

УДК 582.594 (597)

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NEW ORCHIDS (ORCHIDACEAE) IN THE FLORA OF VIETNAM

НОВЫЕ ОРХИДНЫЕ (ORCHIDACEAE) ВО ФЛОРЕ ВЬЕТНАМА

Summary. *Tainia cornuta*, a taxonomically isolated species combining morphological features of genera *Ania*, *Tainia*, *Mischobulbum*, *Nephelaphyllum* and *Hancockia* discovered in central Vietnam, is described and illustrated. *Abdominea minimiflora* representing the monotypic genus, along with *Appendicula torta*, *Bulbophyllum unciniferum*, *Liparis compressa* and *Phaius wenshanensis* are recorded as new for Vietnam. Native locality of *Dendrobium farinatum* described on the base of unlabeled commercial export to Germany is firstly detected.

Key words: *Appendicula torta*, *Bulbophyllum unciniferum*, *Dendrobium farinatum*, *Liparis compressa*, *Phaius wenshanensis*, *Tainia cornuta*, new species, new record.

Аннотация. В заметке описывается *Tainia cornuta* – таксономически изолированный вид, найденный в центральном Вьетнаме и сочетающий в своей морфологии черты родов *Ania*, *Tainia*, *Mischobulbum*, *Nephelaphyllum* и *Hancockia*. Единственный представитель рода *Abdominea* – *A. minimiflora* вместе с ещё четырьмя видами – *Appendicula torta*, *Bulbophyllum unciniferum*, *Liparis compressa* и *Phaius wenshanensis* – приводятся для флоры Вьетнама впервые. Установлено местонахождение *Dendrobium farinatum*, описанного в Германии по растению, привезенному из Вьетнама без достоверных данных о его нахождении. Указания видов сопровождаются рисунками и фотографиями.

Ключевые слова: *Appendicula torta*, *Bulbophyllum unciniferum*, *Dendrobium farinatum*, *Liparis compressa*, *Phaius wenshanensis*, *Tainia cornuta*, новый вид, новые находки.

INTRODUCTION

The paper presents results of field botanical explorations in Vietnam during 2011. It includes descriptions of 1 newly discovered, morphologically very distinct species (*Tainia cornuta*) and data for 1 genus and 5 species recorded in Vietnam for the first time. These are *Abdominea minimiflora* (representative of the monotypic genus), *Appendicula torta*, *Bulbophyllum unciniferum*, *Liparis compressa* and *Phaius wenshanensis*. Native locality of *Dendrobium farinatum* described in Germany on the base of unlabeled commercial export is firstly detected. Mentioned species are listed below in alphabetical order. Each record is accompanied (when necessary) with main synonyms and description. Data on ecology, phenology, rarity, distribution, taxonomical notes and list of studied specimens are also provided. Most of recorded species are illustrated with analytical drawings and photographs.

***Abdominea minimiflora* (Hook. f.) J.J. Sm.,** 1917, Bull. Buitenzorg 2 s. 25: 98; Seidenf., 1988, Opera Bot. 95: 51, fig. 27; Comber, 1990, Orch. Java: 332, photo; Seidenf., Wood, 1992, Orch.

Pen. Mal. Sing.: 590, fig. 268 a-c; Wood, Cribb, 1994, Checklist Orch. Borneo: 321. – *Saccolabium minimiflorum* Hook. f., 1890, Fl. Brit. Ind. 6: 59; id., 1893, Ic. Pl., tab. 2133.

Described from central part of Peninsular Malaysia (“Perak, ...”). Type (“... *Scortechini 635b*”) – K.

Distribution. Northern Vietnam (Tuyen Quang province). Thailand, Malacca Peninsula, Java, Kalimantan, Philippines.

Ecology. Canopy epiphyte. Primary and secondary broad-leaved evergreen humid lowland forests on sandstone and shale at elev. 400–600 m a.s.l. Flowers in September – October.

Notes. Very rare orchid all over its broad distribution, a member of monotypic genus.

