest on river side granite slopes above waterfall. Epiphyte in shady place. Rare. 15 XII 1995, *L. Averyanov, N.T. Hiep, VH 2483b*.

12.25. *B. delitescens* Hance – **N.Vietnam, Thai Nguyen Prov., Vo Nhai Distr.**, Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, 450–550 m. Primary broad-leaved evergreen dry forest along tops of karst remnant limestone ridge. Epiphyte. Not rare. 23 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3804*.

12.26. *B. emarginatum* (Finet) J.J. Smith – **N.Vietnam, Lao Cai Prov., Van Ban Distr.**, Khanh Yen Ha Mun., to the SW of Na Nheo village, in the vic. of point 21°57'43"N, 104°13'42"E, 2000 m. Primary open evergreen broad-leaved and mixed forests with *Fokienia hodginsii* along granite and quartzite ridge. Creeping epiphyte. Rare. 22 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2629*.

12.27. *B. evrardii* Gagnep. – **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved closed evergreen wet mt. forest on sandstone steep slopes of forest river. Epiphyte on high trees. Flowers light yellow, tips of sepals brightly orange. Rare. 23 IV 2000, *L. Averyanov et al., VH 5642*.

12.28. *B. funingense* Tsi et H.C. Chen* – **N.Vietnam, Hoa Binh Prov., Mai Chau Distr.**, Hang Kia Mun., near Pa Khong village, 20°44'40"N, 104°52'32"E, 1300–1440 m. Primary broad-leaved evergreen dry forest with *Pinus kwangtungensis* along tops of highly eroded remnant karst limestone ridge. Epiphyte and lithophyte. Flowers yellow with brown stripes, lip yellow with purple center, unpleasant rotting fish smelled. Not common. 9 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 783*.

12.29. *B. guttulatum* (Hook. f.) Balakrishnan – **N.Vietnam, Ninh Binh Prov., Nho Quan Distr.**, Cuc Phuong Mun., Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20°16'28"N, 105°40'57", 400 m. Secondary closed evergreen seasonal broad-leaved lowland forest on limestone hills. Lithophyte and epiphyte in shady places on tops of hills. Flower buds yellowish-brown-purple. Occasional. 19 V 2002, *L. Averyanov, P.K. Loc et al., HAL 1642*; id., **Nho Quan Distr.**, Cuc Phuong Mun., Cuc Phuong National Park, about 0.5 km W from Bong locality, 20°21'01"N, 105°35'38"E, 500 m. Primary closed evergreen seasonal broad-leaved lowland forest on tops of limestone hills. Lithophyte and epiphyte in shady places on tops of hills. Flower buds yellowish-brown-purple. Common. 20 V 2002, *L. Averyanov, P.K. Loc et al., HAL 1651*; id., **Nho Quan Distr.**, Cuc Phuong Mun., living collection of Cuc Phuong National Park, 20°15'15"N, 105°41'40"E. Evergreen broad-leaved forests on limestone hills. Flowers yellow-orange, lip purple. 22 V 2002, *L. Averyanov, P.K. Loc, CP 127*.

12.30. *B. hymenanthum* Hook. f. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river. Exposed limestone ridge top under light canopy

on north and east facing slopes, 23°06'57"N, 105°01'48"E, 514–900 m. Rare lithophyte. 1 IV 2000, *D. Harder*, *N.T. Hiep*, *L. Averyanov et al.*, **DKH 4828**.

12.31. *B. insulsum* (Gagnep.) Seidenf. – **N.Vietnam, Cao Bang Prov., Ba Be** Distr., national park Ba Be, 400–600 m. Primary shady wet evergreen forest on slopes of limestone mt. Common epiphyte. 24 X 1995, *L. Averyanov*, *N.T. Hiep et al.*, **CB 48**; id., **Bao Lac** Distr., Ca Thanh Mun., about 3 km to SW from Yen Lac village, N 22°44' E 105°50'', about 42 km to NWW from Cao Bang town, 1400–1450 m. Primary open coniferous mossy forest with *Pseudotsuga brevifolia* along tops of limestone karst remnant ridge. Epiphyte and lithophyte. Very common. 18 XI 1998, *L. Averyanov*, *P.K. Loc et al.*, **CBL 402**; id., **Ha Lang** Distr., Duc Quan Mun., vic. of Lung Hoai village, 22°43'N, 106°40'E, about 43 km to E from Cao Bang town, 600–650 m. Primary open coniferous and mixed semi deciduous forest with *Pinus kwangtungensis* and *Pseudotsuga brevifolia* along tops of remnant limestone ridge. Epiphyte. Leaves below violet. Common. 28 XI 1998, *L. Averyanov*, *P.K. Loc*, **CBL 758**. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte on mossy trees. Common. Flowers (under cultivation) unpleasant fish smelled: column and tepals except lip light dull yellowish-green, outside with brown-pink tint along midvein; lip light dull yellow-greenish with dark brown-purple margins and apex; column foot inside purple-violet. 12 X 1999, *N.T. Hiep*, *L. Averyanov*, *P. Cribb et al.*, **NTH 3579**; id., **Quan Ba** Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte on mossy trees. Common. 12 X 1999, *N.T. Hiep*, *L. Averyanov*, *P. Cribb et al.*, **NTH 3579**. **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Khanh Yen Ha Mun., elev. from Na Nheo village to the S from 680 to 880 m (around point 21°58'28"N, 104°15'52"E), 800–880 m. Primary evergreen broad-leaved submontane forest on steep granite and quartzite slopes. Epiphyte on mossy tree. Flowers with unpleasant smell; tepals white with pink purple stripes, lip light yellowish with purple marginal line. Not rare. 14 III 2002, *L. Averyanov*, *P.K. Loc et al.*, **HAL 2325**; id., **Van Ban** Distr., Khanh Yen Ha Mun., to the S of Na Nheo village, in the vic. of point 21°59'04"N, 104°15'08"E, 900 m. Primary closed broad-leaved evergreen submontane forest on steep granite and quartzite slopes. Epiphyte, flowers unpleasant smelled; tepals yellowish-white with dirty-purple median vein. Locally very common. 25 III 2002, *L. Averyanov*, *P.K. Loc et al.*, **HAL 2746a**.

12. 32. *B. longibrachiatum* Tsi (= *B. purpureifolium* Aver.) – **Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Frequent lithophyte, all parts deep purple. 5 IV 2000, *D. Harder*, *N.T. Hiep*, *L. Averyanov et al.*, **DKH 5153**.

12.33. *B. luanii* Tixier. – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr.,

Hieu Mun., Mang La forest enterprise, 14°38'55"N, 108°25'15"E, 1186 m. Disturbed closed evergreen submontane forest. Epiphyte on fallen tree. Flower buds green with dark red-purple longitudinal streaks. 1 III 2000, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 4615*; id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise (14°40'37"N, 108°23'52"E), 1057–1220 m. Climbing epiphyte. Flower buds with longitudinal purple stripes. Occasional. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4691*.

12.34. *B. macraei* (Lindley) Rchb. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Epiphyte and lithophyte, sheath on new shoots spotted red-purple. Frequent. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5179*.

12.35. *B. pectenvenensis* (Gagnepain) Seidenf. – **N.Vietnam, Tuyen Quang** Prov., **Na Hang** Distr., Thuong Lam Mun., Na Lau village, in the vic. of point 22°28'23"N, 105°19'47"E, 450–500 m. Primary evergreen seasonal broad-leaved forest on highly eroded remnant ridge composed with soft stratified limestone consolidated with numerous quartzite dikes. Epiphyte in shady place. Flowers yellow-orange. Occasional. 31 V 2002, *L. Averyanov, P.K. Loc, HAL 1708*.

12.36. *B. penicillium* Parish et Rchb. f.* – **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Khanh Yen Ha Mun., to the S of Na Nheo village, in the vic. of point 21°59'04"N, 104°15'08"E, 900 m. Primary broad-leaved evergreen wet submontane forest on steep granite and quartzite slopes of stream canyon. Creeping epiphyte on high mossy tree. Rare. 27 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2828c*.

12.37. *B. protractum* Hook. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son mt. around point 23°09'18"N, 105°00'09"E, 1100–1250 m. Forest on steep slopes of rocky limestone outcrops along ridges. Lithophyte. Tepals dull yellow, column and lip brighter yellow. Occasional. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5044*; id., **Quan Ba** Distr., Bat Dai So mt., around point 23°09'N, 104°59'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Taxus* and *Acer* sp. along ridge and below peak. Lithophyte. Tepals dull yellow. Abundant. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, DKH 5146*; id., **Quan Ba** Distr., Bat Dai Son mt., 23°09'N, 104°59'E, 1100–1200 m. Primary deciduous forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Taxus* and *Acer* along ridge and below peak. Frequent lithophyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, DKH 5151*; id., **Quan Ba** Distr., Bat Dai Son mt., 23°08'11"N, 105°00'48"E, 1310 m. Primary deciduous forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along ridge and below peak. Occasional lithophyte. Flowers dull light orange. 6 IV 2000, *D. Harder, L. Averyanov et al., DKH 5259*.

12.38. *B. reptans* (Lindley) Lindley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-7937*.

12.39. *B. retusiusculum* Rchb. f. – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of

Chu Yang Sinh mt. system, 12°24'N, 108°26'E along Dak Tour river (N slope), 1200–1300 m. Primary closed wet broad-leaved and mixed forest (with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus*) on steep granite slopes. Epiphyte on mossy trees along river. Not rare. 8 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6237**. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest (with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga*) along tops of karst remnant limestone ridge. Epiphyte on mossy trees. Common. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3579**.

12.40. *B. sessile* (Koen.) J.J. Smith – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high mossy trees. Flowers light yellowish-white. Not common. 16 IV 2000, *L. Averyanov, P.K. Loc et al.*, **VH 5246**.

12.41. *B. smitinandii* Seidenf. et Thorut.* – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, Sa Son Mun., on foot of east slope of Ngoc To Lum mt. on granite, 14°27'N, 107°41'E, 940 m. Primary closed evergreen seasonal broad-leaved submontane forests. Epiphyte on trunk and branches of big tree *Pometia pinnata*. Flowers solitary, tepals pale yellowish green with brownish red dots, lips pale greenish with many red brown dots and traces. 3 I 2000, *P.K. Loc, et al.*, **P-8207**.

12.42. *B. taeniophyllum* Parish et Rchb. f. – **N.Vietnam, Hoa Binh** Prov., **Da Bac** Distr., to the SW of Doan Ket village, 20°54'01"N, 105°04'19"E, 800–1000 m. Primary broad-leaved evergreen forest on steep slopes of remnant highly eroded limestone ridge. Epiphyte. Young leaves with violet tint. Common. 29 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 299**.

12.43. *B. umbellatum* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Epiphyte. Tepals dull yellow-green with red speckles inside. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4967**.

12.44. *B. xylophyllum* Parish et Rchb. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son mt. around point 28°08'11"N, 105°00'48"E, 1200–1300 m. Primary forest on limestone with *Quercus* sp., *Pseudotsuga* sp. and *Podocarpus* sp. along ridge and below peak. Epiphyte among mosses. Rare. 6 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5283**.

13. *Calanthe* R. Br.

13.45. *C. aleizettii* Gagnepain – **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Long Luong Mun., near Sang Cai village, 20°45'51"N, 104°51'26"E, 1500 m. Primary wet broad-leaved evergreen and semi deciduous mossy forest along tops of remnant limestone highly eroded ridge. Terrestrial herb on steep shady rocky slope. Flowers odorless, tepals light violet, lip white with violet tint, white keels, column white. Rare. 8

III 2001, *P.K. Loc, L. Averyanov et al.*, **DKH 7508**.

13.46. *C. alismifolia* Lindley – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 800–1000 m, 26.2 km to 2° of Ha Giang city. Primary wet evergreen broad-leaved closed forest on very steep rocky slope of karst remnant limestone ridge. Terrestrial and lithophytic herb. Not rare. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3565**.

13.47. *C. angusta* Lindley – **N.Vietnam, Lao Cai Prov., Than Uyen Distr.**, Ho Mit Mun., 22°06'N, 103°52'E, 1600–2100 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge). Primary wet evergreen broad-leaved forest on very steep rocky slope. Terrestrial and lithophytic herb on wet shady very steep slopes. Common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2813**.

13.48. *C. angustifolia* (Blume) Lindley – **N.Vietnam, Lao Cai Prov., Than Uyen Distr.**, Ho Mit Mun., 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge). Primary wet evergreen broad-leaved forest on very steep rocky slopes. Terrestrial and lithophytic (also occasionally epiphyte at mossy base of old trees) herb on wet steep slope. Not rare. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2687**.

13.49. *C. argenteo-striata* C.Z. Tang et S.J. Cheng – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Limestone exposed ridge top under light canopy on north and east facing slopes. Lithophyte. Flowers white with yellow spots on lip. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, et al.*, **DKH 4804**.

13.50. *C. cardioglossa* Schltr. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr.**, Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 25 XII 1999, *P.K. Loc et al.*, **P-8043**.

13.51. *C. clavata* Lindley – **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°40'37"N, 108°23'52"E, 1057–1220 m. Terrestrial in understory. Widespread above 1000 m. 2 III 2000, *D. Harder, N.T. Hiep*, **DKH 4706**. **S.Vietnam, Lam Dong Prov.**, Bi Dup mt. Flowers white, light yellowish, lip with two red spots on disk and yellow at the center. 1997, *N.V.Duy*, **274**.

13.52. *C. masuca* (D. Don) Lindley – **S.Vietnam, Lam Dong Prov.**, Bi Dup mountains. Flowers light pink-violet, lip with red spot on the center. 1997, *N.V.Duy*, **313**.

13.53. *C. triplicata* (Willemet) Ames – **N.Vietnam, Son La Prov., Moc Chau Distr.**, Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 900–1100 m. Primary evergreen broad-leaved wet forest on very steep slopes and bluffs of remnant karst limestone ridge. Terrestrial and lithophytic herb on steep shady slopes. Flowers white, lip with brightly red spot at the center. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2954**.

13.54. *C. velutina* Ridley – **N.Vietnam, Son La Prov., Yen Chau Distr.**, Muong Lum Mun., On Oc Village, 20°59'06"N, 104°28'46"E, 1468 m. Primary forest along

limestone ridge top. Terrestrial herb. Occasional. 4 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al., DKH 7283.*

14. *Cephalantheropsis* Guillaumin

14.55. *C. obcordata* (Lindley) Ormerod (= *C. gracilis* (Lindley) S.Y. Hu) – **S.Vietnam, Kon Tum Prov., Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-7980*. **N.Vietnam, Lao Cai Prov., Than Uyen** Distr., Ho Mit Mun., 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge). Primary wet evergreen broad-leaved forest on very steep rocky slopes. Terrestrial herb up to 0.6 m hg on shady steep slopes. Not rare. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2673.*

15. *Ceratostylis* Blume

15.56. *C. himalaica* Hook. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest along exposed rock outcrops on north ridge slope. On tree trunks, stem bracts brown-red, scaly, outer tepals pale yellow orange, streaked in red-purple, lip dull-yellow, column white. Occasional. 03 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4938*; id., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus*. Epiphyte on top of ridge. Stem bracts brown-red, scaly, outer tepals pale yellow orange, streaked in red-purple, lip dull yellow, column white. Occasionally abundant. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5126.*

15.57. *C. siamensis* Rolfe ex Downie – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8040, P-8450*; id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°38'55"N, 108°25'15"E, 1186 m. Disturbed closed evergreen submontane forest. Epiphyte on tree trunks. Rare. 1 III 2000, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 4661.*

15.58. *C. subulata* Blume – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, 500–900 m, along Dak Tour river (N slope). Primary wet closed mt. broad-leaved forest on granites along river slopes. Epiphyte on mossy trees above river in shady place. Not rare. 4 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6077.*

16. *Cheirostylis* Blume

16.59. *Ch. bipunctata* Aver. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. In deep shade,

among rocks. Calyx light cream-green with white hairs, corolla white. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4895/1.*

16.60. *Ch. chinensis* Rolfe – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. On rocks. Stem red-purple, fleshy, leaves deep green, inflorescence petioles pink-red and dull, bract dull red-brown, corolla white. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4894*; id., **Quan Ba Distr.**, Bat Dai Son, about 23°07"N, 105°02"E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. Petals white, lip with green spots at the base. In shady places. Occasional and widespread. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5098*. **N.Vietnam, Son La Prov., Yen Chau Distr.**, Muong Lum Mun., Lum village, around point 21°00'47"N, 104°29'30"E, 900–1134 m. Degraded secondary vegetation on limestone outcrops under canopy of *Pistacia* and *Calocedrus macrolepis*. Among rocks. Stem dull light red, leaves green to very light green, corolla white, lip with two green spots inside. Frequent. 2 III 2001, *D. Harder, P.K. Loc, N. T. Hiep, L. Averyanov et al., DKH 7111.*

16.61. *Ch. marmorifolia* Aver. (= *Ch. marmorata* Aver.) – **N.Vietnam, Son La Prov., Yen Chau Distr.**, Muong Lum Mun., Lum village, around point 21°00'17"N, 104°29'08"E, 1242 m. Ridge top with primary vegetation of *Pinus kwangtungensis* and *Calocedrus macrolepis*. Stem green, leaves light green with darker nerves, scape light green, petals white. Occasional. 3 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al., DKH 7203.*

16.62. *Ch. takeoi* (Hayata) Schltr. (= *Ch. eglandulosa* Aver.) – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Calyx light cream-green with white hairs, corolla white. In deep shade, among rocks. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4895.*

16.63. *Ch. yunnanense* Rolfe – **N.Vietnam, Ha Giang Prov., Dong Van Distr.**, Tu Tinh Mun., 23°05"N, 105°15"E, 40.7 km to 43° of Ha Giang city, 600–750 m. Remnants of dry broad-leaved evergreen forest on steep slopes and cliffs near the top of karst limestone isolated mesas. Lithophyte in rock crevices. Leaves pale dull green. Not common. 10 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3526*; id., **Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Stem fleshy and green, bract brown-red, calyx tube with dull brown hairs, corolla all white. On rocks in disturbed area. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4893*; id., **Quan Ba Distr.**, Bat Dai Son, 23°07"N, 105°02"E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5097.*

17. *Cleisocentron* Bruehl.

