Taiwania 60(1):33−38, 2015
DOI: 10.6165/tai.2015.60.33

Review of the genus *Miguelia* (Orchidaceae) with a new species, *M. cruenta,* from southern Vietnam

Leonid V. Averyanov[(1*)] and Truong Ba Vuong[(2)]

1.Komarov Botanical Institute, Russian Academy of Science, St. Petersburg. Prof. Popov Str. 2, Russia, 197376.
2.Institute of Tropical Biology, Department of Biological resources,85 Tran Quoc Toan Str., Distr. 3, Hochiminh City,Vietnam. E-mail: bavuong2019@yahoo.com
** Corresponding author. Email: av_leonid@mail.ru; av_leonid@yahoo.com*

(Manuscript received 13 April 2014; accepted 9 March 2015)

ABSTRACT: This review of the genus *Miguelia* Aver. includes a brief characterization of the genus, a key for species identification, appropriate taxonomic citation and synonyms for each species, and notes on ecology, phenology and distribution. *M. cruenta,* discovered in southern Vietnam, is described and illustrated as a new species. The tentative relationship of the newly discovered species is briefly discussed.

KEY WORDS: *Miguelia, Miguelia cruenta,* Orchidaceae, new species, plant diversity, plant taxonomy, Vietnam.

INTRODUCTION

Miguelia Aver. is a small orchid genus of four species occurring in southern and south-eastern China, Vietnam and Laos. Species of this genus are related to the large and widespread genus *Vanilla* Plum. ex Mill., but differing by a sympodial, branched, cymose inflorescence (Averyanov, 2011). In a recent monographic treatment of *Vanilla* these species have been recognized as a separate alliance tentatively named "*Vanilla annamica* group" (Soto and Cribb, 2010). This Sino-Indochinese group is well-defined morphologically but has not yet been studied using molecular cladistics (Cameron, 2011a,b) and was not yet generally accepted as a separate genus (World Checklist…, 2014). The present paper provides a review of these closely related species recognized within the limits of a separate genus *Miguelia*. The review includes an identification key, an appropriate taxonomic citation and synonyms for each species, and notes on their ecology, phenology and distribution. One species, *M. cruenta* discovered in southern Vietnam, is described as new.

TAXONOMIC TREATMENT

Miguelia Aver.

2011, Turczaninowia 14, 2: 45. – *Vanilla* Plum. ex Mill., 1754, Gard. Dict. Abr. 4, 3 p.p.; Gagnep., 1934, Fl. Gen. Indo-Chine, 6, 5: 580–583; Seidenf., 1978, Dansk Bot. Ark. 32, 2: 138–146; id., 1992, Opera Bot. 114: 71–72; Aver., 1994, Ident. Guide Vietnam. Orch.: 75–77; P. H. Ho, 2000, Ill. Fl. Vietnam, 3: 791–792; Su Horng-Jye, 2000, Fl. Taiwan 5: 1063; Aver., Averyanova, 2003, Updated Checklist Orch. Vietnam: 60–61; Newman *et al*., 2007, Checkl. Vasc. Pl. Lao PDR: 283; Schuiteman *et al.*, 2008, Nordic. J. Bot. 26: 314–315; Chen Sing-chi and Cribb, 2009, Fl. China, 25: 167–168. – "*Vanilla annamica* group": Soto, Cribb, 2010, Lankesteriana 9, 3: 359.

Type: *M. somae* (Hayata) Aver. (*Vanilla somae* Hayata).
4 species in S. China, Laos and Vietnam.

Notes. A description of the genus with a detailed morphological analysis of the inflorescence structure is available in a previous publication (Averyanov, 2011: 45, 48). A digital herbarium sheet of the type species *M. somae* providing analytical images of the flower details is presented in Fig. 1.

Key to species

1a. Inflorescence monochasial, with 1 secondary axis, less than 1–2(3) cm long, with 1–2(4) biflorous cymes, placed distichously; flowers in inflorescence commonly open simultaneously; lip broadest at apex, inside light salmon-pink or purple ……... 2
1b. Inflorescence monochasial or dichasial, with 1 or 2 secondary axes, more than 3 cm long, each axis with several or many biflorous cymes placed in one row and sometimes with 1–3 solitary apical flowers, flowers in inflorescence open in succession; lip broadest at the middle, white or light yellowish tinged with green ……... 3
2a. Flowers widely opening; sepals and petals less than 3.5 cm long; petals oblanceolate, less than 1.5 cm wide; lip less than 3.5 cm long, light salmon-pink inside; median lip lobe with many down-curved fat clavate papillae 1.5–2 mm long; column less than 3 cm long ……..… ***M. somae***
2b. Flowers not fully opening; sepals and petals longer than 3.5 cm; petals narrowly obovate, more than 1.5 cm wide; lip longer than 3.5 cm, purple-marked inside; median lip lobe with 3–5 rows of short, horn-like, erect, falcate papillae; column more than 3 cm long …….. ***M. shenzhenica***