Studied specimens. Tuyen Quang Prov., Na Hang Distr., Sinh Long municipality, Nam Duong village, Xo Lo Tre Valley, point 22°35'16.4"N, 105°21'32.1"E, 512 m a.s.l. In logged closed primary evergreen broad-leaved lowland forests on slopes of sandstone and shale mts. Epiphyte, tepals white. 28 Sept. 2011, *N.T. Hiep, N.S. Khang, P.V. The, N.T. Vinh, CPC 4512* (CPC Herbarium, LE). Fig. 1 a-c.

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Поступило в редакцию 09.03.2012 г.

Submitted 09.03.2012

***Appendicula torta* Blume,**

1825, Bijdr.: 303; Comber, 1990, Orch. Java: 194, photo; Seidenf., Wood, 1992, Orch. Pen. Mal. Sing.: 327, fig. 143 i-l; Wood, Cribb, 1994, Checklist Orch. Borneo: 230; Comber, 2001, Orch. Sumatra: 533, photo; Schuiteman et al., 2008, Checklist Orch. Laos. Nord. Journ. Bot. 26: 264.

Described from Java ("Crescit: in montanis Seribu et Pantjar."). Type ("*Blume s.n.*") – BO (holotype), K (isotype).

Distribution. Northern Vietnam (Dien Bien province). Laos, Malacca Peninsula, Java, Sumatra, Kalimantan.

Ecology. Epiphyte. Primary evergreen broad-leaved submontane forests on rocky crystalline marble-like rocky limestone at elevation 1000–1100 m a.s.l., particularly on mountain tops. Flowers in February – August.

Studied specimens. Dien Bien Prov., Dien Bien Distr., Na U municipality, Hua Thanh village, around point 21°12'16"N, 102°57'27"E. Highly destroyed primary closed evergreen broad-leaved submontane forest on rocky crystalline marble-like rocky limestone at elevation 1000–1100 m a.s.l. Epiphyte on old trees on rocky top of mountain. Not common. 9 April 2011, *P.V. The, CPC 2329* (CPC Herbarium, LE).

***Bulbophyllum unciniferum* Seidenf.,**

1973, Bot. Tidsskr. 68: 58, fig. 18; id., 1979, Dansk Bot. Ark. 33, 3: 174, fig. 125; Chen Xinqi, Vermeul., 2009, Fl. China 25: 424.

Described from northern Thailand ("Doi Inthanond 1600 m"). Type ("Beusekom & Phengkhlai 2667") – L.

Distribution. Northern Vietnam (Dien Bien province). N Thailand, S China (S Yunnan).

Ecology. Creeping epiphyte. Primary humid evergreen broad-leaved forests on highly eroded marble-like solid crystalline limestone at elevation 1100–1500 m a.s.l., particularly on mountain tops. Flowers in February – March.

Studied specimens. Dien Bien Prov., Tua Chua Distr., Sin Chai Municipality, around point 22°03'38"N 103°19'56"E. Primary humid evergreen broad-leaved forest on very steep rocky slopes and on tops of remnant mountain composed with highly eroded marble-like solid crystalline limestone at elevation 1350–1500 m a.s.l. Creeping epiphyte on old mossy tree. Occasional. 14 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 930a* (CPC Herbarium, LE). Dien Bien Prov., Muong Cha Distr., Mua Ngai Municipality, around point 21°52'19"N 103°10'01"E. Remnants of pri-

mary evergreen broad-leaved forest on very steep rocky slopes and on tops of remnant mountain composed with highly eroded marble-like solid crystalline limestone at elevation 1150–1250 m a.s.l. Creeping epiphyte on old mossy trees near top of ridge. Common. 18 December 2010, *L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, CPC 1057a* (CPC Herbarium, LE). Fig. 1 e-i.

***Dendrobium farinatum* Schildh. et Schraut,**

2004, Journ. Orchideenf. 11, 4, 4: 374, figures.