17.64. *Cleisocentron klossii* (Ridley) Garay – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2100–2300 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Epiphyte on high trees. Flowers pink-purple. Common. 9 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6214*; id., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 1700 m. Primary wet closed mt. broad-leaved and mixed forest on granites along very steep shady slopes of river. Epiphyte on high trees. Not common. 11 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6432/1*. **S.Vietnam, Lam Dong** Prov., 31 km to NE from Dalat city, **Lac Duong** Distr., Da Chay Mun., vic. Klong Lanh village, 12°08'N, 108°39'E, 1850–1950 m. Closed primary broad-leaved mt. forest on NW macro slope of Bi Dup mt. system. Epiphyte on high trees. Rare. 15 III 1997, *L. Averyanov, P.K. Loc et al., VH 2646*; id., 29 km to NE from Dalat city, **Lac Duong** Distr., Da Chay Mun., 12°05'N, 108°40'E, 2260 m. Closed broad-leaved cloud forest on main peak of Bi Dup mt. system. Epiphyte on high trees, flowers purple-violet, spur white. Not common. 21 III 1997, *L. Averyanov, P.K. Loc et al., VH 2991*; id., 29 km to NE from Dalat city, **Lac Duong** Distr., Da Chay Mun., 12°06'N, 108°39'E, 1900–2000 m. Primary wet closed broad-leaved cloud forest along main Bi Dup ridge. Epiphyte on high trees. Flowers brightly purple-violet, spur white. Not rare. 23 III 1997, *L. Averyanov, P.K. Loc et al., VH 3131*; id., **Lac Duong** Distr., Da Chay Mun., 32.5 km to NE from Dalat city, 12°07'N, 108°41'E, 1600–1700 m. Closed primary broad-leaved mt. forest along very wet deep stream canyon on NNW macro slope of Bi Dup mt. system in 6–7 km to NNW from main peak. Epiphyte on high trees. Flowers purple-violet. Not rare. 30 III 1997, *L. Averyanov, P.K. Loc et al., VH 3443*.

18. *Cleisostoma* Blume

18.65. *C. arietinum* (Rchb. f.) Garay – **N.Vietnam, Son La** Prov., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 550–600 m. Remnants of primary evergreen broad-leaved forests on vertical limestone bluffs along Xap river canyon. Epiphyte on high trees on open cliffs. Rare. 28 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2928*; id., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Epiphyte on high trees. Not rare. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2976*.

18.66. *C. crochettii* (Guillaumin) Garay – **N.Vietnam, Cao Bang** Prov., **Tra Linh** Distr., Quoc Toan Mun., vic. of Thang Heng and Lung Tao villages near Thang Heng lake, 500–650 m. Remnant closed evergreen primary broad-leaved forest on steep slopes and bluffs of limestone ridges and mesas near karst lake. Epiphyte on shady rocky slopes and bluffs. Tepals light pink with yellow tint, lip and spur purple-

violet, side lobes yellow. Not common. 25–27 V 1997, *L. Averyanov, N.T. Hiep, VH 4860*. **N.Vietnam, Ha Nam Ninh** Prov., Cuc Phuong. 1985, *Averyanov et al., LX-VN 85-96*. **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, 300 m. Primary dry broad-leaved evergreen forest on very steep rocky slopes of remnant karst limestone ridge. Epiphyte on mossy trees in shady places. Not rare. 24 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3888*; id., **Vo Nhai** distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, about 300 m. Primary dry broad-leaved evergreen forest on very steep rocky slopes of remnant karst limestone ridge. Epiphyte on mossy trees in shady places. Not rare. Flowers (under cultivation) odorless: tepals, column and anther cup yellow, side lobes and median lobe of the lip purple-violet. 24 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3889*. **N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., Pu Luong protected area, near Co Lung village, 20°27'28"N, 105°12'18"E, 500 m. Primary broad-leaved evergreen forest on slope of remnant highly eroded karst limestone ridge. Epiphyte. Flower buds green-purple-violet striped. Not rare. 17 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 1103*. **N.Vietnam, Vinh Phu**, Tam Dao. 1988, *Averyanov et al., LX-VN sine no.*

18.67. *C. fuersteinbergianum* Kraenzlin – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8535*. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 650–750 m. Forest remnants protected by sheer limestone rock along ridge. Pendant epiphyte and lithophyte. Rare. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4919*.

18.68. *C. paniculatum* (Ker-Gawl.) Garay – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Sin Suoi Ho village and river, 23°07'N, 105°02'E, 514–900 m. Limestone rocks at ridge top under light canopy on north and east facing slopes. Rare epiphyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4876*; id., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes.. Rare epiphyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4876*. **N.Vietnam, Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, 20°15'15"N, 105°41'40"E. Evergreen broad-leaved forests on limestone hills. Flowers yellow, tepals with brown-purple stripes, living collection of Cuc Phuong National Park. 22 V 2002, *L. Averyanov, P.K. Loc, CP 128*.

18.69. *C. rostratum* (Lodd.) Seidenf. – **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun. Primary closed evergreen broad-leaved mt. forest. 1999, *P.K. Loc et al., P-8234*.

18.70. *C. striatum* (Rchb. f.) Garay – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte and lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4877*.

N.Vietnam, Son La Prov., Moc Chau Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1000–1100 m. Primary evergreen broad-leaved wet forest on very steep slopes and bluffs of remnant karst limestone ridge. Epiphyte on high trees. Not common. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2957.*

19. *Coelogyne* Lindley

19.71. *C. assamica* Linden et Rchb. f. – S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area. Primary closed evergreen broad-leaved mt. forest at 600–1770 m. XII 1999 – I 2000, *P.K. Loc et al., P-8435.*

19.72. *C. calcicola* A.F. Kerr – S.Vietnam, Lam Dong Prov. *N.V.Duy, 86.*

19.73. *C. ecarinata* C.Schweinf.* – N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Climber to 3 m. Stems brown. Frequent. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4874*; id., **Quan Ba Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m.** Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. Frequent lithophyte. Outer three sepals brown-purple, lighter green outside, petals similarly colored, awl shaped, pollinia light yellow, lip light green outside, brown-purple on lateral sides inside, purple-brown at tip, dull yellow-cream at lip behind tip. Locally abundant. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5155.*

19.74. *C. fimbriata* Lindley – S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8213, P-8217.* **N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m.** Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, et al., DKH 4814*; id., **Quan Ba Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m.** Degraded forest on limestone outcrops along north ridge slope. Frequent lithophytic vine. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5205.* **N.Vietnam, Lao Cai Prov., Than Uyen Distr., Ho Mit Mun, 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge).** Primary wet evergreen broad-leaved forest on very steep rocky slopes. Epiphytic creeping herb on high trees. Very common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2674*; id., **Than Uyen Distr., Ho Mit Mun., 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge).** Primary wet evergreen broad-leaved forest on very steep rocky slopes. Creeping epiphytic herb on high trees. Occasionally common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2683.*

19.75. *C. huettneriana* Rchb. f.* – N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village, small limestone hill along east side Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 650–8000 m. Remnants of primary forest protected by

sheer limestone rocks. Lithophyte. Flowers sour smell, tepals white, corolla tube with longitudinal striations red-purple, lip yellow at tip, column white at tip. Rare. 2 IV 2000, *D. Harder, L. Averyanov et al.*, **DKH 4915**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on limestone outcrops along north ridge slope. Flowers white, lip with red-purple streaks on lateral walls, yellow behind and yellow at lip, sweetly fragrant. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5043**; id., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. Frequent lithophyte. Tepals white-cream, lip white at tip, yellow then yellow with red streaks laterally, column white then yellow with red at base. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5136**. **N.Vietnam, Son La** Prov., **Yen Chau** Distr., Muong Lum Mun., Lum village, around point 21°00'47"N, 104°29'30"E, 900–1134 m. Degraded secondary vegetation on limestone outcrops under canopy of *Pistacia* and *Calocedrus macrolepis*. Epiphyte and lithophyte. Tepals light yellow to light orange, inner petals white, streaked in red on sides and yellow on lip, thick, musky, sweet fragrant. Occasional. 2 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al.*, **DKH 7095**; id., **Yen Chau** Distr., Muong Lum Mun., On Oc Village, 20°59'06"N, 104°28'46"E, 1468 m. Primary forest along limestone ridge top. Lithophyte on limestone rocks. Tepals light creamy yellow, lip streaked in red-purple inside, slightly yellow on lip, sweetly fragrant. Frequent. 4 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al.*, **DKH 7262**.

19.76. *C. lawrenceana* Rolfe – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8473**.

19.77. *C. lentiginosa* Lindley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Sa Son Mun., Chu Mom Ray protected area, 14°26'33"N 107°41'08"E, 500–800 m. Primary seasonally dry, semi-deciduous forest. Canopy epiphyte. 20 II 2000, *D. Harder, N.T. Hiep, P.K. Loc et al.*, **DKH 4555**.

19.78. *C. lockii* Aver. – **N.Vietnam, Ha Giang** Prov., **Meo Vac** Distr., Shung Cha Mun., vic. of Lo Loi Phin village, 23°11'N, 105°17'E, 1200–1250 m. Coniferous primary mossy forest with domination of *Pseudotsuga brevifolia* along tops of remnant limestone karst ridge. Lithophyte on open mossy rocks. Very common. 5 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3307**; id., **Dong Van** Distr., Ho Quan Phin Mun., 23°11'N, 105°15'E, 48.2 km to 36° of Ha Giang city, 1250–1300 m. Remnants of dry mossy open coniferous forest with *Pseudotsuga brevifolia* along tops of remnant limestone karst ridge. Lithophyte on open mossy rocks. Abundant. 6 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3343**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°07'N, 105°02'E, 1100 m. Degraded forest along ridge, exposed limestone outcrops. Lithophyte and occasionally epiphyte. Tepals all white, fringes on lip brown, yellow at base of lip near tip. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5003**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E,

1000–1100 m. Degraded forest along north ridge slope, exposed limestone outcrops. Lithophyte and epiphyte. Frequent. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5196**; id., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Epiphyte and lithophyte, inflorescence wiry and arching in flower. Petals all white, yellow spots on lip, column dull yellow-brown. Frequent. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5220**; id., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Frequent lithophyte and epiphyte. Flowers all white with yellow spot at lip. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5150**.

19.79. *C. malipoensis* Tsi – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river. Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4880**.

19.80. *C. mooreana* Rolfe – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E along Dak Tour river (N slope), 2200–2400 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Epiphyte. Flowers white, lip with yellow center. Very common. 9 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6129**.

19.81. *C. rigida* Parish et Rchb. f. – **N.Vietnam, Lao Cai** Prov., **Than Uyen** Distr., Ho Mit Mun., 22°06'N, 103°52'E, 800 m. Remnants of primary broad-leaved evergreen wet forest on quartzite along Mit Noi river between Ho Mit and Ban Thao villages (SSW macro slope of Hoang Lien Son ridge). Lithophyte herb on quartzite river cliffs. Not rare. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2692**.

19.82. *C. sanderæ* Kraenzlin – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2200–2400 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Epiphyte. Flowers white, lip with yellow center. Very common. 9 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6128**. **S.Vietnam, Lam Dong** Prov. Flowers white, lip with yellowish center. *N.V.Duy*, **248**.

19.83. *C. schultesii* Jain et Das – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 514–900 m, 23°06'57"N, 105°01'48"E. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte. Bracts dull brown, persistent. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov, et al.*, **DKH 4850**. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 I 2000, *P.K. Loc et al.*, **P-8032**.

19.84. *C. viscosa* Rchb. f. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 3 I 2000, *P.K. Loc et al.*, **P-8208**.

20. *Collabium* Blume

20.85. *C. assamicum* (Hook. f.) Seidenf. – **S.Vietnam, Kon Tum Prov., Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°40'37"N, 108°23'52"E, 1057–1220 m. Terrestrial herb near ridge top. Tepals green with red-purple spots, spur yellow, lip pure white, faint sweet fragrant. Rare. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4678*. **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Khanh Yen Ha Mun., elev. from Na Nheo village to the S from 680 to 880 m, around point 21°58'28"N, 104°15'52"E, 800–880 m. Primary evergreen broad-leaved submontane forest on steep granite and quartzite slopes. Terrestrial herb. Tepals light yellowish-green with purple marks, lip white with purple spots, column white, anther yellow. Rare. 14 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2321*.

20.86. *C. chloranthum* (Gagnepain) Seidenf. – **N.Vietnam, Ha Giang** Prov., **Meo Vac** Distr., vic. of Meo Vac town, 23°10'N, 105°24'E, 48.2 km to 36° of Ha Giang city, 1400–1600 m. Primary evergreen broad-leaved wet closed forest on sandstones. Lithophytic herb on shady mossy rocky cliffs. Leaves with deep green spots. Not common. 7 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3408*.

21. *Corymborkis* Thouars

21.87. *C. veratrifolia* (Reinw.) Blume – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8334*.

22. *Cryptostylis* R. Br.

22.88. *C. arachnites* (Blume) Hassk. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Sin Suoi Ho village on east side of Sin Suoi Ho river, (23°07'N, 105°02'E), 1000–1100 m. Degraded forest on limestone exposed outcrops along north ridge slope. Terrestrial herb on steep slope. Tepals light yellowish-green, lip light yellowish-pink with red-brown marks. Not common. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5005*. **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1150 m. Degraded primary and secondary wet evergreen broad-leaved forest with *Dacrydium* and *Dacrycarpus* along mt. river valley on sandstone. Terrestrial herb on shady river slope. Tepals light green, lip yellowish with brown-purple spots, anther yellow. Not common. 20 IV 2000, *L. Averyanov et al., VH 5438*.

23. *Cymbidium* Sw.

23.89. *C. aloifolium* (L.) Sw. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-18387*.

23.90. *C. erythrostylum* Rolfe – **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Long Luong Mun., near Sang Cai village, 20°45'51"N, 104°51'26"E, 1500 m. Primary wet broad-leaved evergreen and semi deciduous mossy forest along tops of remnant limestone highly eroded ridge. Large epiphyte on *Livistona* sp. Flowers odorless, tepals

white with light pink tint and finest purple-violet stripes, lip with white background and pink tint at basal part, yellowish at center, all over with red-purple stripes and marks, column purple-violet, anther white, keels dull light yellowish-brown. Not common. 8 III 2001, *P.K. Loc, L. Averyanov et al., DKH 7506*.

23.91. *C. floribundum* Lindley – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Occasional epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5223*.

23.92. *C. lancifolium* Hook. – **N.Vietnam, Lao Cai Prov., Than Uyen Distr.**, Ho Mit Mun., 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge). Primary wet evergreen broad-leaved forest on very steep rocky slopes. Terrestrial herb on steep shady slopes. Not rare. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2688*.

23.93. *C. sinense* (Jackson) Willd. – **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise 14°38'55"N 108°25'15"E, 1186 m. Disturbed closed evergreen submontane forest. Widespread, but rarely flowering. Tepals green to yellow with longitudinal red-purple streaks, deeper purple in throat, column yellow-green, lip green with purple. 1 III 2000, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 4637*.

24. *Cyrtosia* Blume

24.94. *C. integra* (Rolfe ex Downie) Garay* – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Thai An Mun., in the vic. of Lo Thang village, around point 23°59'50"N, 105°05'46"E, 1400–1500 m. Broad-leaved evergreen secondary forest with bamboo on alluvial slopes of remnant highly eroded limestone ridge. Yellowish-brown mycotrophic achlorophyllous terrestrial herb 15–30 cm tall. Flowers yellowish, pedicels pinkish. Occasional. 10 V 2002, *P.K. Loc, L. Averyanov et al., HAL 1510*.

25. *Dendrobium* Sw.

25.95. *D. acinaciforme* Roxb. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr.**, Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8305, P-8449*. **N.Vietnam, Son La Prov., Moc Chau Distr.**, Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1100–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Epiphyte on mossy high trees. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2950*.

25.96. *D. anosmum* Lindley – **S.Vietnam, Dak Lac Prov., Krong Bong Distr.**, Krong Kmar waterfall, N slope of Chu Yang Sinh mt. system, 12°29'N, 108°20'E, 400–450 m, remnants of primary evergreen dry broad-leaved forest on granite outcrops. Epiphyte on vertical cliff. Flowers spicy fragrant, light violet, lip with two deep violet spots. Rare. 1 V 2000, *L. Averyanov, N.T. Hiep et al., VH 5859*.

25.97. *D. brymerianum* Rchb. f.* – N.Vietnam, Lao Cai Prov., Van Ban Distr., Nam Xe Mun., Nam Xi Tan village. W facing slope along stream between Nam Xe and Khau Co Pass at near 40 km to Than Uyen, from 22°02'31"N, 103°58'32"E to 22°02'57"N, 103°58'35"E, 700–1113 m. Secondary forest on top of ridge on eroded granite soils. Epiphyte near top of ridge. Pseudobulbs yellow-green, flower buds light yellow-green. Occasional. 26 II 2001, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 6975*.