3a Inflorescence commonly dichasial, with 2 secondary axes (rarely monochasial with 1 secondary axis), each branch (4)5–20 cm long with (3)4–10 biflorous cymes; pedicel and ovary 2.5–3 cm long; sepals and petals 2–3 cm long, 5–7 mm wide; lip uniformly white to yellowish, tinged with green, longer than broad, 2–2.5 cm long, 1–1.5 cm wide; disk with 2–4 short, low, shallowly incised keels . …….. ***M. annamica***

3b. Inflorescence monochasial with 1 secondary branch 3-4(5) cm long bearing 3-4(5) biflorous cymes; pedicel and ovary 6.5-7.5 cm long; sepals and petals 3-3.5 cm long, 7-10 mm wide; lip white to light yellowish-green, 3 cm long and broad; disk with 4-6(10) prominent, bright red, strongly incised or serrulate keels rising distally and becoming warty nerves toward the lip margins …… ***M. cruenta***

Miguelia somae (Hayata) Aver., 2011, Turczaninowia 14, 2: 49, fig. 20a-d; 21; 24i; 27a,b. – *Vanilla somae* Hayata, 1916, Icon. Pl. Formos. 6: 88, tab. 14; Chen Sing-chi, Cribb, 2009, Fl. China 25: 167; Soto, Cribb, 2010, Lankesteriana 9, 3: 359, 394. – *V. griffithii* Rchb. f. var. *formosana* Ito, 1911, Icon. Pl. Japan. 1, 4: 1, tab. 1. – *V. ronoensis* Hayata, 1920, Icon. Pl. Formos. 9: 114. – *V. griffithii* Rchb.f. var. *ronoensis* (Hayata) S. S. Ying, 1977, Ill. Indig. Orch. Taiwan 1, 2: 509. – *V. annamica* auct. non Gagnep.: Aver., 1988, Bot. Zhurn. (Leningrad), 73, 3: 427, 429, fig. 6; id., 1994, Identif. Guide. Vietnam. Orch.: 76, fig. 3; P. H. Ho, 2000, Ill. Fl. Vietnam, 3: 792, fig. 10928; Aver., Averyanova, 2003, Updated Checkl. Orchids Vietnam: 60, p.p. – *V. albida* auct. non Blume: H. J. Su, 2000, Fl. Taiwan 5: 1065, fig. 457; Shih-Wen Chung, 2008, Orch. Taiwan 2: 203, photos.

Described from Taiwan ("Taiwan, between Urai and Agisku "). Type ("May 1916, *Hayata s.n.*") – TI.

Ecology: Primary and secondary evergreen broad-leaved, mixed and coniferous forests, as well as secondary scrub on any kind of soil (but more common on rocky limestone, particularly on steep rocky slopes and cliffs) at elevation 300–1400m a.s.l. Fl. April – June.

Distribution: Northern Vietnam (Bac Kan, Cao Bang, Ha Giang, Hoa Binh, Lang Son, Lao Cai, Ninh Binh, Quang Binh, Son La, Thai Nguyen, Thanh Hoa). Southern China (Guangdong, Guangxi, Taiwan, Yunnan).

Notes: An adequate description of the species is presented in previous publications (Chen Sing-chi, Cribb, 2009: 167; Soto, Cribb, 2010: 394; Averyanov, 2011: 49).

Miguelia shenzhenica (Z. J. Liu et S. C. Chen) Aver., 2013, Turczaninowia 16, 1: 160. – *Vanilla shenzhenica* Z. J. Liu & S. C. Chen, 2007, Acta Phytotax. Sin. 45, 3: 301, fig. 1; Chen Sing-chi, Cribb, 2009, Fl. China 25: 168; Aver., 2011, Turczaninowia 14, 2: 49; Barretto, Cribb, Gale, 2011, Orch. Hong Kong: 97–99.

Described from SE. China ("Guangdong: Shenzhen, Longgang, Meishajian, alt. 300 m, on tree trunk and rock along a valley"). Type ("22 Feb. 2005, *Z. J. Liu 3025*") – The National Orchid Conservation Center, China.

Ecology: Epiphytic and lithophytic creeping vine on shady steep rocky slopes and bluffs at elevation 200–400 m a.s.l. Fl. February – March.

Distribution: South-eastern China (Guangdong, Hong Kong).

Notes. An adequate description of the species is presented in previous publications (Chen Sing-chi, Cribb, 2009: 168; Barretto, Cribb, Gale, 2011: 98).

Miguelia annamica (Gagnep.) Aver., 2011, Turczaninowia 14, 2: 49, fig. 20e; 22. – *Vanilla annamica* Gagnep., 1931, Bull. Mus. Natl. Hist. Nat. (Paris), 2 ser. 3, 7: 686; id., 1934, Fl. Gen. Indo Chine, 6, 5: 584, fig. 56, 1; Lang, Tsi, 1976, Icon. Corm. Sinic. 5: 651, fig. 8132; Seidenf., 1992, Opera Bot. 114: 72; P. H. Ho, 2000, Ill. Fl. Vietnam, 3: 792, p.p.; Aver., Averyanova, 2003, Updated Checkl. Orchids Vietnam: 60; Schuit. *et al.*, 2008, Nordic J. Bot. 26: 314; Chen Sing-chi, Cribb, 2009, Fl. China 25: 168; Soto, Cribb, 2010, Lankesteriana 9, 3: 368.