Described on the base of plants imported to Germany supposedly from NW Vietnam. Type ("Typus: Nordwestvietnam, Lai Chau Provinz, ca. 800–900 m Höhe, importiert im Jahre 2001 (Holotypus: M)") – M.

Distribution. Northern Vietnam (Lai Chau province – questionable), southern Vietnam (Khanh Hoa province).

Ecology. Epiphyte. Primary and secondary broad-leaved evergreen humid forests on silicate rocks at elev. 1300–1500 m a.s.l. Flowers in June – July.

Notes. Taxonomically isolated species. It belongs to *Dendrobium* sect. *Breviflores* Hook. f. and may be related to *D. dantaniense*. Probably it is a local endemic of South Annamese floristic province (Averyanov et al., 2003) occurring in eastern part of Central Highlands (Tay Nguyen Plateau). Origin of authentic specimen exported from Vietnam and used for species description remains questionable. The only verified finding of this species in nature was made in Hon Ba Mountains of central Vietnam.

Studied specimens. Vietnam, Khanh Hoa Prov., Cam Lam Distr., Hon Ba nature reserve, below Yersin house along road side at elevation about 1400 m a.s.l., very rare. June 2011, *Jana Skornickova, HB-116* (ITB), photo (LE, SING). Fig. 1 j, k.

***Liparis compressa* (Blume) Lindl.,**

1830, Gen. Sp. Orch. Pl.: 32; Comber, 1990, Orch. Java: 133, photo; Seidenf., Wood, 1992, Orch. Pen. Mal. Sing.: 239, fig. 102 d-f; Wood, Cribb, 1994, Checklist Orch. Borneo: 90, fig. 5, c, d; Comber, 2001, Orch. Sumatra: 147, photo. – *Malaxis compressa* Blume, 1825, Bijdr.: 390.

Described from Java ("Crescit: in sylvis altioribus Provinciarum Buitenzorg, Bantam et Tjanjor."). Type ("*Blume s.n.*") – BO.

Distribution. Southern Vietnam (Lam Dong province). Malacca Peninsula, Sumatra, Java, Kalimantan, Sulawesi, Philippines.

Ecology. Epiphyte. Primary and secondary broad-leaved evergreen humid submontane forests



Fig. 1. *Abdominea minimiflora* (Hook. f.) J.J. Sm. a-c: plant in flowers, inflorescence and flowers, CPC 4512 (all photos of Nguyen Sinh Khang). *Bulbophyllum unciniferum* Seidenf. d-i: plant in flowers, flowers and column, lip and petals, CPC 1057a (all photos of Phan Ke Loc). *Dendrobium farinatum* Schildh. et Schraut. j, k: portion of flowering stem and inflorescence, HB-116 (all photos of J. Skornickova). *Liparis compressa* (Blume) Lindl. l-o: flowering plant in its habitat, inflorescence and flowers J. Skornickova s.n., July 2011 (all photos of J. Skornickova).



Fig. 2. *Phaius wenshanensis* F.Y. Liu. a: upper part of inflorescence, b-d: flowers, side and frontal view, e: lip, frontal view, f: column and anther, frontal view CPC 4517 (all photos of Nguyen Sinh Khang).

on sandstone and shale. Flowers in June – August (September).

Studied specimens. Vietnam, Lam Dong Prov., Dalat – Bidoup road, Bi Dup mt., July 2011, *Jana Skornickova s.n.*, photo (LE, SING). Fig. 1 l-o.

***Phaius wenshanensis* F.Y. Liu,**

1991, *Acta Bot. Yunnan.* 13, 4: 372, fig. 1; Chen Xinqi, *Cribb, Bell*, 2009, *Fl. China* 25: 291.

Described from SE Yunnan (“Yunnan: ..., Wenshan ..., Alt. 1300 m, terrestrial in dense forest.”). Type (“1988, *F.Y. Liu ... 88003*”) – KUN.