25.98. *D. cariniferum* Rchb. f. – N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte on low tree. Petals light yellow, lip with orange at opening. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4800*; id., Quan Ba Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Frequent epiphyte. Tepals light yellow-green, edge of lip and lateral petals bright orange. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5225*. S.Vietnam, Kon Tum Prov., Sa Thay Distr., Sa Son Mun., Chu Mom Ray nature reserve, 14°25'N, 107°44'E, 500–600 m. Secondary open broad-leaved evergreen dry forest on granites. Epiphyte on high tree. Flowers light yellow, lip light yellow with orange keels, column at front with red spot. Not common. 28 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5816*.

25.99. *D. chittimae* Seidenf. * – N.Vietnam, Ha Giang Prov., Quan Ba Distr., Sin Suoi Ho village and river. Exposed limestone along ridge, 23°06'37" 105°01'47"E, 893 m under light canopy. Lithophyte. Some roots with swollen parts. Flowers odorless, outer tepals very light pink, fringed lip white at opening, yellow at the base, column light green. Rare. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4810*; id., Quan Ba Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Stems red-brown, outer tepals pure white, spur dull brown-green, lip yellow, pink on walls outside, practically leafless. Rare. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4944*; id., Quan Ba Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Epiphyte and lithophyte. Stems dull red-brown, fragile, usually growing latterly on steep rocky slopes, pedicel light pink, outer tepals pink at base than all white, lip white at tip, yellow in throat, then red-purple streaked on lateral walls, column white at tip, streaked in red-purple at base, sweetly fragrant. Rare. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5180*; id., 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5227*.

25.100. *D. chrysanthum* Lindley – N.Vietnam, Bac Can Prov., Na Ri Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, 700 m. Primary evergreen mixed mossy forest with *Pseudotsuga brevifolia* and bamboo along tops of karst remnant limestone ridge. Epiphytic and lithophytic herb with shoots up to 1 m lg. Common. 20 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3730*. N.Vietnam, Ha Giang Prov., Quan Ba Distr., Can Ti Mun., vic. of Sing

Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Lithophyte on mossy rocks and epiphyte. Common. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3584*; id., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Rare lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4896*. **N.Vietnam, Lai Chau** Prov., **Sin Ho** Distr., Ta Ngau Mun. about 30 km of Lai Chau town to the N (22°18'N, 103°15'E), about 1600 m. Secondary open wet mossy evergreen broad-leaved forest with remnants of primary elements on rocky foothills of remnant karst limestone ridge. Lithophytic herb on open wet mossy vertical limestone cliff. Flowers brightly yellow; lip with chestnut spots on side lobes. Common. 25 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2763*. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1100–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophytic herb up to 1 m hg on mossy rocks and cliffs. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2949*.

25.101. *D. cruentum* Rehb. f.* – **S.Vietnam, Lam Dong** Prov., living collection of Dalat Biology Institute. Primary broad-leaved evergreen dry mt. forest along Laos border. Flowers odorless, tepals yellowish with green tint, lip yellowish with green tint and brightly red central keels and lateral lobes. 16 V 2000, *L. Averyanov, N.T. Hiep et al., VH sine no.*

25.102. *D. crumenatum* Sw. – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, along Dak Tour river on N macro slope of Chu Yang Sinh mt. system, 500–550 m. Primary broad-leaved mt. evergreen forest on granites along river slopes. Epiphytic and lithophytic shrublet. Very common. 3 V 2000, *L. Averyanov, N.T. Hiep et al., VH 5947*.

25.103. *D. cumulatum* Lindley – **S.Vietnam, Khanh Hoa** Prov., **Khanh Le** Distr., about 8 km from Khanh Le village to the W along Lieng Ly river, 850 m. Open primary evergreen mt. forest on river side granite slopes above waterfall. Epiphyte and lithophyte. Rare. 15 XII 1995, *L. Averyanov, N.T. Hiep, VH 2483/b*.

25.104. *D. dentatum* Seidenf. – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 13°9'N, 108°25'E, 1000–1200 m. Primary evergreen broad-leaved wet forest on steep mt. slopes on sandstone and gneiss. Epiphyte on high tree. Not rare. Flowers white, light yellowish, lip with 2 orange spots on tips of keels and purple nerves on side-lobes. 15 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5152*. **N.Vietnam, Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20°16'28'N, 105°40'57", 400 m. Secondary closed evergreen seasonal broad-leaved lowland forest on limestone hills. Lithophytic and epiphytic herb on top of hill. Flowers white, lip white with fine purple nerves on lateral sides and yellow central callus. Locally very common. 19 V 2002, *L. Averyanov, P.K. Loc et al., HAL 1626*;

id., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, 20°15'15"N, 105°41'40"E. Evergreen broad-leaved forests on limestone hills. Flowers white. Living collection of Cuc Phuong National Park. 22 V 2002, *L. Averyanov, P.K. Loc, CP 27*. **N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., territory of Pu Luong protected area, near Co Lung village, 20°27'28"N, 105°12'18"E, 550–600 m. Primary broad-leaved evergreen forest on tops of remnant highly eroded karst limestone ridge. Lithophytic herb on mossy shady rocks. Flowers white, lip white, side lobes with finest purple-violet stripes. Very common, locally abundant. 17 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 1085*.

25.105. *D. ellipsophyllum* Tang et F.T. Wang – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved and mixed (with *Dacrydium* and *Dacrycarpus*) evergreen dry mt. forest, on sandstone. Epiphyte on high tree. Tepals white, light yellowish, lip light brownish-yellow, with brown keels. Rare. 21 IV 2000, *L. Averyanov et al., VH 5528*.

25.106. *D. fimbriatum* Hook. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4873*. **N.Vietnam, Hoa Binh** Prov., **Mai Chau** Distr., Hang Kia Mun., near Thung Ang village, mt. Tao Xinh, 20°43'43"N, 104°51'21"E, 1000–1100 m. Primary broad-leaved evergreen dry forest with *Calocedrus macrolepis* on remnant limestone highly eroded ridge. Lithophytic herb up to 0.5 m hg on vertical cliffs. Flowers yellow, lip with dark chestnut spot at the center. Very common. 6 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 628*; id., **Mai Chau** Distr., Hang Kia Mun., near Hang Kia village, 20°43'39"N, 104°53'43"E, 1100–1300 m. Primary broad-leaved evergreen wet forest on remnant limestone highly eroded ridge. Epiphyte and lithophyte on mossy trees and rocks. Flowers pleasant fragrant, bright yellow, lip bright yellow with deep black-chestnut central spot. Very common. 7 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 686*. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1100–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophytic herb up to 1 m hg on mossy rocks and cliffs. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2978*. **N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., Pu Luong protected area, near Co Lung village, Nui Doan (Pha Doan) mt. system, 20°26'30"N, 105°11'32"E, 500–550 m. Primary evergreen broad-leaved dry forest along tops of remnant highly eroded karst limestone ridge. Lithophyte on very steep slopes and cliffs. Flowers pleasant fragrant, bright yellow, lip bright yellow with deep chestnut spot at center. Common. 16 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 1021*.

25.107. *D. hancockii* Rolfe* – **N.Vietnam, Hoa Binh** Prov., **Mai Chau** Distr., Hang Kia Mun., near Pa Khong village, 20°44'40"N, 104°52'32"E, 1300–1440 m. Primary broad-leaved evergreen dry forest with *Pinus kwangtungensis* along tops of highly eroded remnant karst limestone ridge. Epiphyte on shady steep slope. Flowers

with fine pleasant fragrance, bright yellow, lip bright yellow, side lobes with very fine short purple stripes or pure yellow. Not common. 9 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 838**.

25.108. *D. hemimelanoglossum* Guillaumin – **S.Vietnam, Lam Dong** Prov., Dalat area (wild collected sample in living collection of Dalat Biology Institute), 1200–1500 m. Primary broad-leaved evergreen submontane and mt. forests near Dalat town. Flowers odorless, dull green. Rare. 16 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH sine no.**

25.109. *D. hercoglossum* Rchb. f. – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 800 m. Primary closed mt. broad-leaved evergreen forest on granite slopes along river canyon. Lithophyte on mossy shady granite cliff along river. Flowers light pink-violet. Not common. 12 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6465**. **N.Vietnam, Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, about 0.5 km W from Bong locality, 20°21'01"N, 105°35'38"E, 500 m. Primary closed evergreen seasonal broad-leaved lowland forest on tops of limestone hills. Epiphyte on high tree. Tepals light violet, lip white with violet tint and light violet apex, column at the base green, anther deep violet. Not rare. 20 V 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 1660**. **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun., in the vic. of Rao An village, around point 18°22'00"N, 105°13'13"E, 240–260 m. Primary evergreen lowland seasonal broad-leaved forest on granite along rocky river valley. Epiphyte on high trees. Flowers light lilac, lip white with lilac tip and greenish callus, anther deep violet. Very common. 28 IV 2002, *P.K. Loc, L. Averyanov et al.*, **HAL 1249**.

25.110. *D. leonis* (Lindley) Rchb. f. – **S.Vietnam, Dak Lac** Prov., **Buon Don** Distr., approximately 12°53'N, 107°48'E, 100–150 m. Open dry semi deciduous Dipterocarp forest. Epiphyte. Flowers light yellow, with pink tint, anther yellow. Common. 30 IV 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 5841**.

25.111. *D. longicornum* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Frequent epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5228**.

25.112. *D. nobile* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son, about 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Occasional epiphyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5147**.

25.113. *D. ochraceum* De Wild. – **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun., in the vic. of Rao An village, around point 18°22'00"N, 105°13'13"E, 200–240 m. Primary evergreen lowland seasonal broad-leaved forest on steep granite-shale slopes. Epiphyte. Flowers odorless, tepals light yellowish, lip

light yellowish with bright red venation; column and anther white, spur and pedicel dull yellow. Rare. 1 V 2002, *P.K. Loc, L. Averyanov et al., HAL 1365.*

25.114. *D. palpebrae* Lindley – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m.** Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8256.*

25.115. *D. parcum* Rchb. f. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m.** Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8171, P-8452.*

25.116. *D. pendulum* Roxb. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Sa Thay town area, 14°25'15"N, 107°47'04"E, 450 m.** Sepals and petals white; lip greenish yellow with dark yellow at base. 23 V 2001, *P.K. Loc, P-9852.* **S.Vietnam, Lam Dong Prov., Cat Tien protected area.** Epiphyte. Flowers with pungent fragrance, petals and sepals whitish with some pinkish dots; lip yellowish in the middle, whitish on edges. 30 V 2001, *P.K. Loc, P-9869.*

25.117. *D. pseudotenellum* Guillaumin – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m.** Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8458;* id., **Kon Plong Distr., Hieu Mun., Mang La forest enterprise, 14°38'55"N 108°25'15"E, 1186 m.** Disturbed closed evergreen submontane forest. Epiphyte. 1 III 2000, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 4662.*

25.118. *D. salaccense* (Blume) Lindley – **S.Vietnam, Dak Lac Prov., Krong Bong Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, along Dak Tour river on N macro slope of Chu Yang Sinh mt. system, 500–550 m.** Primary broad-leaved mt. evergreen forest on granites along river slopes. Epiphytic and lithophytic shrublet. Flowers yellowish. Not common. 3 V 2000, *L. Averyanov, N.T. Hiep et al., VH 5948.*

25.119. *D. secundum* (Blume) Lindley – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Sa Thay town, 14°25'N, 107°48'E, 580 m.** Primary closed evergreen seasonal broad-leaved lowland forest. Epiphyte 30 cm tall. Inflorescence 5–7 cm long, sepals and petals purple, lip yellowish, orange at top. 1 V 2000, *P.K. Loc et al., P-8837.*

25.120. *D. thyriflorum* Rchb. f. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m.** Primary closed evergreen broad-leaved mt. forest. XIII 1999 – I 2000, *P.K. Loc et al., P-8210.*

25.121. *D. truncatum* Lindley – **N.Vietnam, Ha Tinh Prov., Huong Son Distr., Son Kim Mun., Huong Son forest enterprise, along Rao Anh river, 18°25'N, 105°13'E, 200–220 m.** Primary forest. Common epiphyte. 13 VI 1999, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4431/HS-390.* **N.Vietnam, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Mun., Cuc Phuong National Park, 20°15'15"N, 105°41'40"E.** Evergreen broad-leaved forests on limestone hills. Flowers white. Living collection of Cuc Phuong National Park. 22 V 2002, *L. Averyanov, P.K. Loc, CP 06.*

25.122. *D. unicum* Seidenf. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Sa Son Mun., Chu Mom Ray nature reserve, 14°25'N, 107°44'E, 500–600 m.**

Secondary open broad-leaved evergreen dry forest on granites. Epiphyte on high tree. Flowers with carrot sweet smell, orange, lip yellowish with purple nerves. Rare. 28 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5817*.

25.123. *D. virgineum* Rchb. f. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-7991*.

25.124. *D. venustum* Teijsm. et Binnend. – **S.Vietnam, Dak Lac** Prov., **Buon Don** Distr., approximately 12°53'N, 107°48'E, 100–150 m. Open dry semi deciduous Dipterocarp forest. Epiphyte. Flower buds light yellowish-green. Common. 30 IV 2000, *L. Averyanov, N.T. Hiep et al., VH 5843*.

26. *Didymoplexiella* Garay*

26.125. *D. siamensis* (Rolfe) Seidenf.* – **N.Vietnam, Tuyen Quan** Prov., **Na Hang** Distr., Xuan Tam Mun., near Ban Cai village, 22°29'18"N, 105°19'47"E, 450–500 m. Primary broad-leaved evergreen dry forest on very steep slopes of highly eroded remnant limestone ridge. Terrestrial tuberiferous saprophyte in dry steep slope with bamboo. Flowers with strong, very pleasant fragrance, tepals light purple-violet, column white. Rare. 22 III 2001, *P.K. Loc, L. Averyanov et al., HAL 218*.

27. *Diplomeris* D. Don

27.126. *D. pulchella* D. Don – **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Liem Phu Mun., 21°57'11"N, 104°19'59"E, 1128 m. Lithophytic herb. Bulb succulent, whitish gray, leaves dark green above, paler beneath, with many small dots. Lower part of lip violet, upper part greenish, fruit green with many regularly gland dots. 1 X 2001, *N.T. Hiep et al., NTH 5081*.

28. *Doritis* Lindley

28.127. *D. pulcherrima* Lindley – **S.Vietnam, Kon Tum** Prov., **Duc Co** Distr., Sa Thay town area, around point 14°25'15"N, 107°47'04"E, 450 m. Flowers purple; lip with white trace along the middle. 13 VI 2001, *P.K. Loc, P-9882*.

29. *Epigeneium* Gagnepain

29.128. *E. amplum* (Lindley ex Wallich) Summerh. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophytic and epiphytic creeping vine. Frequent. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5191*; id., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Frequent lithophytic creeping vine 1.5 m long. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5281*. **N.Vietnam, Lao Cai** Prov., **Than Uyen** Distr., Ho Mit Mun., 22°06'N, 103°52'E, 1600–1700 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge).

Primary wet evergreen broad-leaved forest on very steep rocky slopes. Creeping epiphyte vine 2–3 m lg on high trees. Common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2684**.

29.129. *E. chapaense* Gagnepain – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional epiphyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4881**. **N.Vietnam, Lao Cai Prov., Than Uyen Distr.**, Ho Mit Mun., 22°06'N, 103°52'E, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge), 1600–1700 m. Primary wet evergreen broad-leaved forest on very steep rocky slopes. Creeping epiphyte herb on high trees. Occasionally common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2682**.

29.130. *E. labuanum* (Lindl.) Summerh. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Lithophyte. Tepals deep red-purple, lighter cream on edge, light cream fringes on lip. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4794**; *id.*, **Dong Van Distr.**, Tu Tinh Mun., 23°05'N, 105°15'E, 40.7 km to 43° of Ha Giang city, 600–750 m. Remnants of dry broad-leaved evergreen forest on steep slopes and cliffs near the top of karst limestone isolated mesas. Lithophyte on open mossy rocks. Abundant. 10 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3510a**.

30. *Eria* Lindley

30.131. *E. acervata* Lindley – **N.Vietnam, Hoa Binh Prov., Da Bac Distr.**, to the SW of Doan Ket village, 20°54'01"N, 105°04'19"E, 900–1000 m. Primary broad-leaved evergreen forest with *Calocedrus macrolepis* along tops of remnant highly eroded limestone ridge. Epiphyte. Not common. 29 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 373**.

30.132. *E. amica* Rchb. f. – **N.Vietnam, Hoa Binh Prov., Da Bac Distr.**, 4–6 km to the N of Doan Ket village, Phu Canh mt. system, 20°55'48"N, 105°02'52"E, 800–1000 m. Primary wet broad-leaved evergreen closed mt. forest on sandstone and shale with quartzite. Epiphyte on high trees. Flowers strong honey-sweet fragrant, yellowish-white with purple stripes on tepals, lip yellow-white with purple side lobes and brightly yellow epichile, inflorescence and flower bracts dull yellow. Very common. 30 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 387**. **S.Vietnam, Kon Tum Prov., Sa Thay Distr.**, Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8006, P-8215**.

30.133. *E. bilobulata* Seidenf.* – **N.Vietnam, Ha Giang Prov., Meo Vac Distr.**, Shung Cha Mun., vic. of Lo Loi Phin village, 23°11'N, 105°17'E, 1200–1250 m. Coniferous primary mossy forest with domination of *Pseudotsuga brevifolia* along tops of remnant limestone karst ridge. Lithophyte on shady mossy rocks. Common. 5 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3308**.