Distribution. Northern Vietnam (Lao Cai, Tuyen Quang provinces). SE Yunnan.

Ecology. Terrestrial herb on shady, humid lowland primary broad-leaved evergreen primary forests on sandstone and shale at elevations 400–600 m a.s.l. (in S China to 1300 m). Flowers in September – November (December).

Notes. Rare local endemic of South Chinese floristic province.

Studied specimens. Tuyen Quang Prov., Na Hang Distr., Sinh Long municipality, Nam Duong village, Xo Lo Tre valley, around point 22°35′42.5″N, 105°20′58.8″E, 515 m a.s.l. In logged closed primary evergreen broad-leaved lowland forests on slopes of sandstone and shale mts. Terrestrial herb to 1 m high, labellum brightly orange, red-violet inside. 28 September 2011, *N.T. Hiep, N.S. Khang, P.V. The, N.T. Vinh, CPC 4517* (CPC Herbarium, LE). Fig. 2 a-f. Lao Cai Prov., Sapa town, wild collected cultivated plant, December 2011, *A. Schuite-*

man (LE – anonymous photo).

***Tainia cornuta* Aver., sp. nov.**

Described from central Vietnam (“Quang Nam Prov., Dai Loc Distr., Dai Hong municipality, environs of Dai Hong town around point 15°49′19″N 107°56′58″E. Rich secondary broad-leaved evergreen forest on very steep rocky slopes and cliffs composed with eroded sandstone at elev. about 400 m a.s.l. Terrestrial herb on shady slope. Not common”).

Type (“19 May 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu, P.V. The, N.T. Vinh, CPC 3394*”) – CPC Herbarium (holotype), LE (isotype).

Terrestrial sympodial herb with densely clustering pseudobulbs arising from basal part of each other, leafless at anthesis (or with completely dry, partially disintegrated leaves). **Pseudobulbs** brownish to olive, sometimes with purplish tint, glabrous, of 1 internode, oblique ovate to narrowly ovate, (1.5)2–3(3.5) cm tall, 0.5–1(1.5) cm wide at the base, strongly tetragonal in section, usually with 4 narrow longitudinal ribs, 1-leaved at apex, enveloped by broad, scarious, papyraceous, more or less disintegrated bracts. **Roots** few, arising from the base of pseudobulbs, densely tomentose, 1–2 mm in diam. **Leaves** sessile, without articulation at the base, ovate, (2)3–5(6) cm long, 2–3 cm wide, round to cordate at the base, apiculate, thin, plicate, finely undulate or almost straight along margin, commonly with 8–10 main longitudinal arching anastomosing veins. **Inflorescence** erect, arising from the basal part