30.134. *E. bipunctata* Lindley – **S.Vietnam, Dak Lac Prov., Krong Bong**

Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2200–2300 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Epiphyte on mossy trees, flowers light pinkish. Not rare. 9 V 2000, L. Averyanov, N.T. Hiep et al., **VH 6222**. **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high mossy trees. Flowers white, lip with pink base and yellow top of epichile. Very common. 16 IV 2000, L. Averyanov, P.K. Loc et al., **VH 5244**.

30.135. *E. boniana* (Gagnepain) Tang et F.T. Wang – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope, on sheer rock faces in deep shade. Outer tepals dull light clear green, lip light pink-red at opening, deep red-pink along keels, with deep red-pink spot at base of throat. Occasional. 3 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 5045**. **N.Vietnam, Son La Prov., Moc Chau Distr.**, Van Ho Mun., near Hua Tat village, 20°46'35"N, 104°46'31"E, 1180–1250 m. Primary broad-leaved evergreen closed forest on remnant limestone highly eroded ridge. Lithophytic creeping herb on vertical cliff. Flowers odorless, light greenish, base of column and lip keels reddish-brown, center of epichile pink, anthers yellow. Common. 5 III 2001, P.K. Loc, L. Averyanov et al., **DKH 7323**.

30.136. *E. calcarea* V.N. Long et Aver. – **N.Vietnam, Cao Bang Prov., Thach An Distr.**, Duc Xuan Mun., 22°21'N, 106°27'E, about 39 km to SSE from Cao Bang town, 550 m. Primary broad-leaved semi deciduous forest along tops of remnant limestone ridge. Lithophyte on open rocks. Rare. 2 XII 1998, L. Averyanov, P.K. Loc, **CBL 799**.

30.137. *E. corneri* Rchb. f. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Occasional lithophyte. 4 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 5233**.

30.138. *E. coronaria* (Lindley) Rchb. f. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Lithophyte. Young fruits and sheath of new leaves spotted dull purple-red. Occasional. 1 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 4802**; id., **Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophyte. Sheaths spotted deep red-purple, young fruit light green and red-purple. Frequent. 3 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 5202**.

30.139. *E. foetida* Aver. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 1100–1150 m, 26.2 km to 2°

of Ha Giang city. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte on mossy trees. Not common. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3609**; id., **Quan Ba** Distr., around point 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along mt. ridge. Epiphyte. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5016**.

30.140. *E. globulifera* Seidenf. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N 105°01'48", 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophyte on vertical walls. Occasional. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4917**. **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, 450–550 m. Primary broad-leaved evergreen dry forest along tops of karst remnant limestone ridge. Epiphyte. Very common. 23 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov*, **NTH 3803**.

30.141. *E. lasiopetala* (Willd.) Ormerod (= *E. albidotomentosa* (Blume) Lindley; *E. pubescens* (W.J.Hook.) Lindley ex Loud) – **N.Vietnam, Ha Giang** Prov., **Dong Van** Distr., Tu Tinh Mun., 23°05'N, 105°15'E, 40.7 km to 43° of Ha Giang city, 600–750 m. Remnants of dry broad-leaved evergreen forest on steep slopes and cliffs near the top of karst limestone isolated mesas. Lithophytic and epiphytic creeping vine. Flowers yellowish with reddish stripe. Not rare. 10 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3521**.

30.142. *E. pachyphylla* Aver., **nom. nov.** – *E. crassifolia* Tsi et S.C.Chen, 1994, Acta Phytotax. Sin., 32, 6 : 561., non Ridley, 1915. – **N.Vietnam, Cao Bang** Prov., **Thach An** Distr., about 25 km to SSE from Cao Bang town, 22°27'N, 106°22'E, 500 m. Primary evergreen closed semi deciduous forest on tops of remnant limestone ridge. Lithophyte with succulent leaves in open rocks. Not common. 5 XII 1998, *L. Averyanov et al.*, **CBL 925**. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48", 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophytic vine to 1 m. Inflorescence with bracts green edged in brown. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4911**.

30.143. *E. paniculata* Lindley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8027, P-8419, P-8456b**.

30.144. *E. pannea* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Frequent epiphyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4872**; id., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Frequent epiphyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5148**. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII

1999 – I 2000, *P.K. Loc et al.*, **P-8011, P-8454**.

30.145. *E. pusilla* (Griff.) Lindley – **N.Vietnam, Lao Cai Prov, Van Ban** Distr., Liem Phu Mun., 21°57'11"N, 104°19'59"E. Non limestone evergreen broad-leaved forest. Epiphyte along stream. 1 X 2001, *N.T. Hiep et al.*, **NTH 5078**.

30.146. *E. siamensis* Schltr. – **N.Vietnam, Ha Giang Prov., Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte. Young fruit tomentose, dull white. Occasional at base of trees. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4875**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophyte and epiphyte. Occasional, locally abundant. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5194**.

30.147. *E. spicata* (D. Don) Hand.-Mazz.* – **N.Vietnam, Cao Bang** Prov. 1999, *L. Averyanov et al.*, **CBL sine no**.

30.148. *E. sutepensis* Rolfe ex Downie – **N.Vietnam, Ha Giang** Prov., **Dong Van** Distr., Tu Tinh Mun., 23°05'N, 105°15'E, 40.7 km to 43° of Ha Giang city, 600–750 m. Remnants of dry broad-leaved evergreen forest on steep slopes and cliffs near the top of karst limestone isolated mesas. Lithophyte on open mossy rocks. Very common. 10 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3513**; id., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Epiphyte and lithophyte. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4871**.

31. *Erythroides* Blume

31.149. *E. blumei* (Lindley) Schltr. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son, 23°09'56"N 104°59'13"E, 810 m. Highly disturbed grassland area along roadside. Calyx dull green, internal calyx lobes dull dark green, upright tepals forming hood, parallel with 2 upright tepals streaked in red-brown, lip red-orange at base, bright white at lip, column white. Rare. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov*, **DKH 5073**. **N.Vietnam, Hoa Binh** Prov., **Da Bac** Distr., Cao Son Mun., Ba Tri Mt., 20°52'31"N, 105°11'48"E, 500–550 m. Secondary evergreen broad-leaved forest with bamboo on very steep shale slope with quartzite along river. Terrestrial creeping herb. Sepals light brown-green with central brown-purple spot, lateral petals white with wide brown-purple longitudinal stripe, lip white, spur pinkish-brown. Rare. 3 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 557**.

32. *Eulophia* R. Br.

32.150. *E. macrobulbon* (Parish et Rehb. f.) Hook. f. **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°4'N, 108°26'E, along Dak Tour river (N slope), 500–900 m. Primary wet closed mt. broad-

leaved forest on granites along river slopes. Rare. 4 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6089**.

33. *Flickingeria* A. Hawkes

33.151. *F. angustifolia* (Blume) A. Hawkes – **S.Vietnam, Kon Tum Prov., Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high mossy trees. Flowers pinkish. Not rare. 16 IV 2000, *L. Averyanov, P.K. Loc et al.*, **VH 5247**; id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Remnants of primary broad-leaved evergreen mt. forest on sandstone slopes. Epiphytic shrublet with pendant shoots up to 1 m lg on old tree along forest river. Flowers reddish-pink. Not rare. 26 IV 2000, *L. Averyanov et al.*, **VH 5740**. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1100–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophytic herb on mossy rocks. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2980**.

33.152. *F. fimbriata* (Blume) A. Hawkes – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, along Dak Tour river on N macro slope of Chu Yang Sinh mt. system, 500–550 m. Primary broad-leaved mt. evergreen forest on granites along river slopes. Epiphytic and lithophytic shrub up to 1.5 m hg. Flowers yellowish with dull brown-reddish marks. Very common. 3 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 5954**. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 - I 2000, *P.K. Loc et al.*, **P-8211**.

33.153. *F. fugax* (Rchb. f.) Seidenf. – **N.Vietnam, Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20°16'28"N, 105°40'57", about 400 m. Secondary closed evergreen seasonal broad-leaved lowland forest on limestone hills. Lithophyte and epiphyte on mossy rocky outcrops on top of hill. Tepals light yellowish with green tint, lip light yellowish with orange epichile. Common. 19 V 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 1646**.

34. *Gastrochilus* D. Don

34.154. *G. calceolaris* (J.E. Smith) D. Don – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-7972, P-8206, P-8467, P-8487**; id., **Sa Thay** Distr., Sa Son Mun., Chu Mom Ray protected area, 14°26'33"N 107°41'08"E, 500–800 m. Primary seasonal dry, semi-deciduous forest. On tree trunk. Tepals yellow with purple-red spots, lip fringe white. Occasional. 20 II 2000, *D. Harder, N.T. Hiep, P.K. Loc et al.*, **DKH 4605**. **N.Vietnam, Son la** Prov., **Yen Chau** Distr., Muong Lum Mun., On Oc village, 20°59'06"N 104°28'46"E, 1468 m. Primary forest along limestone ridge top. Epiphyte. Outer petals light, transparent green with dark

purple spots, lower petal light green with dark purple-red spots, fringed in pure white, deep red near column, yellow at tip, behind fringe yellow with red spots. 4 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al.*, **DKH 7278**.

34.155. *G. pseudodistichus* King et Pantl. – **N.Vietnam, Ha Giang Prov., Quan Ba** Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Lithophytic vine to 0.5 m long. Rare. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5282**.

35. *Geodorum* Jackson.

35.156. *G. densiflorum* (Lam.) Schltr. – **N.Vietnam, Thai Nguyen Prov., Vo Nhai** Distr., Thuong Nung Mun., in the vic. of point 21°48'50"N, 105°57'05"E, 550 m. Primary dry evergreen seasonal broad-leaved forest with *Burretiodendron hsienmu* on highly eroded remnant ridge composed with solid hard marble like limestone. Terrestrial ephemeroïd tuberiferous herb in open grassy place among rocks. Locally common. 29 V 2002, *L. Averyanov, P.K. Loc*, **HAL 1585**.

36. *Goodyera* R. Br.

36.157. *G. foliosa* (Lindley) Benth. – **N.Vietnam, Ha Giang Prov., Meo Vac** Distr., vic. of Meo Vac town, 23°10'N, 105°24'E, 48.2 km to 36° of Ha Giang city, 1200–1300 m. Primary evergreen broad-leaved wet closed forest on sandstones. Terrestrial creeping herb in shady place. Flowers white. Not common. 7 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3402**.

36.158. *G. fumata* Thwaites – **S.Vietnam, Kon Tum Prov., Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8317**.

36.159. *G. hispida* Lindley – **S.Vietnam, Dak Lac Prov., Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 500–900 m. Primary wet closed mt. broad-leaved forest on granites along river slopes. Creeping lithophytic herb on mossy shady rocks along river canyon. Leaves deep green-brown with pink or yellow venation. Not rare. 4 V 2000, *L. Averyanov, N.T. Hiep et al.*, **VH 6102**. **N.Vietnam, Ha Giang Prov., Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. In deep shade. Leaves mottled brown with white spots with green. Rare. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4788**; id., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. In deep shade, leaves mottled green medially, with light brown nerves. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4823**.

36.160. *G. procera* (Ker-Gawl.) Hook. – **S.Vietnam, Kon Tum Prov., Sa Thay** Distr., Sa Son Mun., Chu Mom Ray protected area, 14°26'33"N 107°41'08"E, 500–800 m. Primary seasonal dry, semi-deciduous forest along stream bank, in deep

shade. Lower stems and sheathing petiole pale green, tepals white on tip to green at base. 20 II 2000, *D. Harder, N.T. Hiep, P.K. Loc et al., DKH 4553*. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes, in disturbed area. Flowers white. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4834*.

36.161. *G. viridiflora* (Blume) Blume – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Terrestrial herb with dull pink stems. Occasional. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5278*. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Van Ho Mun., near Hua Tat village, 20°46'13"N, 104°46'12"E, 1100–1300 m. Primary broad-leaved evergreen closed wet forest along remnant limestone highly eroded ridge. Terrestrial and lithophytic herb. Flowers odorless, tepals light greenish-brown, lip whitish with brown longitudinal stripes, apex with 1 brown-reddish median stripe. Rare. 7 III 2001, *P.K. Loc, L. Averyanov et al., DKH 7400*.

37. *Habenaria* Willd.

37.162. *H. amplexicaule* Rolfe ex Downie* – **N.Vietnam, Hoa Binh** Prov., **Da Bac** Distr., near Doan Ket village, 20°54'58"N, 105°03'51"E, 750–900 m. Primary broad-leaved evergreen wet forest on steep slopes of remnant highly eroded limestone ridge, Nui Da Trang mt. Lithophyte on shady rocky very steep slope. Rare. 28 II 2001, *N.T. Hiep, L. Averyanov et al., HAL 253*.

37.163. *H. malleifera* Hook. f. – **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48"N, 105°54"E, 23.3 km to 18° of Thai Nguyen city, 300–450 m. Primary broad-leaved evergreen dry forest on very steep rocky slopes of karst remnant limestone ridge. Terrestrial herb on shady slope. Rare. 23 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3802*.

37.164. *H. rhodocheila* Hance – **N.Vietnam, Vinh Phuc** Prov., **Tam Dao** Distr., vic. of Tam Dao town, 21°27"N, 105°39"E, 950 m. Secondary evergreen broad-leaved wet forest on very steep SW rhyolite slopes of Tam Dao ridge, along waterfall cascade. Terrestrial rosette herb on rocky steep slopes. Locally common. 6 VI 1999, *P.K. Loc, L. Averyanov, TD 20*.

37.165. *H. thailandica* Seidenf. – **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17"N, 106°03"E, 27 km to 55° of Bac Can city, 600–700 m. Primary evergreen broad-leaved closed forest on very steep rocky slope of karst remnant limestone ridge. Lithophytic herb on shady rocks. Not rare. 20 XI 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3731*.

38. *Hetaeria* Blume

38.166. *H. biloba* (Ridley) Seidenf. et J.J.Wood* – **N.Vietnam, Hoa Binh** Prov., **Da Bac** Distr., 4–6 km to the N of Doan Ket village, Phu Canh mt. system, 20°55'48"N, 105°02'52"E, 800–1000 m. Primary wet broad-leaved evergreen closed

mt. forest on sandstone and shale with quartzite. Lithophyte creeping herb on mossy shady rocks. Leaves pure dull green. Not common. 30 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 396**. **N.Vietnam, Lao Cai Prov., Van Ban** Distr., Nam Xe Mun., Nam Xi Tan village, W facing slope along stream between Nam Xe and Khau Co Pass at near 40 km to Than Uyen, 22°02'31"N 103°58'32"E – 22°02'57"N 103°58'35"E, 700–1113 m. Secondary forest on top of ridge on eroded granite soils. Terrestrial herb, stems succulent. Lateral tepals dull red-green with white then dull red at tip, lower lip similar, 2 petals forming hood over column, white, pink at base. Rare. 26 II 2001, *D. Harder, P.K. Loc, N.T. Hiep et al.*, **DKH 6987**; id., **Van Ban** Distr., Khanh Yen Ha Mun., elev. from Na Nheo village to the S, around point 21°59'24"N, 104°16'23"E, 680–880 m. Secondary evergreen broad-leaved wet submontane forest on very steep granite and quartzite slopes of river canyon. Terrestrial creeping herb in wet place. Lateral sepals brown-reddish with white tips and reddish spot, median sepal brownish-red with white tip, petals like side sepals, lip white, at base pink-brownish; column and anther white, leaves light uniform green. Not common. 14 III 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 2287**.

38.167. *H. rubens* (Lindley) Benth. ex Hook. f. – **N.Vietnam, Tuyen Quan** Prov., **Na Hang** Distr., Xuan Tam Mun., near Ban Cai village, 22°29'18"N, 105°19'47"E, 450–500 m. Primary broad-leaved evergreen dry forest on very steep slopes of highly eroded remnant limestone ridge. Terrestrial creeping herb in shady rocky slope. Leaves pure green, sepals green with brown tint, petals and lip white. Locally very common. 22 III 2001, *P.K. Loc, L. Averyanov et al.*, **HAL 220**. **N.Vietnam, Cuc Phuong National Park**, 300 m, forest on limestone, 30–40 m tall. Terrestrial herb. Flowers pale pink, fragrant. 1 IV 1997, *Henk van der Werff, B.Gray, N.K.Dao*, **14209**.

39. *Holcoglossum* Schltr.

39.168. *Holcoglossum wangii* Christenson – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Rare epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5269**.

40. *Hygrochilus* Pfitzer

40.169. *H. parishii* (Rchb. f.) Pfitzer – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N 105°01'48"E, 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophyte and epiphyte. Rare. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4913**.

41. *Kingidium* P. Hunt

41.170. *K. deliciosum* (Rchb. f.) Sweet – **S.Vietnam, Sa Thay** Distr., **Kon Tum** Prov., Sa Thay town area, Se San pass, around point 14°25'15"N, 107°47'04"E,

450 m. Epiphyte. Inflorescence 4–5 cm long; petals and sepals whitish with some yellowish traces; lip with a pinkish red or violet purple ring. 30 V 2001, *P.K. Loc, P-9868*. **S.Vietnam, Sa Thay** Distr., Sa Thay town area, Chu Mom Ray Nature Reserve, around point 14°25'15"N, 107°47'04"E, 450 m. Epiphyte. Inflorescence 10–15 cm long, flowers lax, on top, petals and sepals whitish; lip pale violet inside. 1 VI 2001, *P.K. Loc, P-9872*.

41.171. *K. minus* Seidenf.* – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Sa Thay town area, around point 14°25'05"N, 107°47'25"E, 600 m. Primary closed evergreen tropical seasonal broad-leaved sub-mt. forests. Epiphyte. 21 V 2001, *P.K. Loc, P-9846*.

42. *Lecanorchis* Blume

42.172. *L. javanica* Blume – **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Khanh Yen Ha Mun., to the S of Na Nheo village, 21°59'04"N, 104°15'08"E, 1000–1100 m. Primary closed broad-leaved evergreen submontane forest on steep granite and quartzite slopes. Terrestrial achlorophyllous black mycotrophic orchid. Flower buds dirty greenish-violet. Rare. 24 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2715*.

43. *Liparis* Rich.

43.173. *L. aurita* Ridley* – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Rare epiphyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4826*.

43.174. *L. averyanoviana* Szlach. – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m. Epiphyte. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4702*.

43.175. *L. bootanensis* Griff. – **N.Vietnam, Ha Giang** Prov., **Vi Xuyen** Distr., Phong Quan Mun., Mann village, Phong Quan Nature Reserve, around point 104°57'32"N 22°52'04", 200–1000 m. Primary forest on S facing cliffs of limestone ridge. Creeping lithophyte. Tepals orange, operculum green, shiny. 16 II 2001, *D. Harder, L. Averyanov, DKH 6455*.

43.176. *L. chapaensis* Gagnepain – **N.Vietnam, Lao Cai** Prov, **Van Ban** Distr., Liem Phu Min., 21°57'11"N, 104°19'59"E, non limestone evergreen broad-leaved forest. Epiphyte along stream under waterfall. Sepals orange. Very common. 1 X 2001, *N.T. Hiep et al., NTH 5080*; id., **Van Ban** Distr., Khanh Yen Ha Mun., elev. from Na Nheo village to the S, 21°58'28"N, 104°15'52"E, 680–880 m. Primary evergreen broad-leaved submontane forest on steep granite and quartzite slopes. Epiphyte. Flowers greenish. Not common. 14 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2313*.

43.177. *L. cordifolia* Hook. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, at 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Leaves green, shiny. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH*

4824; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, about 1000–1100 m, 23°06'57"N, 105°01'48"E. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophyte. Rare. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5061**.

43.178. *L. distans* C.B. Clarke – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 1000–1100 m, 23°06'57"N, 105°01'48"E. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophyte. Occasional to widespread. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5038**. **N.Vietnam, Lao Cai** Prov., **Than Uyen** Distr., Ho Mit Mun, 22°06'N, 103°52'E, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge), 1600–1700 m. Primary wet evergreen broad-leaved forest on very steep rocky slopes. Epiphyte and lithophyte herb on mossy shady places along stream. Very common at 1600–2200 m. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2685**.

43.179. *L. elliptica* Wight – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Sa Nhon Mun., east slope of Chu Mom Ray mt., 14°27'N, 107°45'E, 1773 m. Primary closed evergreen seasonal broad-leaved submontane forest with domination of *Lithocarpus* spp. on granite deep soil. Epiphyte on big tree. Flowers greenish yellow. 23 XII 1999, *P.K. Loc et al.*, **P-7952**.

43.180. *L. latilabris* Rolfe – **N.Vietnam, Sapa**, lower slopes of Fansipan, 1600 m. Epiphyte. 21 IV 1997, *Henk van der Werff, N.K.Dao, 14432. **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, 600–750 m. Primary evergreen mixed mossy forest with *Pseudotsuga brevifolia* and bamboo along tops of karst remnant limestone ridge. Lithophytic herb on shady rocks. Abundant. 20 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3727*. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional lithophyte. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4892**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°07'N, 105°02'E, about 1100 m. Degraded forest on exposed limestone outcrops along ridge. Lithophyte. Corolla all light clear orange. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5010**; id., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. Occasional lithophyte on open outcrops. Tepals clear light orange. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5112**. **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, 300–450 m. Primary broad-leaved evergreen dry forest on very steep rocky slopes of karst remnant limestone ridge. Lithophyte on shady rocks. Flowers light green. Very common. 23 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH, 3800*.*

43.181. *L. luteola* Lindley – **N.Vietnam, Hoa Binh** Prov., **Mai Chau** Distr., Hang Kia Mun., near Pa Khong village, 20°44'40"N, 104°52'32"E, 1300–1440 m.

Primary broad-leaved evergreen dry forest with *Pinus kwangtungensis* along tops of highly eroded remnant karst limestone ridge. Epiphyte. Flowers green, lip with brownish-green central spot. Rare. 9 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 828**.

43.182. *L. mannii* Rchb. f. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Frequent lithophyte and epiphyte. Flowers dull yellow. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4816**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Epiphyte and lithophyte. Flowers dull yellow-orange. Frequent. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5195**.

43.183. *L. nervosa* (Thunb.) Lindley – **N.Vietnam**, Cuc Phuong National Park, 300 m, forest on limestone. Flowers pale green, lip with brown spot in center. 2 IV 1997, *Henk van der Werff, B.Gray, N.K.Dao*, **14230**. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-7953**.

43.184. *L. viridiflora* (Blume) Lindley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area. Primary closed evergreen broad-leaved mt. forest at 600–1770 m. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8412**. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophyte herb on mossy rocks. Very common. 29 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2975**.

44. *Ludisia* A. Rich.

44.185. *L. discolor* (Ker-Gawl.) A. Rich. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 5 I 2000, *P.K. Loc et al.*, **P-7906b**. **N.Vietnam, Ninh Binh** Prov, **Nho Quan** Distr., Cuc Phuong National Park. Limestone evergreen broad-leaved forest near Bong locality. Terrestrial succulent herb 10 cm high, leaves green with tree white lines above, violet below. 12 XII 1999, *N.T. Hiep et al.*, **NTH 4104**.

45. *Luisia* Gaudich.

45.186. *L. appressifolia* Aver. – **N.Vietnam, Ha Giang** Prov., **Dong Van** Distr., Ho Quang Phin Mun., 23°11'N, 105°15'E, 48.2 km to 36° of Ha Giang city, 1250–1300 m. Remnants of dry mossy open coniferous forest with *Pseudotsuga brevifolia* along tops of remnant limestone karst ridge. Rare epiphyte. 6 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3344**; id., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Occasional epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5270**.

45.187. *L. morsei* Rolfe – **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city,

about 800 m. Remnants of primary mixed evergreen dry open forest with *Pseudotsuga brevifolia* and bamboo along tops of remnant karst limestone ridge. Common epiphyte. 19 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3680*. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8214*. **N.Vietnam, Lang Son** Prov., **Huu Lung** Distr., Huu Lien Mun., 21°40'N, 106°22'E, 400–450 m. Primary evergreen broad-leaved forest with bamboo near the top of remnant karst limestone ridge. Epiphyte. Not rare. 1 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3253*. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Epiphyte on mossy trees. Not common. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2972*.

45.188. *L. thailandica* Seidenf.* – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1150 m. Degraded primary and secondary wet evergreen broad-leaved forest with *Dacrydium* and *Dacrycarpus* along mt. river valley on sandstone. Epiphyte with erect and pendent shoots up to 1 m lg. Tepals dull brownish-red, lip deep brown-violet. Rare. 20 IV 2000, *L. Averyanov et al., VH 5433*.

45.189. *L. zollingeri* Rchb. f. – **S.Vietnam, Lam Dong** Prov., Dalat area, wild collected sample in living collection of Dalat Biology Institute. Primary broad-leaved evergreen submontane and mt. forests near Dalat town at elev. 1200–1500 m. Flowers odorless, dull yellowish. Rare. 16 V 2000, *L. Averyanov, N.T. Hiep et al., VH sine no.*

46. *Malaxis* Sol. ex Sw.

46.190. *M. acuminata* D. Don – **N.Vietnam, Lai Chau** Prov., **Sin Ho** Distr., Ta Ngau Mun. about 30 km of Lai Chau town to the N (22°18'N, 103°15'E), about 1650 m. Secondary open wet mossy evergreen broad-leaved forest with remnants of primary elements on rocky steep slope of remnant karst limestone ridge. Terrestrial herb on steep shady slopes. Flowers dirty purplish-green. Common. 25 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2794*. **N.Vietnam, Lang Son** Prov., **Huu Lung** Distr., Huu Lien Mun., 21°40'N, 106°22'E, 400–450 m. Primary evergreen broad-leaved forest with bamboo near the top of remnant karst limestone ridge. Lithophytic and terrestrial herb on cliffs of N exposition. Common. 1 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3254*. **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Terrestrial and lithophyte herb on steep slopes. Leaves purple striped. Not rare. 29 V 1999, *N.T. Hiep, L. Averyanov et al., NTH 2977*.

46.191. *M. calophylla* (Rchb. f.) Kuentze* – **S.Vietnam, Gia Lai** Prov., **Chu Pah** Distr., Chu Dang Ya Mun., Ha Bau village, Chu Nam mt., to the north of Dang Ri mt., 14°09'N, 107°03'E, 950–1000 m. Primary closed evergreen seasonal broad-leaved

forest with *Lithocarpus* spp., *Castanopsis* sp., *Shorea* sp., *Dipterocarpus* sp., *Parkia sumatrana*, *Rhodoleia championi*, *Schima wallichii*, *Nephelium* sp., *Michelia* sp., *Gironniera subaequalis*, *Syzygium* spp., *Canarium* sp., etc. mixed with bamboos on granite in open places. Terrestrial herb 10–15 cm tall. Flowers whitish green. 27 V 2001, P.K. Loc, **P-9860**.

46.192. *M. ophrydis* (Koenig) Ormerod (= *M. latifolia* J.E. Smith) – **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, 400–450 m. Secondary broad-leaved evergreen closed forest on steep shale slopes of foothills of limestone ridge. Terrestrial herb on steep slope. Rare. 19 X 1999, N.T. Hiep, P.K. Loc, L. Averyanov, **NTH 3692**.

47. *Mischobulbum* Schltr.

47.193. *M. cordifolium* (Hook. f.) Schltr. – **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Nam Xe Mun., Nam Xi Tan village, W facing slope along stream between Nam Xe and Khau Co Pass, near 40 km to Than Uyen, 22°02'31"N 103°58'32"E – 22°02'57"N 103°58'35"E, 700–1113 m. Secondary forest on top of ridge on eroded granite soils. Terrestrial herb at base of trees. Leaves light green with darker green spots. Outer petals light yellow-brown, streaked in red-purple, upright petal yellow-brown, white at base with red-purple spots. Frequent. 26 II 2001, D. Harder, P.K. Loc, N.T. Hiep et al., **DKH 6906**.

48. *Nephelaphyllum* Blume

48.194. *N. tenuiflorum* Blume – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Leaves dull green with red-purple spots. 1 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 4806**.

49. *Nervilia* Comm. ex Gaudich.

49.195. *N. aragoana* Gaudich. – **N.Vietnam, Son La** Prov., **Moc Chau** Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 550–600 m. Remnants of primary evergreen broad-leaved forests on vertical limestone bluffs along Xap river canyon. Terrestrial and lithophyte herb on steep open wet slopes. Leaves uniformly green, or with dirty purple ring-like spot. Not rare. 28 V 1999, N.T. Hiep, L. Averyanov et al., **NTH 2926**. **N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., Pu Luong protected area, near Co Lung village, 20°27'28"N, 105°12'18"E, 500 m. Primary broad-leaved evergreen forest on slope of remnant highly eroded karst limestone ridge. Terrestrial herb on steep open clay slope. Tepals light green, lip white with purple-violet side lobes and apex. Rare. 17 IV 2001, N.T. Hiep, L. Averyanov et al., **HAL 1100**.

49.196. *N. macroglossa* (Hook. f.) Schltr.* – **N.Vietnam, Hoa Binh** Prov., **Mai Chau** Distr., Hang Kia Mun., near Hang Kia village, 20°44'21"N, 104°53'57"E,

1100–1200 m. Primary wet broad-leaved evergreen closed forest on highly eroded remnant karst limestone ridge. Terrestrial tuberiferous herb on steep rocky slope. Flowers white, lip white, epichile with numerous purple-violet marks, tepals outside with finest brownish marks. Rare. 10 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 883**.

49.197. *N. punctata* (Blume) Makino – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Terrestrial herb in deep shade. Tepals green-red, lip variously spotted with purple spots. Rare. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4803**; id., **Quan Ba Distr.**, Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Terrestrial herb in deep shade. Tepals green-red, lip variously spotted with purple. Rare. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5034**; id., **Quan Ba Distr.**, Thanh Van Mun., in the vic. of Lung Cung village, around 1 km to the E from point 23°05'32"N, 105°00'10"E, 1100–1200 m. Primary coniferous forest with *Pseudotsuga brevifolia* on remnant highly eroded limestone ridge. Small terrestrial and lithophytic tuberiferous ephemeroïd herb. Rare. 9 V 2002, *P.K. Loc, L. Averyanov et al.*, **HAL 1498**.

50. *Neuwiedia* Blume

50.198. *N. inae* De Vogel – **N.Vietnam, Ninh Binh Prov., Nho Quan Distr.**, Cuc Phuong Mun., Cuc Phuong National Park, about 1.5 km N from Bong locality, 20°21'01"N, 105°35'38"E, about 450 m. Remnants of primary closed evergreen seasonal broad-leaved lowland forest on rocky slopes of stream valley between limestone hills. Terrestrial herb in shady place. Flower buds white. Occasional. 21 V 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 1686**.

51. *Oberonia* Lindley

51.199. *O. ensiformis* (J.E. Smith) Lindley – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4786**.

51.200. *O. falcata* King et Pantl. – **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m. On tree trunk near ridge top. Frequent. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4676*.

51.201. *O. kwangsiensis* Seidenf. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte. Not rare. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3582**. **N.Vietnam, Lang Son Prov., Huu Lung Distr.**, Huu Lien Mun., 21°40'N, 106°22'E, 400–450 m. Primary evergreen broad-leaved forest with bamboo near the top of remnant karst limestone ridge. Lithophyte and occasional epiphyte on cliffs of N

exposition. Common. 1 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3252*. **N.Vietnam, Ninh Binh** Prov., **Nho Quan** Distr., Cuc Phuong Mun., Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20°16'28"N, 105°40'57", about 400 m. Secondary closed evergreen seasonal broad-leaved lowland forest on limestone hills. Lithophytic and epiphytic herb on top of hills. Flowers light yellow-brown to light green. Locally very common. 19 V 2002, *L. Averyanov, P.K. Loc et al., HAL 1625*.

51.202. *O. longibracteata* Lindley – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved closed evergreen wet mt. forest on sandstone steep slopes of forest river. Epiphyte on high tree. Flowers orange-brown. Rare. 24 IV 2000, *L. Averyanov et al., VH 5702*. **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, about 300 m. Primary dry broad-leaved evergreen forest on very steep rocky slopes of remnant karst limestone ridge. Epiphyte on high trees on tops of ridge. Not common. 24 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3886*.

51.203. *O. pumilio* Rchb. f.* – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high mossy trees. Flowers dirty red-purple. Not common. 16 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5255*. **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Liem Phu Mun., Khuoi Ngoa village, around point 21°59'31"N 104°19'05"E, 1050 m. Disturbed secondary vegetation in deep shady wet ridge slopes. Epiphyte. Flowers red-brown. 22 II 2001, *D. Harder, N.T. Hiep, P.K. Loc, L. Averyanov, DKH 6752*.

52. *Ornithochilus* (Lindley) Wallich ex Benth.

52.204. *O. difformis* (Wallich ex Lindley) Schltr. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Rare epiphyte. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5200*.

53. *Otochilus* Lindley

53.205. *O. fuscus* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Occasional epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5279*.

53.206. *O. porrectus* Lindley – **S.Vietnam, Dak Lac** Prov., **Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2440 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and

Dacrycarpus on very steep granite slopes. Epiphyte on mossy trees in short tall forest on the top of main ridge. Flowers white. Very common. 9 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6202.*

54. *Panisea* (Lindley) Steudel

54.207. *P. tricallosa* Rolfe – **S.Vietnam, Kon Tum Prov., Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 25 XII 1999, *P.K. Loc et al., P-8042.* **N.Vietnam, Son La Prov., Moc Chau** Distr., Van Ho Mun., near Hua Tat village, 20°46'35"N, 104°46'31"E, 1400–1500 m. Coniferous forest with *Pinus kwangtungensis*, *Podocarpus* sp. and *Calocedrus macrolepis* along remnant limestone highly eroded ridge. Epiphyte, mainly on *Calocedrus macrolepis*. Abundant. 6 III 2001, *P.K. Loc, L. Averyanov et al., DKH 7364.*

55. *Paphiopedilum* Pfitzer

55.208. *P. appletonianum* (Gower) Rolfe – **S.Vietnam, Kon Tum Prov., Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°41'N, 108°24'E, forest at 1057–1220 m. Epiphyte and terrestrial in deep humus, associated with *Pinus dalatensis*. Leaves light green with darker square patches, upper petal light green, lateral petals pink-purple on lobes, green and deep purple at base, with dark purple-black raised spots basally, lip inflated purple, green and white, staminode deep green in center, lighter at edge. Occasional above 900 m. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4684*; id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1200 m. Primary wet mossy mt. coniferous forest on sandstone with *Pinus dalatensis*, *Fokienia hodginsii*, *Dacrydium elatum*, *Dacrycarpus imbricatus* along ridge tops. Terrestrial and occasionally lithophytic herb at base of old trees in wet mossy shady places. Central sepal light green with olive-brownish base, petals light pink-violet with green base and deep brown spots and warts along upper margin, sometimes with indistinct brownish stripes toward base, lip dull pinkish-violet with green base and green margin, synsepal light apple green, staminode emerald green with yellowish-white margin and central spot. Locally common. 18 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5316.*

55.209. *P. barbigerum* Tang et F.T. Wang var. *lockianum* Aver. – **N.Vietnam, Son La Prov., Moc Chau** Distr., Dong Sang Mun., village Ba Phach, 20°49'N, 104°39'E. Evergreen seasonal broad-leaved submontane forest on south-east slope of limestone mt. at elev. 1000–1100 m. Lithophytic herb scattered or clustered in small groups in heavily logged forest in cracks or narrow shelves of shaded vertical cliffs near ridge top. Rare. 4 IX 2001. *P.K. Loc et al., P-9894.*

55.210. *P. callosum* (Rchb. f.) Stein var. *callosum* – **S.Vietnam, Gia Lai** Prov., **Chu Pah** Distr., Chu Dang Ya Mun., village Ha Bau, mt. Chu Nam, to the north of Dang Ri mt., 14°09'N, 107°03'E, 900–950 m. Logged primary closed evergreen seasonal broad-leaved forests on granite with *Lithocarpus* spp., *Castanopsis* sp., *Shorea* sp., *Dipterocarpus* sp., *Parkia sumatrana*, *Rhodoleia championi*, *Schima*

wallichii, *Nephelium* sp., *Michelia* sp., *Gironniera subaequalis*, *Syzygium* spp., *Canarium* sp., etc. mixed with bamboos, usually in rather open places near stream banks. Terrestrial orchid (almost never on rocks). Lip reddish brown. 27 V 2001, P.K. Loc, **P-9864**.