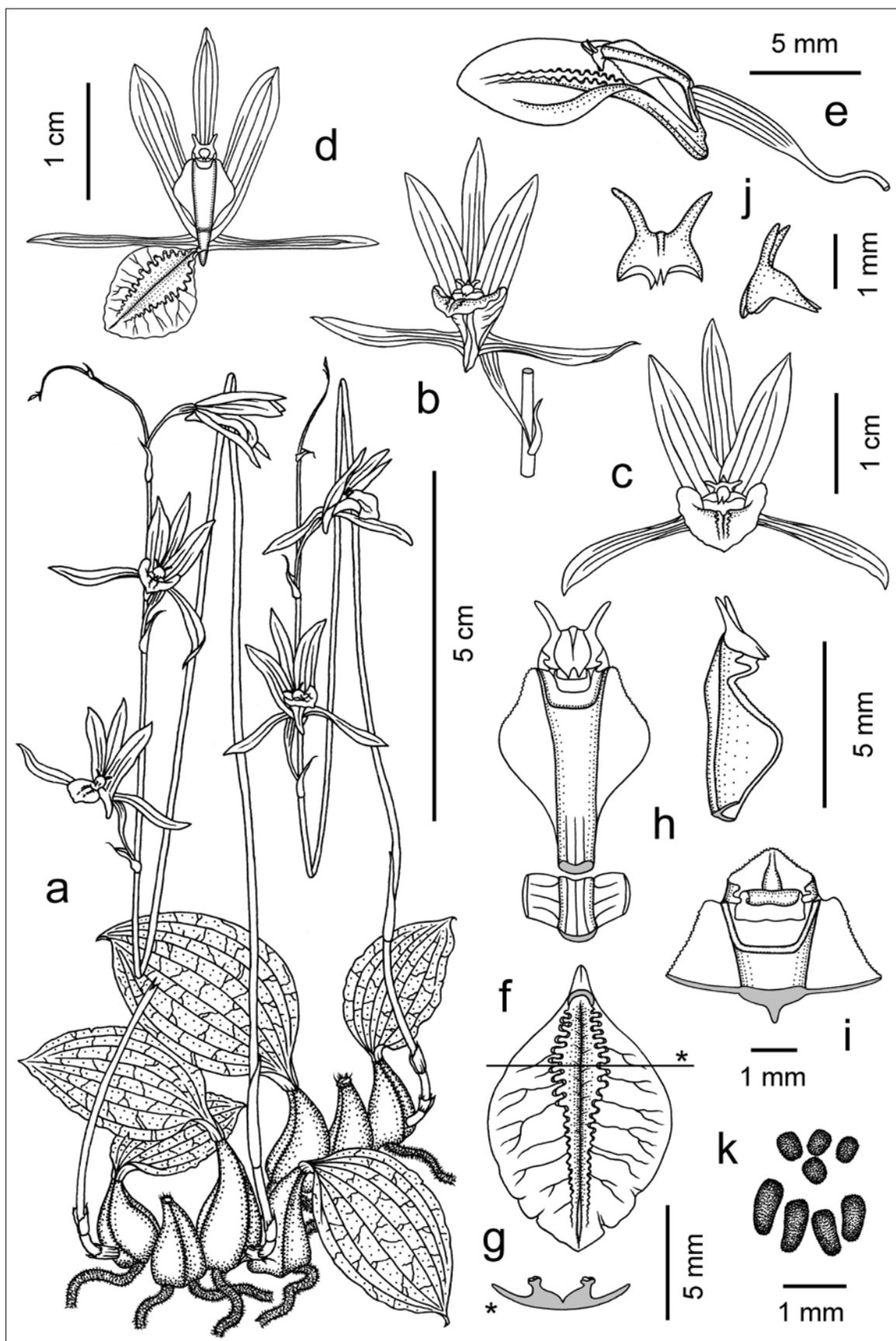


Fig. 3. *Tainia cornuta* Aver. a: flowering plant; b, c: flower, half-side and frontal view; d: flattened flower, frontal view; e: lip, column and ovary, side view; f, g: flattened lip and lip transversal section (along line marked with asterisk); h: column, frontal and side view; i: column apex with removed operculum, frontal view; j: operculum, frontal and side view; k: pollinia. All drawn from the type – CPC 3394 by L. Averyanov and T. Maisak.

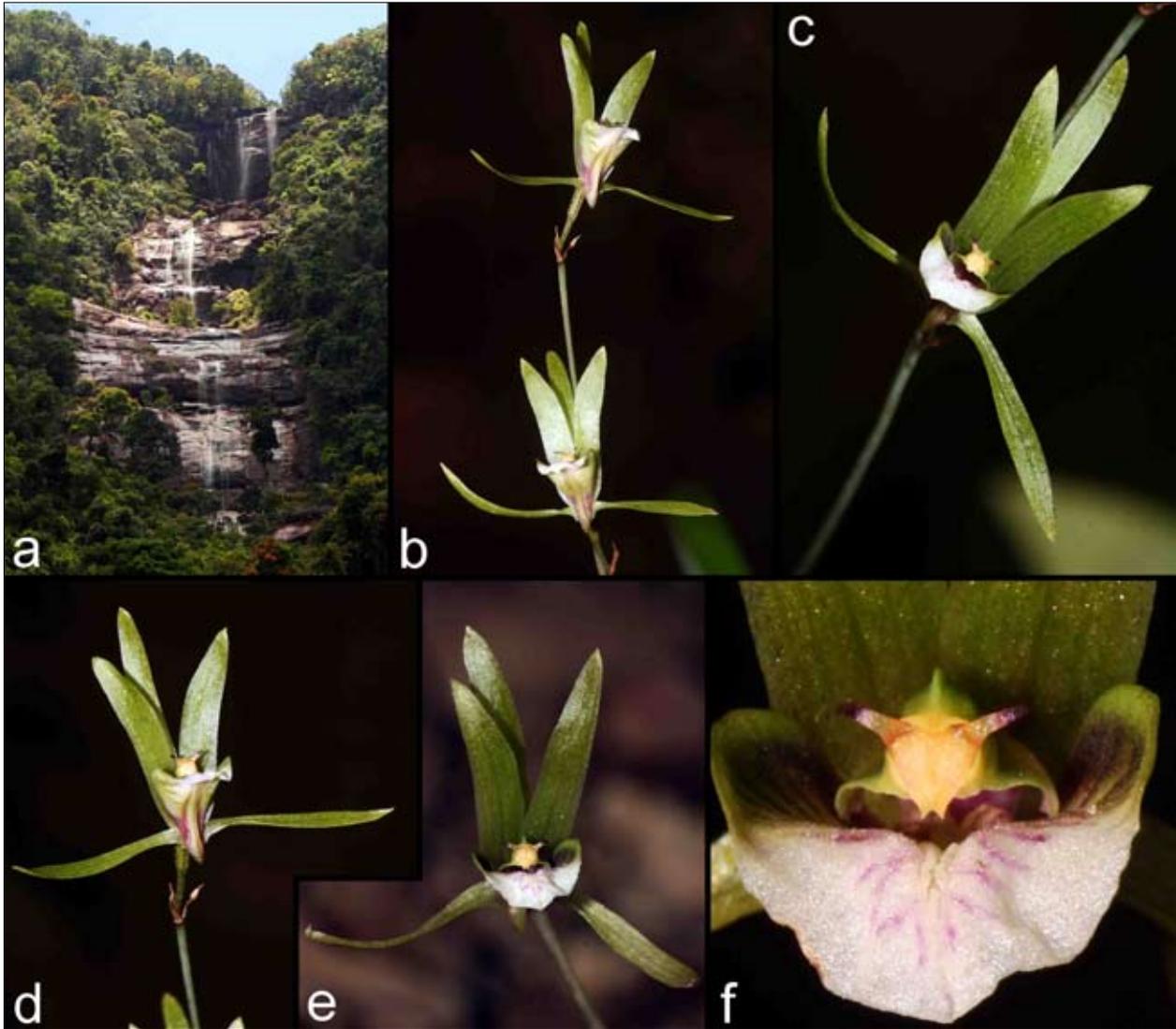


Fig. 4. *Tainia cornuta* Aver. a: habitat of species on ancient highly eroded sandstone; b: inflorescence; c-e: flower; f: column and operculum, view from the top. All photos made from the type specimens – CPC 3394 by author.

of pseudobulb, 20–(30)35 cm long, with (1)2–3(5) flowers. **Peduncle** in basal part bears 2–3(4) sterile, light yellowish ovate to lanceolate, acute scales 0.4–1.5 cm long, 2–3 mm wide. **Rachis** glaucous, 3–8(10) cm long, with flowers distant on (2.5)3–4 cm. **Floral bracts** papyraceous, yellowish-brown, suberect to reflexed, narrowly cuneate, acuminate, 3–6 mm long, 1–2 mm wide. **Pedicele and ovary** 1–1.5 cm long, more than twice longer than floral bracts; pedicel often flexuose, filiform; ovary distinctly ridged, 1–1.5 mm in diam. **Flowers** widely opening, 2.5–3 cm in diam., odorless, all opening at the same time, sepals and petals uniform light green, 3–5 veined. **Sepals** narrowly lanceolate, 1.5–2 mm long, 1.5–2 mm wide, acute, with broad base adnate to lateral distal part of column foot. **Petals** obliquely oblong lanceolate, 1.5–1.8 mm long, 2–3 mm wide, twice broader than median sepal, acute, with broad