55.211. *P. dianthum* Tang et F.T. Wang – N.Vietnam, Son La Prov., Moc Chau Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophyte herb on mossy vertical shady cliffs of N exposition. Not common. 29 V 1999, N.T. Hiep, L. Averyanov et al., **NTH 2970**.

55.212. *P. henryanum* Braem. – N.Vietnam, Ha Giang Prov., Quan Ba Distr., Sin Suoi Ho village along Sin Suoi Ho river, 23°07'N, 105°02'E, 514–900 m. Exposed limestone rocks on north and east facing slopes near ridge top under light canopy. Lithophyte on almost vertical rock walls. Occasional. 1 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 4787**. N.Vietnam, Tuyen Quan Prov., Na Hang Distr., Xuan Tam Mun., near Ban Cai village, 22°29'18"N, 105°19'47"E, 450–500 m. Primary broad-leaved evergreen dry forest on very steep slopes of highly eroded remnant limestone ridge. Lithophyte herb on vertical shady cliffs composed with salty stratified limestone mainly N and NW exposition. Rare. 22 III 2001, P.K. Loc, L. Averyanov et al., **HAL 244**.

55.213. *P. hirsutissimum* (Lindley) Pfitzer var. *esquirolei* (Schltr.) Karasawa et Saito – N.Vietnam, Ha Giang Prov., Quan Ba Distr., Sin Suoi Ho village along Sin Suoi Ho river, 23°07'N, 105°02'E, 514–900 m. Exposed limestone rocks on east facing slopes near ridge top under light. Lithophyte. Occasional. 1 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 4807**; id., Quan Ba Distr., Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°07'N, 105°02'E, 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophyte. Calyx green with dark brown hairs, corolla appears dark purple. Frequent. 2 IV 2000, D. Harder, N.T. Hiep, L. Averyanov et al., **DKH 4910**. N.Vietnam, Son La Prov., Moc Chau Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophyte herb on mossy vertical shady cliffs of N exposition. Not common. 29 V 1999, N.T. Hiep, L. Averyanov et al., **NTH 2971**; id., Moc Chau Distr., Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1200–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophyte herb on mossy vertical shady cliffs of N exposition. Not common. 29 V 1999, N.T. Hiep, L. Averyanov et al., **NTH 2971**.

55.214. *P. malipoense* S.C.Chen et Tsi var. *malipoense* – N.Vietnam, Bac Can Prov., Na Ri Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, about 800 m. Remnants of primary mixed evergreen dry open forest with *Pseudotsuga brevifolia* and bamboo along tops of remnant karst limestone ridge. Terrestrial herb on steep slope of N exposition with bamboo near the top of ridge. Leaves above green-light green tessellated, below dirty violet spotted. Very rare. 19 X 1999, N.T. Hiep, P.K. Loc, L. Averyanov, **NTH 3705**.

N.Vietnam, Ha Giang Prov., **Quan Ba** Distr., Sin Suoi Ho village along Sin Suoi Ho river, 23°07'N, 105°02'E, 514–900 m. Exposed limestone rocks on north and east facing slopes near ridge top under light canopy. Lithophyte. Upright tepal green, lateral with red-purple striations and more solid colored at base, lip with red-purple spots inside, staminode tip deep purple, shiny. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4805**.

55.215. *P. micranthum* Tang et F.T. Wang – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°07'N, 105°02'E, 1000–1100 m. Rock outcrops in degraded forest along north limestone ridge slope. Adaxial leaf surfaces green with irregular light green patches, abaxial leaf surfaces speckled red-purple, bracts light green with deep red-purple spots, young inflorescence similarly speckled, upper tepal yellow with red-purple spots, laterals yellow-green medially outside with pink margins, inside complex yellow medially with deep red veins and pink at margin, lip large, inflated white at base, pink on sides and at opening, white speckled red-pink inside, staminode mostly white, deep red-purple at base, yellow with deep red purple spots at tip. Occasionally frequent at ridge top among rocks, forming clumps to 0.25 m. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4983**; id., **Quan Ba** Distr., Bat Dai Son village, 28°08'N, 105°01'E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Abaxial leaf surfaces with red-purple spots, adaxial surfaces deep, dull green with white spots, stoloniferous, forming small colonies. Occasionally below ridge in drier protected places. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5231**.

55.216. *P. villosum* (Lindley) Stein – **S.Vietnam, Gia Lai** Prov., **Chu Pah** Distr., Chu Dang Ya Mun., village Ha Bau, mt. Chu Nam, to the north of Dang Ri mt., 14°09'N, 107°03'E, 950–1000 m. Logged primary closed evergreen seasonal broad-leaved forest with *Lithocarpus* spp., *Castanopsis* sp., *Shorea* sp., *Dipterocarpus* sp., *Parkia sumatrana*, *Rhodoleia championi*, *Schima wallichii*, *Nephelium* sp., *Michelia* sp., *Girardinia subaequalis*, *Syzygium* spp., *Canarium* sp., etc. mixed with bamboos on granite. Clustered lithophytic herb scattered in open places. Base of leaves and bracts with violet dots. 27 V 2001, *P.K. Loc*, **P-9863**.

55.217. *P. villosum* (Lindley) Stein var. *annamense* Rolfe. – **S.Vietnam, Gia Lai** Prov., **Chu Pah** Distr., Chu Dang Ya Mun., village Ha Bau, mt. Chu Nam, to the north of Dang Ri mt. 14°09'N, 107°03'E, 950–1000 m. Logged primary closed evergreen seasonal broad-leaved forest with *Lithocarpus* spp., *Castanopsis* sp., *Shorea* sp., *Dipterocarpus* sp., *Parkia sumatrana*, *Rhodoleia championi*, *Schima wallichii*, *Nephelium* sp., *Michelia* sp., *Girardinia subaequalis*, *Syzygium* spp., *Canarium* sp., etc. mixed with bamboos on granite. Clustered lithophytic herb scattered in open places. Base of leaves and bracts with violet dots. 27 V 2001, *P.K. Loc*, **P-9845C**.

56. *Parapteroceras* Aver.

56.218. *P. elobe* (Seidenf.) Aver. – **N.Vietnam, Tuyen Quang** Prov., **Na Hang** Distr., Thanh Tuong Mun., near Ban Bung village, 22°16'26"N, 105°25'58"E, 600 m. Primary broad-leaved evergreen very dry forest with *Burretiodendron hsienmu* near

top of limestone ridge. Epiphyte. Not common. 21 III 2001, *P.K. Loc, L. Averyanov et al.*, **HAL 182**.

57. *Pelatantheria* Ridley

57.219. *P. insectifera* (Rchb. f.) Ridley – **N.Vietnam, Lai Chau Prov., Sin Ho** Distr., about 50 km downstream along Black river (Song Da) from Lai Chau town, 22°03'N, 103°09'E, to Nam Ma village, about 220 m. Open shale and limestone rocks on steep slopes of the river. Epiphyte on high trees. Common. 24 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2746**.

58. *Phaius* Lour.

58.220. *P. flavus* (Blume) Lindley – **N.Vietnam, Cao Bang Prov., Bao Lac** Distr., Dinh Phung Mun., Nam Linh mt., 22°47'N, 105°49'E, 1550–1600 m. Old secondary broad-leaved wet mossy cloud forest along tops of remnant karst limestone Nam Linh ridge. Terrestrial herb up to 1.2 m hg in shady deep karst crevices and depressions. Leaves with numerous yellow spots. Not rare. 15 IV 1999, *P.K. Loc, L. Averyanov et al.*, **CBL 1403**. **N.Vietnam, Ha Giang Prov., Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Leaves with white spots. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4808**. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8287**. **N.Vietnam, Lai Chau** Prov., **Sin Ho** Distr., Ta Ngau Mun., about 30 km of Lai Chau town to the N (22°18'N, 103°15'E), about 1650 m. Secondary open wet mossy evergreen broad-leaved forest with remnants of primary elements on rocky steep slope of remnant karst limestone ridge. Terrestrial herb up to 1.6 m hg in shady steep slope. Flowers dull yellowish, leaves uniformly green. Common. 25 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2770**.

58.221. *P. longicruris* Tsi – **N.Vietnam, Cao Bang** Prov., **Tra Linh** Distr., Quoc Toan Mun., vic. of Lung Tao village, 22°45'N, 106°19'E, about 12 km from Cao Bang town to the NNE, 600–800 m. Primary semi deciduous open broad-leaved forest on steep slopes and bluffs of remnant limestone ridge. Terrestrial herb in shady place. Not common. 14 XII 1998, *N.T. Hiep, P.K. Loc, L. Averyanov et al.*, **CBL 1253**.

59. *Phalaenopsis* Blume

59.222. *Ph. braceana* (Hook. f.) Christenson* – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte. Rare. Flowers (under cultivation) odorless; sepals and lateral petals yellow-brown, warty outside, brown-chocolate inside; lip white, light brown-yellowish at the base; midlobe deep purple-violet, striped with white; side lobes white, yellow at the base, with violet tint at the apex; column light violet; anther cup

white, pollinia brightly yellow, scape and flower bracts dull green mottled with dirty-purple, pedicel and ovary green flushed with purple. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3590/a.*

59.223. *Ph. chibae* Yukawa – **S.Vietnam, Lam Dong Prov., Dalat area**, wild collected sample in living collection of Dalat Biology Institute, 1200–1500 m. Primary broad-leaved evergreen submontane and mt. forests near Dalat town. Flowers odorless, dull yellowish. Rare. 16 V 2000, *L. Averyanov, N.T. Hiep et al., VH sine no.*

59.224. *Ph. honghenensis* F.Y. Liu* – **S.Vietnam, Kon Tum Prov., Sa Thay Distr.**, Sa Thay town area, 14°25'05"N, 107°47'25"E, 600 m. Primary closed evergreen tropical seasonal broad-leaved sub-montane forests. Perennial epiphyte. 21 V 2001, *P.K. Loc, P-9867.*

59.225. *Ph. lobbii* (Rchb. f.) Sweet – **N.Vietnam, Thanh Hoa Prov., Ba Thuoc Distr.**, Eo Dieu Mun., Pu Luong protected area, near Eo Dieu village, 20°25'48"N, 105°14'13"E, 600–700 m. Primary wet broad-leaved evergreen forest on very steep slopes of remnant highly eroded karst limestone ridge. Epiphyte. Tepals white, lip yellow with brown base of side lobes. Occasional. 13 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 950.*

59.226. *Ph. mannii* Rchb. f. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, Bat Dai Son village, 28°08'11"N, 105°00'48"E, 1100–1260 m. Primary forest on limestone with *Quercus*, *Pseudotsuga* and *Podocarpus* along Chung Ti Tei ridge. Occasional epiphyte. 4 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5271.* **S.Vietnam, Sa Thay Distr., Kon Tum Prov.**, Thay town area, 14°25'15"N, 107°7'04"E, 450 m. Flowers yellow with horizontal reddish brown traces, column bright yellow. 25 V 2001, *P.K. Loc, P-9857.*

59.227. *Ph. sumatrana* Korth. et Rchb. f. *¹ – **S.Vietnam, Gialai Kon Tum Prov., Kbang Distr.**, Sopoai Mun. Epiphyte on mossy tree along forest stream. Tepals yellow with reddish-brown marks. Very rare. 17 V 1985, *Averyanov et al., LX-VN 2064.*

59.228. *Ph. wilsonii* Rolfe* – **N.Vietnam, Hoa Binh Prov., Mai Chau Distr.**, Hang Kia Mun., near Pa Khong village, 20°44'40"N, 104°52'32"E, 1300–1440 m. Primary broad-leaved evergreen dry forest with *Pinus kwangtungensis* along tops of highly eroded remnant karst limestone ridge. Epiphyte. Occasional small leaves about 2 cm lg and 1 cm wide, deep green above, light violet below. Tepals light violet, lip deep violet, column light with whitish stripes, side lobes violet with yellow, anther yellow. Locally common. 9 IV 2001, *N.T. Hiep, L. Averyanov et al., HAL 782.*

60. *Pholidota* Lindley ex Hook.

60.229. *Ph. articulata* Lindley – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N 105°01'48", 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Lithophyte. Stems brown. Rare. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH*

¹ Alone collected sample determined by Dr. E. Christenson.

4908; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Lithophytic vine. Stems dull yellow-green. Occasional. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5204**. **N.Vietnam, Lao Cai** Prov., **Than Uyen** Distr., Ho Mit Mun., 22°06'N, 103°52'E, 1500–1600 m, elev. to Mang Han San quartzite peak by SW slope from Ban Thao village (SSW macro slope of Hoang Lien Son ridge). Primary wet evergreen broad-leaved forest on very steep rocky slope. Epiphyte vine 1–2 m lg on high trees. Common. 21–22 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2711**.

60.230. *Ph. chinensis* Lindley – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Lithophyte. Upper bract dull brown-red, outer calyx light white, tip of lip yellow. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4813**; **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8371**. **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m. Occasional epiphyte on tree trunk. Inflorescence dull yellow-orange. 2 III 2000, *D. Harder, N.T. Hiep*. **DKH 4671**; id., **Kon Plong** Distr., Hieu Mun., Lan Truong Mang La forest enterprise, around point 14°40'37"N, 103°23'52"E, 1057–1220 m. Primary submontane forest. Occasional epiphyte on tree trunk. 2 III 2000, *D. Harder, N.T. Hiep*, **DKH 4671**.

60.231. *Ph. missionariorum* Gagnepain – **N.Vietnam, Ha Giang** Prov., **Meo Vac** Distr., vic. of Meo Vac town, 23°10'N, 105°24'E, 48.2 km to 36° of Ha Giang city, 1200–1250 m. Remnants of primary open mossy wet mixed forests with *Pseudotsuga brevifolia* along tops of limestone karst remnant ridge. Lithophyte on open mossy rocks. Very common. 7 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3440**.

60.232. *Ph. pallida* Lindley – **N.Vietnam, Son La** Prov., **Yan Chau** Distr., Muong Lum Mun., On Oc Village, 20°59'06"N, 104°28'46"E, 1468 m. Primary forest along ridge on crystalline limestone. Mostly lithophytic. Frequent. 4 III 2001, *D. Harder et al.*, **DKH 7266**.

60.233. *Ph. recurva* Lindley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. 25 XII 1999, *P.K. Loc et al.*, **P-8034**; id., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-7918, P-8038**.

60.234. *Ph. roseans* Schltr. – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Lithophyte. Occasional. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4870**; id., **Quan Ba** Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 1000–1100 m, 23°06'57"N, 105°01'48"E. Degraded forest on exposed limestone outcrops along north

ridge slope. Occasional lithophyte. Locally abundant. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5197**.

60.235. *Ph. rubra* Lindley – N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village on east side of Sin Suoi Ho river, 1000–1100 m, 23°06'57"N, 105°01'48"E. Degraded forest on exposed limestone outcrops along north ridge slope. Occasional lithophyte. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4940**. **N.Vietnam, Son La Prov., Moc Chau Distr.**, Chieng Hac Mun., vic. of Co Liu village, 20°51'N, 104°38'E, 1100–1240 m. Primary evergreen broad-leaved wet mossy forest along rocky tops of remnant karst limestone ridge. Lithophyte herb on mossy rocks. Abundant. 29 V 1999, *N.T. Hiep, L. Averyanov et al.*, **NTH 2979**.

60.236. *Ph. yunnanensis* Rolfe – N.Vietnam, Ha Giang Prov., Meo Vac Distr., vic. of Meo Vac town, 23°10'N, 105°24'E, 48.2 km to 36° of Ha Giang city, 1200–1250 m. Remnants of primary open mossy wet mixed forests with *Pseudotsuga brevifolia* along tops of limestone karst remnant ridge. Lithophyte on open mossy rocks. Very common. 7 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al.*, **NTH 3439**; id., **Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Frequent lithophyte. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5198**; id., **Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Frequent. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5042**; id., **Quan Ba Distr.**, Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis, Fraxinus, Quercus, Pseudotsuga, Acer* and *Taxus* along ridge and below peak. Occasional epiphyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5170**; **N.Vietnam, Hoa Binh Prov., Da Bac Distr.**, to the SW of Doan Ket village, 20°54'01"N, 105°04'19"E, 900–1000 m. Primary broad-leaved evergreen forest with *Calocedrus macrolepis* along tops of remnant highly eroded limestone ridge. Epiphyte and lithophyte. Flowers white, anther orange. Very common. 29 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 375**. **N.Vietnam, Son La Prov., Yen Chau Distr.**, Muong Lum Mun., Lum village, around point 21°00'47"N 104°29'30"E, 900–1134 m. Degraded secondary vegetation on limestone outcrops under canopy of *Pistacia* and *Calocedrus macrolepis*. Lithophyte. Outer petals golden, lip white-pink-orange, anther orange. Frequent. 2 III 2001, *D. Harder, P.K. Loc, N. T. Hiep, L. Averyanov et al.*, **DKH 7102**. **N.Vietnam, Thanh Hoa Prov., Ba Thuoc Distr.**, Eo Dieu Mun., Pu Luong protected area, near Eo Dieu village, 20°25'48"N, 105°14'13"E, 600–700 m. Primary wet broad-leaved evergreen forest on very steep slopes of remnant highly eroded karst limestone ridge. Epiphyte. Flowers white, anther orange-pink. Common. 13 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 957**.