base decurrent along column foot flanges. **Lip** white with few red-purple nerves and small marks, laterally greenish, entire, ovate, (9)10–11(12) mm long, 8–9 mm wide, thin, strongly recurved, irregularly undulate along margin, with 2 fleshy longitudinal keels strongly undulate along edge, shortly spurred at the base. **Spur** white, greenish to purplish, straight, broadly conical, about 1 mm long and broad, roundish-obtuse at apex. **Column** pinkish-green, slightly forward curved to nearly straight, erect, 4.5–5 mm tall, 4–4.5 mm wide, with large triangular, finely denticulate, incurved lateral wings 2–2.5 mm wide, forming cymbiform structure; dorsally column with prominent longitudinal keel increasing to the top. **Column foot** at broad angle to column base, down directed, 2.5–3 mm long, lip firmly attached without articulation, not moveable. **Stigma** subapical, subquadrate; rostellum in form of broad plate erect

and revolute (from pollinia); clinandrium deep, with 2-lobed lateral arms embracing operculum base and with high, triangular, finely denticulate dorsal wall. **Operculum** light yellow, helmet-shaped, with 2 erect, or slightly laterally curved, finger-like horns, white at the base, dark purple to the apex. **Pollinia** 8, 4 small – ovoid and 4 larger – clavate, composed by friably placed massulae. **Fruits** narrowly ovoid, indistinctly ridged, drooping capsule to 2 cm long. Fig. 3, 4.

Distribution. Central Vietnam (Quang Nam province). Probably, endemic of eroded sandstone formations in central part of Vietnam.

Ecology. Terrestrial herb on shady, very steep sandstone slopes in primary and rich secondary broad-leaved evergreen forests at elevations about 300–500 m a.s.l. Flowering was observed during rainless season in May, when leaves become completely dry and partially disintegrate into fibrous remnants. Fruits in July – August.

Etymology. Species name reflects presence of characteristic horn-like processes on anther cap top.

Notes. Discovered plant represents curious entity that dramatically changes widely accepted concept of delimitation of closely related genera *Ania* Lindl., *Tainia* Blume, *Mischobulbum* Schltr., *Nephelaphyllum* Blume and *Hancockia* Rolfe. The

plant undoubtedly belongs to the mentioned generic complex, but it does not fit with any of these genera in its morphology. Meanwhile, it surprisingly combines features sporadically occurring in species spreading in all mentioned genera. This plant has pseudobulbs that resemble pseudobulbs of *Ania* species, spur and column foot occurring in flowers of *Tainia*, leaves similar to leaves of *Mischobulbum* and *Hancockia*, horny operculum similar to some species of *Nephelaphyllum*, etc. (see Table 1).

At the same time the plant indeed differs from *Ania* and *Tainia* in strongly tetragonal pseudobulbs, in sessile, thin leaves (cordate or subcordate at the base), in distinct spur and in finger-like horns erected on anther cap. Our plant differs from *Nephelaphyllum* (besides the mentioned features) in resupinate flowers with well-developed column foot, and in long column and insignificant rostellum. Eventually, the discovered plant differs from *Mischobulbum* in spurred lip, well developed column foot, and from *Hancockia* in many flowered inflorescence, fleshy pseudobulbs, large rostellum, horny anther cap and in short spur. Meanwhile, some distinct features typical for described plant are probably unique in the complex. These are: large triangular lateral column wings, dorsal longitudinal keel on column back and bidentate operculum. Additionally, plant

Table
Comparative morphological features observed in *Tainia cornuta* and in species of related genera treated in narrow sense

Morphological feature	Genus					
	<i>T. cornuta</i>	<i>Tainia</i> s. str.	<i>Ania</i> s. str.	<i>Nephelaphyllum</i>	<i>Mischobulbum</i> s. str.	<i>Hancockia</i>
Pseudobulbs thick, conical or ovoid (+); pseudobulbs thin, cylindric (–)	+	–	+	–	±	–
Pseudobulbs in section distinctly tetragonal (+); pseudobulbs in section round or indistinctly angled (–)	+	–	–	–	±	–
Leaves sessile or subsessile (+); leaves petiolate (–)	+	±	–	±	+	+
Leaf base cordate to round (+); leaf base attenuate (–)	+	±	–	+	+	+
Plant leafless during anthesis (+); Plant with green leaves during anthesis (–)	+	–	–	–	–	–
Flowers resupinate (+); flowers not resupinate (–)	+	+	+	–	+	+
Spur present (+); spur absent (–)	+	–	+	+	–	+
Column with broad triangular lateral wings (+); column without wings or with narrow lateral wings (–)	+	–	–	–	–	–
Column dorsally with longitudinal keel (+); column dorsally without keel (–)	+	–	–	–	–	–
Column foot distinct (+); column foot absent or very small, indistinct (–)	+	+	±	–	+	+
Operculum with 2 horns or distinct warts (+); operculum without horns or warts (–)	+	±	–	+	±	–
Operculum with furcate-bidentate apex (+); operculum apex obtuse or acute (–)	+	–	–	–	–	–
Rostellum large, broadly ligulate, revolute (+); rostellum small, insignificant (–)	+	±	±	–	±	–

becomes leafless at anthesis that normally has never been observed in any species of the related genera. Following the narrow concept of the mentioned genera, our plant should be, undoubtedly, accepted as a member of a separate undescribed monotypic genus on the base of its distinct specific morphology. Nevertheless, I follow here some recent authors (Chen Xinqi, Wood, 2009; Pridgeon et al., 2005) reasonably treating largest portion of the mentioned generic complex in a broader sense, placing *Ania*, *Tainia* and *Mischobulbum* into one genus under the prior name *Tainia*. In such circumstances, it is reasonable to place the newly discovered plant into this genus. It is remarkable that in a certain sense our plant demonstrates “central” position in the complex having transitional morphology connecting earlier accepted “narrow” genera. This fact indirectly justifies uniting these genera.

Tainia cornuta, probably, represents a case of local plant endemism of central Vietnam connected with ancient eroded sandstone formations observed in Quang Nam province (Dai Loc district, Dai Hong municipality) on a very limited territory. The complex of plant species in these endangered habitats is very specific (Averyanov, Tanaka, 2012) and certainly requires protection as an important

“hot-spot” of outstanding aboriginal plant diversity.

Acknowledgements. The author cordially thanks the organizers of our field works – Directorate of non-government organization “Center for Plant Conservation” (Vietnam Union of Science and Technology Associations) – Prof. Phan Ke Loc, Dr. Nguyen Tien Hiep and MSc. Nguyen Quang Hieu. Author is also grateful to Prof. Phan Ke Loc, Dr. J. Skornickova and MSc. Nguyen Sinh Khang, whose photographs and data were used in this publication, as well as T. Maisak for her valuable help in preparation of ink drawings. Field work resulted in presented discovery was supported from U.S.A. National Geographic Society research program – “Exploration of primary woods along constructed highway Hanoi – Ho Chi Minh for their sustainable conservation (in limits of Ha Tinh, Quang Binh, Quang Tri, Thua Thien – Hue, Quang Nam and Kon Tum provinces of central Vietnam)” (Grant # 8800-10) and Critical Ecosystem Partnership Fund for the Project “Strengthening community conservation of priority sites within the Ba Be / Na Hang Limestone Forest Complex, northern Vietnam” through the agreement between People Resources Conservation Foundation and Center for Plant Conservation (CPC).

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