61. *Phreathia* Lindley

61.237. *Ph. secunda* (Blume) Lindley – N.Vietnam, Ha Giang Prov., Quan Ba Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°59'E, 26.2 km to 2°

of Ha Giang city, 1100–1150 m. Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte on high trees. Rare. 12 X 1999, *N.T. Hiep*, *L. Averyanov*, *P. Cribb et al.*, **NTH 3570**.

62. *Platanthera* Rich.

62.238. *P. angustata* (Blume) Lindley – **S.Vietnam, Dak Lac Prov., Krong Bong Distr.**, Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 2200–2440 m. Primary mossy cloud mixed forest with *Pinus*, *Fokienia*, *Dacrydium* and *Dacrycarpus* on very steep granite slopes. Terrestrial herb up to 0.6 m hg on mossy steep slope. Not common. 9 V 2000, *L. Averyanov*, *N.T. Hiep et al.*, **VH 6201. S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m. Terrestrial at base of *Fokienia*. Rare. 2 III 2000, *D. Harder*, *N.T. Hiep*, **DKH 4689**.

63. *Pleione* D. Don

63.239. *P. grandiflora* (Rolfe) Rolfe – **N.Vietnam, Lao Cai Prov., Van Ban Distr.**, Khanh Yen Ha Mun., to the SW of Na Nheo village, in the vic. of point 21°57'15"N, 104°12'39"E, 2300 m. Primary broad-leaved evergreen montane forest along tops of granite-quartzite ridge. Lithophytic herb on high vertical shady mossy rocky cliff of SE exposition. Rare, but occasionally in very large colonies. Flowers pink-violet, lip with yellow center and brownish-purple spots. 20 III 2002, *L. Averyanov*, *P.K. Loc et al.*, **HAL 2542**.

64. *Plocoglottis* Blume*

64.240. *P. bokorensis* (Gagnepain) Seidenf.* – **S.Vietnam, Dak Lac Prov., Krong Bong Distr.**, Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, to main peak of Chu Yang Sinh mt. system, 12°24'N, 108°26'E, along Dak Tour river (N slope), 1100 m. Primary closed mt. broad-leaved evergreen forest on very steep granite slopes along river canyon. Terrestrial herb up to 1.5 m hg on shady rocky river slope. Rare. 12 V 2000, *L. Averyanov*, *N.T. Hiep et al.*, **VH 6435. S.Vietnam, Khanh Hoa Prov., Khanh Le Distr.**, about 8 km from Khanh Le village to the W along Lieng Ly river, 850 m. Open primary evergreen mt. forest on river side granite slopes above waterfall. Terrestrial herb in shady place. Rare. 15 XII 1995, *L. Averyanov*, *N.T. Hiep*, **VH 2483/c**.

64.241. *P. javanica* Blume* – **S.Vietnam, Khanh Hoa Prov., Khanh Le Distr.**, about 8 km from Khanh Le village to the W along Lieng Ly river, 700–850 m. Open primary evergreen mt. forest on river side granite slopes above waterfall. Terrestrial herb in shady place. Occasional. Flowers (under cultivation) odorless; sepals and lateral petals yellow with irregular red purple marks; lip light lemon-yellow with small purple marks at the base; column dull yellow, white toward the base, with longitudinal short purple stripe on each side of stigma, dull red-purple marked on dorsal

surface; anther cup and stigma dull yellow; pollinia yellow; ovary green with indistinct pale brownish marks; flower bract green. 15 XII 1995, *L. Averyanov, N.T. Hiep, VH 2483/a*.

65. *Podochilus* Blume

65.242. *P. microphyllus* Lindley – N.Vietnam, Ha Giang Prov., Quan Ba Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Widespread. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4883*; id., **Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N, 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along north ridge slope. Epiphyte and lithophyte. Rare. 3 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5201*; id., **Quan Ba Distr.**, Bat Dai Son, 23°09'N, 104°59'E, 1100 – 1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Taxus* and *Acer* along ridge and below peak. Frequent epiphyte and lithophyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov DKH 5201*. **S.Vietnam, Kon Tum Prov., Kon Plong Distr.**, Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m. Frequent epiphyte. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4675*.

66. *Porpax* Lindley

66.243. *P. reticulata* Lindley* – S.Vietnam, Kon Tum Prov., Sa Thay Distr., Sa Son Mun., south slope of Chu Mom Ray mt., 14°27'N, 107°43'E, 900–1000 m. Primary closed evergreen seasonal broad-leaved submontane forests on granite. Epiphyte. Flowers brownish-red. 14 I 2000, *P.K. Loc et al., P-8441*.

67. *Pteroceras* Hasselt ex Hassk.

67.244. *P. leopardinum* (Parish et Rehb. f.) Seidenf. et Smitin. – S.Vietnam, Kon Tum Prov., Kon Plong Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved wet evergreen forest on sandstone. Epiphyte. Tepals light yellowish with yellow-brown spots, lip white, side lobes light yellowish with yellow-brown spots, apex of middle lobe purple. 18 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5353*.

68. *Renanthera* Lour.

68.245. *R. citrina* Aver. – N.Vietnam, Ha Giang Prov., Quan Ba Distr., Thanh Van Mun., in the vic. of Lung Cung village, around 1 km to the E from point 23°25'32"N, 105°00'10"E, 1100–1200 m. Primary coniferous forest with *Pseudotsuga brevifolia* on remnant highly eroded limestone ridge. Epiphyte on mossy trees. Flowers light yellow, usually with sparse purple dots. Not common. 9 V 2002, *P.K. Loc, L. Averyanov et al., HAL 1495*.

68.246. *R. coccinea* Lour. – N.Vietnam, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Mun., living collection of Cuc Phuong National Park, 20°15'15"N, 105°41'40"E. Evergreen broad-leaved forests on limestone hills. Flowers brightly red.

22 V 2002, *L. Averyanov*, *P.K. Loc*, **CP 83. N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., Pu Luong protected area, near Co Lung village, 20°27'28"N, 105°12'18"E, 550–600 m. Primary broad-leaved evergreen forest on tops of remnant highly eroded karst limestone ridge. Woody vine up to 2 m hg on open shrubs on tops of ridge. Tepals bright purple with orange tessellation, lip purple, mesochile yellow, side lobes purple with yellow stripes, spur purple. Occasional. *N.T. Hiep*, *L. Averyanov et al.*, **HAL 1082**.

68.247. *R. vietnamensis* Aver. et R. Rice – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Lithophytic vine 1–1.5 m. Occasional. 5 IV 2000, *D. Harder*; *N.T. Hiep*, *L. Averyanov et al.*, **DKH 5156**; id., **Quan Ba** Distr., Thanh Van Mun. Small woody vine or shrublet 20–30 cm hg. Flowers brightly red to orange-yellow. Not rare. 9 V 2002, *P.K. Loc*, *L. Averyanov et al.*, **HAL 1474**; id., **Quan Ba** Distr., Thanh Van Mun., in the vic. of Lung Cung village, around 1 km to the E from point 23°05'32"N, 105°00'10"E, 1100–1200 m. Primary coniferous forest with *Pseudotsuga brevifolia* on remnant highly eroded limestone ridge. Epiphyte on mossy trees. Flowers from brightly red and red-orange to yellow-orange. Occasional. 9 V 2002, *P.K. Loc*, *L. Averyanov et al.*, **HAL 1497**.

69. *Robiquetia* Gaudich.

69.248. *R. pachyphylla* (Rchb. f.) Garay* – **N.Vietnam, Ha Giang** Prov., **Vi Xuyen** Distr., Minh Tan Mun., Ban Ngay village, around point 23°00'09"N 104°55'46"E, 225–621 m. Primary forests on E-facing ridge above river on exposed limestone rocks. Corolla white with slight pink tinge, deeper pink spot on middle lip lobe, anther light yellow. Occasional. 17 II 2001, *D. Harder*; *P.K. Loc*, *N.T. Hiep et al.*, **DKH 6470**.

69.249. *R. spathulata* (Blume) J.J. Smith – **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun. Primary closed evergreen broad-leaved mt. forest. 1999, *P.K. Loc et al.*, **PH-8236**.

69.250. *R. succisa* (Lindley) Seidenf. et Garay – **Vietnam, Ninh Binh** Prov., Cuc Phuong National Park, 20°18.83'N, 105°38.25'E, Xom Dong Con village, 7 km to Bong center. Primary valley forest. Epiphyte. 8 VIII 1999, *N.M. Cong*, *H.L. Quyen*, *M.V.Xinh*, **NMC 401**.

70. *Sarcoglyphis* Garay

70.251. *S. smithianus* (A.F.G. Kerr) Seidenf. – **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, 500–600 m. Primary broad-leaved evergreen dry closed forest on very steep slopes of remnant karst limestone ridge. Rare epiphyte. 19 X 1999, *N.T. Hiep*, *P.K. Loc*, *L. Averyanov*, **NTH 3698**.

71. *Schoenorchis* Reinw.

71.252. *Sch. gemmata* (Lindley) J.J. Smith – **S.Vietnam, Kon Tum** Prov., **Sa**

Thay Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8446**.

71.253. *Sch. seidenfadenii* Pradhan* – **N.Vietnam, Thanh Hoa** Prov., **Ba Thuoc** Distr., Co Lung Mun., Pu Luong protected area, near Co Lung village, 20°28'N, 105°12'18"E, 550–600 m. Primary broad-leaved evergreen forest on tops of remnant highly eroded karst limestone ridge. Creeping epiphyte on stem of old tree *Pistacia veinmanniifolia*. Flowers buds light violet. Rare. 17 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 1084**.

72. *Spiranthes* Rich.

72.254. *S. sinensis* (Pers.) Ames – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Tepals white at base, pink on lobes and at tip. Widespread and common. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4832**. **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr. Terrestrial herb on disturbed roadside of national route 24, 14° 36'46"N, 108° 20'42", 1103 m. Outer tepals white, pink on tip, upper and lower petals more pink, white at base. Occasional, locally abundant. 3 III 2000, *D. Harder, N.T. Hiep, P.K. Loc, DKH 4750*.

73. *Staurochilus* Ridley ex Pfitzer

73.255. *S. fasciatus* (Rchb. f.) Ridley – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P – sine no.**

74. *Sunipia* Buch.-Ham. ex Lindley

74.256. *S. annamensis* (Ridley) P.F. Hunt – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al.*, **P-8033**.

74.257. *S. racemosa* (J.E. Smith) Tang et F.T. Wang – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m. Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Epiphyte, young leaves deep purple. Locally abundant. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 5172**.

75. *Taeniophyllum* Blume

75.258. *T. pahangense* Carr. – **S.Vietnam, Kon Tum** Prov., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary degraded broad-leaved evergreen mt. forest with *Dacrycarpus* and *Dacrydium* on sandstone slopes. Epiphyte on high trees. Flowers yellowish-green to light green. Rare. 25 IV 2000, *L. Averyanov et al.*, **VH 5733**.

76. *Tainia* Blume

76.259. *T. angustifolia* (Lindley) Benth. et Hook. f. – **N.Vietnam, Bac Can** Prov., **Na Ri** Distr., Kim Hy Mun., vic. of Lung Hin Con village, 22°17'N, 106°03'E, 27 km to 55° of Bac Can city, 550–600 m. Primary evergreen broad-leaved closed forest on very steep rocky slope of karst remnant limestone ridge. Terrestrial herb on shady slope. Not rare. 20 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3712*. **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., at Sin Suoi Ho village and river, 23°06'57"N, 105°01'48"E, 514–900 m. Exposed limestone ridge top under light canopy on north and east facing slopes. Lithophyte. Inflorescence scape dull red-purple, pedicel deep purple, tepals dull red-brown, column yellow, bright yellow on lip, light purple on tip. Rare. 1 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 4809*. **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Nam Xe Mun., Nam Xi Tan village, between points 22°02'31"N, 103°58'32"E and 22°02'57"N, 103°58'35"E, 700–1113 m. Secondary forest on eroded granite soils on steep W facing slope along stream on north side of road between Nam Xe and Khau Co Pass. Occasional. 26 II 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al., DKH 6979*.

76.260. *T. latifolia* (Lindley) Rchb. f. – **N.Vietnam, Lao Cai** Prov., **Van Ban** Distr., Liem Phu Mun., Khuoi Ngoa village, around point 21°58'20"N–21°58'08"N, 104°20'16"E–104°21'00"E, 1000 m. Primary to secondary closed broad-leaved evergreen forest of *Lauraceae*, *Fagaceae*, *Sapotaceae* and *Fokienia hodginsii* on quartzite and limestone. Terrestrial herb in shady understory. Buds light yellow-green with purple markings. Rare. 21 II 2001, *D. Harder, L. Averyanov, P.K. Loc, DKH 6625*; id., **Van Ban** Distr., Nam Xe Mun., Nam Xi Tan village, W facing slope along stream between Nam Xe and Khau Co Pass, 22°02'31"N 103°58'32"E – 22°02'57"N, 103°58'35"E, 700–1113 m. Secondary forest on top of ridge on eroded granite soils. Terrestrial herb. Outer petals brown-green, lower petal dull pink-red, with white ridges, yellow deeper in throat, column white with red tint, yellow at tip, nectary red-pink. Occasional. 26 II 2001, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 6976*; id., **Van Ban** Distr., Khanh Yen Ha Mun., elev. from Na Nheo village to the S from 680 to 880 m, 21°59'24'N, 104°16'23"E, 800–880 m. Primary evergreen broad-leaved submontane forest on steep granite and quartzite slopes. Terrestrial herb. Flowers with strong sweetish unpleasant smell; sepals and side petals chestnut-brown striped, lip white with yellow epichile, column white, anther yellow. Rare. 14 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2300*; id., **Van Ban** Distr., Khanh Yen Ha Mun., to the S of Na Nheo village, in the vic. of point 21°59'04'N, 104°15'08"E, 1000–1100 m. Primary closed broad-leaved evergreen submontane forest on steep granite and quartzite slopes. Terrestrial herb in shady place. Tepals light brown-yellow with brown venation. Common. 24 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2700*.

76.261. *T. penangiana* Hook. f. – **N.Vietnam, Hoa Binh** Prov., **Da Bac** Distr., Cao Son Mun., Nui Hen (Ba Tri) mt. system, 20°54'09'N, 105°12'15"E, 700–800 m. Remnants of primary forest among secondary wet broad-leaved evergreen forest with bamboo on very steep mt. slopes based on shale and sandstones with quartzite. Lithophyte herb on shady stream rocks. Tepals yellow-brown, lip yellow

with purple-violet small marks. Occasional. 4 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 593**.

76.262. *T. viridifusca* (Hook. f.) Benth. et Hook. f. – **S.Vietnam, Kon Tum Prov., Kon Plong Distr., Hieu Mun., Mang La forest enterprise, 14°40'37"N 108°23'52"E, 1057–1220 m.** Terrestrial herb associated with *Pinus dalatensis* and *Fokienia*. Inflorescence to 1.5 m tall, tepals deep red-purple, column dull yellow. Rare. 2 III 2000, *D. Harder, N.T. Hiep, DKH 4672*.

77. *Thelasis* Blume

77.263. *Th. khasiana* Hook. f. – **N.Vietnam, Ha Giang Prov., Dong Van Distr., Tu Tinh Mun., 23°05'N, 105°15'E, 40.7 km to 43° of Ha Giang city, 600–750 m.** Remnants of dry broad-leaved evergreen forest on steep slopes and cliffs near the top of karst limestone isolated mesas. Epiphyte on mossy trees. Not rare. 10 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3514*; id., **Quan Ba Distr., Can Ti Mun., vic. of Sing Xuoi Ho village, 23°04'N, 104°9'E, 26.2 km to 2° of Ha Giang city, 1100–1150 m.** Primary closed evergreen mixed wet mossy forest with *Xanthocyparis*, *Taxus*, *Nageia* and *Pseudotsuga* along tops of karst remnant limestone ridge. Epiphyte on mossy trees. Common. 12 X 1999, *N.T. Hiep, L. Averyanov, P. Cribb et al., NTH 3578*.

77.264. *Th. pygmaea* (Griff.) Blume – **N.Vietnam, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Mun., Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20°16'28"N, 105°40'57", about 400 m.** Secondary closed evergreen seasonal broad-leaved lowland forest on limestone hills. Epiphyte on high trees on top of hill. Flowers whitish. Very common. 19 V 2002, *L. Averyanov, P.K. Loc et al., HAL 1633*.

78. *Thrixspermum* Lour.

78.265. *Th. calceolus* (Lindley) Rchb. f. – **N.Vietnam, Ha Giang Prov., Quan Ba Distr., Bat Dai Son, 23°07'N, 105°02'E, 1100–1200 m.** Primary forest on limestone with *Xanthocyparis*, *Fraxinus*, *Quercus*, *Pseudotsuga*, *Acer* and *Taxus* along ridge and below peak. Occasional epiphyte. 5 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al., DKH 5167*.

78.266. *Th. centipeda* Lour. – **S.Vietnam, Kon Tum Prov., Sa Thay Distr., Chu Mom Ray protected area, 600–1770 m.** Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8472*.

78.267. *Th. fleuryi* (Gagnepain) Tang et F.T. Wang – **N.Vietnam, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Mun., living collection of Cuc Phuong National Park, 20°15'15"N, 105°41'40"E.** Evergreen broad-leaved forests on limestone hills. Flowers light-yellow, lip white with yellow side lobes and purple nerves. 22 V 2002, *L. Averyanov, P.K. Loc, CP 11529*.

78.268. *Th. formosanum* (Hayata) Schltr. – **N.Vietnam, Lao Cai Prov., Van Ban Distr., Khanh Yen Ha Mun., to the SW of Na Nheo village, in the vic. of point 21°58'39"N, 104°14'35"E, 800–1200 m.** Primary closed evergreen broad-leaved

submontane forest on steep granite and quartzite slopes. Epiphyte on high tree. Flowers odorless; tepals yellow, lip white with fine violet spotting. Rare. 23 III 2002, *L. Averyanov, P.K. Loc et al., HAL 2676a.*

78.269. *Th. fragrans* Ridley – **S.Vietnam, Dak Lac Prov., Krong Bong** Distr., Cu Pui Mun., elev. from Dak Tour village, 12°30'N, 108°30'E, along Dak Tour river on N macro slope of Chu Yang Sinh mt. system, 500–550 m. Primary broad-leaved mt. evergreen forest on granite along river slopes. Epiphyte. Flowers yellowish-white. Very common. 3 V 2000, *L. Averyanov, N.T. Hiep et al., VH 6004.* **S.Vietnam, Kon Tum Prov., Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high tree. Not common. 16 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5239;* id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary evergreen broad-leaved wet forest with *Dacrycarpus imbricatus* on steep mt. slopes on sandstone and gneiss. Epiphyte on high tree (*Dacrydium elatum*). Flowers yellowish. 17 IV 2000, *L. Averyanov, P.K. Loc et al., VH 5297;* id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, about 1100–1150 m. Degraded primary and secondary wet evergreen broad-leaved forest with *Dacrydium* and *Dacrycarpus* along mt. river valley, on sandstone. Epiphyte on high trees along river. Flowers yellowish-white, lip white, side lobes yellowish with brownish-yellow stripes. Rare. 20 IV 2000, *L. Averyanov et al., VH 5476;* id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°39'N, 108°25'E, 1100–1200 m. Primary broad-leaved closed evergreen wet mt. forest on sandstone steep slopes of forest river. Epiphyte on high trees. Flowers odorless, yellowish-white, lip yellowish-white, side lobes with brown-orange stripes, column at front with smallest brown-orange marks. Not rare. 23 IV 2000, *L. Averyanov et al., VH 5643.*

79. *Trichotomia* Blume

79.270. *T. dasyphylla* (Parish et Rehb. f.) Kraenzlin – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8013, P-8333;* id., **Kon Plong** Distr., Hieu Mun., Mang La forest enterprise, 14°38'55"N 108°25'15"E, 1186 m. Disturbed closed evergreen submontane forest. Rare epiphyte. 1 III 2000, *D. Harder, P.K. Loc, N.T. Hiep et al., DKH 4660.*

79.271. *T. pulvinata* (Lindley) Kraenzlin – **N.Vietnam, Thai Nguyen** Prov., **Vo Nhai** Distr., Than Sa Mun., vic. of Kim Son village, 21°48'N, 105°54'E, 23.3 km to 18° of Thai Nguyen city, 450–550 m. Primary broad-leaved evergreen dry forest along tops on karst remnant limestone ridge. Epiphyte. Not common. 23 X 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3814.*

80. *Tropidia* Lindley

80.272. *T. angulosa* (Lindley) Blume – **N.Vietnam, Cao Bang** Prov., **Bao Lac** Distr., Yen Lac Mun., vic. of Yen Lac village, 22°44'N, 105°50'E, about 44 km to

NWW from Cao Bang town, 1200 m. Primary evergreen closed broad-leaved forest on steep mt. slopes of limestone ridge. Terrestrial herb up to 0.5 m hg on steep shady slope. Not rare. 15 XI 1998, *L. Averyanov, N.T. Hiep, P.K. Loc et al., CBL 307*. **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun. Primary closed evergreen broad-leaved mt. forest. 1999, *P.K. Loc et al., P-8215*.

80.273. *T. curculigoides* Lindley – **N.Vietnam, Ha Tinh** Prov., **Huong Son** Distr., Son Kim Mun., in the vic. of Rao An village, around point 18°24'30"N, 105°13'13"E, 180–200 m. Remnants of primary evergreen lowland seasonal broad-leaved forest on very steep granite-shale slopes of rocky river canyon. Terrestrial herb 20–30 cm hg. Flowers with strong sweet fragrance, white, lip with yellowish-green center. Locally common. 27 IV 2002, *P.K. Loc, L. Averyanov et al., HAL 1223*. **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8230*.

81. *Tuberolabium* Yamam.*

81.274. *T. rhopalorrhachis* (Rchb. f.) J.J. Wood* – **S.Vietnam, Lam Dong** Prov., Dalat area, wild collected sample in living collection of Dalat Biology Institute 1200–1500 m. Primary broad-leaved evergreen submontane and mt. forests near Dalat town. Flowers odorless, dull pale yellowish with dirty purple marks. Rare. 16 V 2000, *L. Averyanov, N.T. Hiep, N.Q.Hieu VH sine no.*

82. *Uncifera* Lindley

82.275. *U. dalatensis* (Guillaumin) Seidenf. et Smitin. – **S.Vietnam, Lam Dong** Prov., Langbian ridge. Flowers rose-pink, lip and spur white. 1996, *N.V.Duy, 315*.

83. *Vanda* Jones ex R. Br. – **83.276. *V. concolor*** (Rchb. f.) Garay – **N.Vietnam, Ha Giang** Prov., **Quan Ba** Distr., Bat Dai Son Mun., Bat Dai Son protected area, around point 13°09'13"N 104°59'36"E, 1064 m. Degraded forest on limestone ridge. Occasional epiphyte on trees. Petals yellow at base with dull red spots to all dull red at lobes, nectary spur creamy white, column dull white tipped in light yellow. 10 II 2001, *D. Harder, N.T. Hiep, P.K. Loc, L. Averyanov et al., DKH 6049*. **N.Vietnam, Son La** Prov., **Yen Chau** Distr., Muong Lum Mun., Lum village, around point 21°00'17"N 104°29'08"E, 1242 m. Ridge top with primary vegetation of *Pinus kwangtungensis* and *Calocedrus macrolepis*. Occasional epiphyte. Tepals light yellow to white outside, dull red inside with lighter yellow lines, base of lip yellow streaked and speckled in red-purple and on lateral walls, column creamy white. 3 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al., DKH 7200*.

83.277. *V. denisoniana* Benson et Rchb. f. – **S.Vietnam, Kon Tum** Prov., **Sa Thay** Distr., Chu Mom Ray protected area, 600–1770 m. Primary closed evergreen broad-leaved mt. forest. XII 1999 – I 2000, *P.K. Loc et al., P-8686*

83.278. *V. lilacina* Teijsm. et Binnend. – **N.Vietnam**, sine loc. III 2002, *L. Averyanov, P.K. Loc, HAL 2847*.

84. *Vandopsis* Pfitzer

84.279. *V. gigantea* (Lindley) Pfitzer – **N.Vietnam, Ha Giang Prov., Quan Ba Distr.**, at Sin Suoi Ho village on east side of Sin Suoi Ho river, 23°06'57"N 105°01'48"E, 650–750 m. Forest remnants protected by sheer limestone rocks along ridge. Rare. 2 IV 2000, *D. Harder, N.T. Hiep, L. Averyanov et al.*, **DKH 4909/1.**

85. *Vanilla* Miller

85.280. *V. annamica* Gagnepain – **N.Vietnam, Thai Nguyen Prov., Dong Hy Distr.**, Tan Long Mun., vic. of Mo Ba village, 21°46'21"N, 105°52'07"E, 400–450 m. Primary wet broad-leaved evergreen closed forest with *Burretiodendron hsienmu* on remnant highly eroded limestone ridge. Creeping epiphytic vine up to 10 m lg. Flower buds light green. Not common. 15 III 2001, *P.K. Loc, L. Averyanov et al.*, **HAL 061.**

86. *Vrydagzynea* Blume

86.281. *V. albida* (Blume) Blume – **N.Vietnam, Hoa Binh Prov., Da Bac Distr.**, 4–6 km to the N of Doan Ket village, Phu Canh mt. system, 20°55'48"N, 105°02'52"E, 800–1000 m. Primary wet broad-leaved evergreen closed mt. forest on sandstone and shale with quartzite. Terrestrial creeping herb on shady steep slopes. Sepals green at the base, white to the apex, later with yellow tips, spur greenish-white. Rare. 30 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 440. N.Vietnam, Lao Cai Prov., Van Ban Distr.**, Liem Phu Mun., Khuoi Ngoa village, around point 21°59'31"N 104°19'10"E, 1050 m. Disturbed secondary vegetation on shady wet slopes. 22 II 2001, *D. Harder, N.T. Hiep, P.K. Loc, L. Averyanov*, **DKH 6678a**; id., **Van Ban Distr.**, Khanh Yen Ha Mun., to the S of Na Nheo village, in the vic. of point 21°59'04"N, 104°15'08"E, 900 m. Primary closed broad-leaved evergreen submontane forest on steep granite and quartzite slopes. Terrestrial herb in shady place. Flowers light dull yellowish (young white). Locally not rare. 25 III 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 2748. N.Vietnam, Tuyen Quan Prov., Na Hang Distr.**, Xuan Tam Mun., near Ban Cai village, 22°29'18"N, 105°19'47"E, 450–500 m. Primary broad-leaved evergreen dry forest on very steep slopes of highly eroded remnant limestone ridge. Terrestrial creeping herb in shady rocky slope. Sepals green, petals yellow. Rare. 22 III 2001, *P.K. Loc, L. Averyanov et al.*, **HAL 221.**

87. *Zeuxine* Lindley

87.282. *Z. nervosa* (Wallich ex Lindley) Benth. ex C.B. Clarke – **N.Vietnam, Cuc Phuong national park, limestone massif**, 100–400 m. Terrestrial creeping herb in shady places, leaves green with wide median longitudinal stripe. Not common. 1999, *N.T. Hiep, NTH 3890. N.Vietnam, Ha Giang Prov., Quan Ba Distr., around point 23°06'57"N 105°01'48"E, 1000–1100 m. Degraded forest on exposed limestone outcrops along mt. ridge. Lithophytic and terrestrial herb, leaves dull green with medial lighter gray area, lower tepals brown-orange, upper tepal hood-like, similarly colored with white edges, anther light brown-orange. Rare. 3 IV 2000, *D. Harder, N.T. Hiep,**

L. Averyanov et al., **DKH 5008**. N.Vietnam, Hoa Binh Prov., Da Bac Distr., 4–6 km to the N of Doan Ket village, Phu Canh mt. system, 20°55'48"N, 105°02'52"E, 800–1000 m. Primary wet broad-leaved evergreen closed mt. forest on sandstone and shale with quartzite. Lithophytic herb on mossy shady rocks, leaves green with wide median silver stripe, sepals light pinkish-brown, petals and lip white. Rare. 30 III 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 393**. N.Vietnam, Lao Cai Prov., Van Ban Distr., to the west of Nam Xay village, 21°59'15"N, 104°03'53"E, at 600–900 m. Secondary evergreen forest with bamboo on steep slopes of granite and shale mt. Creeping herb, flowers white, lip white, with yellow center of epichile; leaves light dull green with wide whitish median longitudinal stripe. Common. 3 III 2002, *L. Averyanov, P.K. Loc et al.*, **HAL 2001**. N.Vietnam, Son La Prov., Yen Chau Distr., Muong Lum Mun., Lum village, around point 21°00'17"N 104°29'08"E, 1242 m, ridge top with primary vegetation of *Pinus kwangtungensis* and *Calocedrus macrolepis*. Among rocks, on decayed wood. Leaves green, tepals green, inner tepals green at base white at tip and on lobes, two light green spots at center of lip. Rare. 3 III 2001, *D. Harder, P.K. Loc, N.T. Hiep, L. Averyanov et al.*, **DKH 7225**; id., Moc Chau Distr., Van Ho Mun., near Hua Tat village, 20°46'35"N, 104°46'31"E, 1400–1500 m. Coniferous forest with *Pinus kwangtungensis*, *Podocarpus* sp. and *Calocedrus macrolepis* along remnant limestone highly eroded ridge. Terrestrial and Lithophytic herb, leaves green with wide silver median stripe, sepals green, petals and lip white. Rare. 6 III 2001, *P.K. Loc, L. Averyanov et al.*, **DKH 7357**. N.Vietnam, Tuyen Quang Prov., Na Hang Distr., Thanh Tuong Mun., near Ban Bung village, 22°16'26"N, 105°25'58"E, about 500 m. Primary wet broad-leaved evergreen forest with bamboo on very steep limestone-shale mt. slope. Terrestrial creeping herb on steep slope. Leaves green with wide white median stripe, sepals yellowish-green, lip and petals white. Rare. 21 III 2001, *P.K. Loc, L. Averyanov et al.*, **HAL 181**.

87.283. *Z. parvifolia* (Ridley) Seidenf. – N.Vietnam, Hoa Binh Prov., Da Bac Distr., Cao Son Mun., Buoï Truong station near Ba Tri mt., 20°52'31"N, 105°11'48"E, 500–550 m. Secondary evergreen broad-leaved forest with bamboo on very steep shale slope with quartzite along river. Terrestrial creeping herb, sepals brownish-green, petals and lip white, leaves pale dull green with median wide silver stripe. Rare. 3 IV 2001, *N.T. Hiep, L. Averyanov et al.*, **HAL 556**. N.Vietnam, Lao Cai Prov., Van Ban Distr., Liem Phu Mun., Khuoi Ngoa village, around point 21°59'31"N 104°19'05"E, 1050 m. Disturbed secondary vegetation on shady wet ridge slopes. Leaves light green, stem red-purple, peduncle red-pink. Widespread but rare in flower. 22 II 2001, *D. Harder, N.T. Hiep, P.K. Loc, L. Averyanov*, **DKH 6740**. N.Vietnam, Son La Prov., Moc Chau Distr., Long Luong Mun., near Sang Cai village, 20°45'51"N, 104°51'26"E, 1300–1400 m. Secondary wet bamboo forest at the margin of primary forest on alluvial base of remnant limestone highly eroded ridge. Terrestrial creeping herb. Flowers odorless, sepals green-brownish, lateral petals light green, lip brightly yellow. Rare. 8 III 2001, *P.K. Loc, L. Averyanov et al.*, **DKH 7515**.

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РЕЗЮМЕ

В статье приводятся новые местонахождения 283 редких видов орхидных из 87 родов, собранных на территории Вьетнама во время полевых работ 1999–2002 годов, а также обнаруженных в гербариях и частных коллекциях СПб и России. Из них 3 рода (*Didymoplexiella* Garay, *Plocoglottis* Blume, *Tuberolabium* Yamam.) и 32 вида (*Anoectochilus repens* (Downie) Seidenf. et Smitin., *Bulbophyllum clipeibulbum* J.J. Vermeulen, *B. funingense* Tsi et H.C. Chen, *B. penicillium* Parish et Rchb. f., *B. smitinandii* Seidenf. et Thorut., *Coelogyne ecarinata* C. Schweinf., *C. huettneriana* Rchb. f., *Cyrtosia integra* (Rolfe ex Downie) Garay, *Denadribium brymerianum* Rchb. f., *D. chittimae* Seidenf., *D. cruentum* Rchb. f., *D. hancockii* Rolfe, *Didymoplexiella siamensis* (Rolfe) Seidenf., *Eria bilobulata* Seidenf., *E. spicata* (D. Don) Hand.-Mazz., *Habenaria amplexicaule* Rolfe ex Downie, *Hetaeria biloba* (Ridley) Seidenf. et J.J. Wood, *Kingidium minus* Seidenf., *Liparis aurita* Ridley, *Luisia thailandica* Seidenf., *Malaxis calophylla* (Rchb. f.) Kuentze, *Nervilia macroglossa* (Hook. f.) Schltr., *Oberonia pumilio* Rchb. f., *Phalaenopsis braceana* (Hook. f.) Christenson, *Ph. honghenensis* F.Y. Liu, *Ph. sumatrana* Korth. et Rchb. f., *Ph. wilsonii* Rolfe, *Plocoglottis bokorensis* (Gagnepain) Seidenf., *P. javanica* Blume, *Porpax reticulata* Lindley, *Schoenorchis seidenfadenii* Pradhan, *Tuberolabium rhopalorrhachis* (Rchb. f.) J.J. Wood) найдены во Вьетнаме впервые. Впервые для орхидных Вьетнама приняты 5 законных названий, одно из которых предложено впервые. Это – *Bulbophyllum longibrachiatum* Tsi (= *B. purpureifolium* Aver.), *Cephalantheropsis obcordata* (Lindley) Ormerod (= *C. gracilis* (Lindley) S.Y.Hu), *Cheirostylis takeoi* (Hayata) Schltr. (= *Ch. eglandulosa* Aver.), *Eria lasiopetala* (Willd.) Ormerod (= *E. albidotomentosa* (Blume) Lindley; *E. pubescens* (W.J. Hook.) Lindley ex Loud), ***Eria pachyphylla* Tsi et S.C. Chen ex Aver., nom. nov.** (*E. crassifolia* Tsi et S.C. Chen, 1994, non Ridley, 1915).