Described from southern Vietnam ("Annam: col de Mangiang, prov. Quinhon; Langbian, entre B'dle et Dankia; Lang-bian; prov. de Binh-Thuan, Djiring"). Syntypes ("*Poilane 17973, 18635; Jacquel 622; Magnein 82*") – P.

Ecology. Primary and secondary broad-leaved evergreen and mixed forests, commonly on steep slopes and cliffs composed with silicate rocks at elevation 1000–1400 m a.s.l. Fl. February – April.

Distribution. Vietnam (Binh Dinh, Binh Thuan, Lam Dong, Ninh Thuan, Thua Thien Hue). Southern China (Fujian, Guizhou, Hong Kong, Yunnan), Laos.

Notes. An adequate description of the species is presented in previous publications (Chen Sing-chi, Cribb, 2009: 168; Soto, Cribb, 2010: 368; Averyanov, 2011: 49, 54).

Fig. 1. Type of the genus *Miguelia* Aver., *M. somae* (Hayata) Aver. Digital herbarium sheet: d-EXSICCATES OF VIETNAMESE FLORA *0175/CPC 1392* (all photos and design by L. Averyanov).

Miguelia cruenta Aver. et Vuong **sp. nov.** Figs. 2 & 3

Described from southern Vietnam ("Khanh Hoa province, Hon Ba nature reserve, Hon Ba mountain, evergreen humid shady forest, rocky stream slope near mountain summit at elevation about 1500 m a.s.l. Terrestrial liana more than 10 m long climbing on big tree"). Type ("21 May 2013, *Truong Ba Vuong 3*") – LE.

Creeping epiphytic, lithophytic or terrestrial vine. Stem slightly branching, terete, green, fleshy, 10–15 m long, 0.5–1 cm in diam., with internodes 7–10(12) cm long, nodes slightly swollen. Roots 2–3 mm in diam., rigid, wiry, flexuose. Leaves shortly petiolate; petiole fleshy, 8–12 mm long, 4–6 mm wide., shallowly canaliculate; leaf blade fleshy, coriaceous, narrowly ovate to narrowly elliptic, 15–30(35) cm long, 4–6 cm wide, acuminate to shortly attenuate. Inflorescence lateral, arising from leaf axil, shortly pedunculate to subsessile, abbreviated, normally monochasial, consisting of one branch (possibly sometime dichasial with two branches), bearing 3–4(5) secund biflorous cymes (3)4–6 mm apart; rachis fleshy, slightly recurved to almost straight, 3–4(5) cm long, 4–5 mm in diam. Inflorescence bracts of two different types: internodal bracts on rachis rigid, paired, subopposite, half-circular, rounded at apex, shell-like, (4)5–8 mm across; nodal bracts on rachis triangular-ovate, concave, acute, (6)8–12 mm long and wide (when flatten). Floral bracts similar to the nodal inflorescence bracts. Flowers opening by two in succession. Pedicel and ovary light green, terete, curved, 6.5–7.5 cm long, 4–4.5 mm in diam. Flowers widely opening, 6–7 cm across. Sepals and petals white to light yellowish, greenish towards the apex, broadly oblanceolate to narrowly obovate, concave, carnose, obtuse, 3–3.5 cm long, 0.7–1 cm wide; lateral sepals and petals slightly falcate, outside with fleshy keel along the midvein. Lip white to light yellowish or yellowish-green, trumpet-shaped, abaxially with distinct longitudinal groove, almost entire to obscurely 3-lobed, broadly deltoid when spread out, 3 cm long and wide, adnate to the sides of the column over 8/10 of their length. Lip side lobes broad, semi-orbicular, thin, recurved, irregularly crisped, 1.2–1.4 cm broad. Lip median lobe green, fleshy, ovate, 0.8–1 cm long, 4–6 mm broad, with a bunch of long clavate fat white papilla-like appendages 1–2 mm long. Lip disk in the centre with callus-like white, transverse, incumbent, imbricate, scarious, fimbriate scales, laterally with 4–6(10) incised to serrulate keels rising distally and becoming warty nerves toward the lip margins; keels and warty nerves on the lip side lobes bright red. Column white, slender, slightly curved towards the apex, 1.8–2 cm long, 2.5–3.5 mm wide, glabrous; rostellum truncate, fleshy; clinandrium with erose margins. Anther cap white, ovoid, glabrous, 3–3.5 mm long. Fruit not seen.

Etymology: From *cruentum* (Latin) - bloody, referring to the contrasting bloody-red coloration of the lip keels and nerves on the lip side lobes.

Ecology: Primary humid broad-leaved evergreen montane forests, on mountain slopes and cliffs composed of granitic rocks at elevation 1500 m a.s.l. Fl. May.

Distribution: Southern Vietnam (Khanh Hoa province). Endemic.

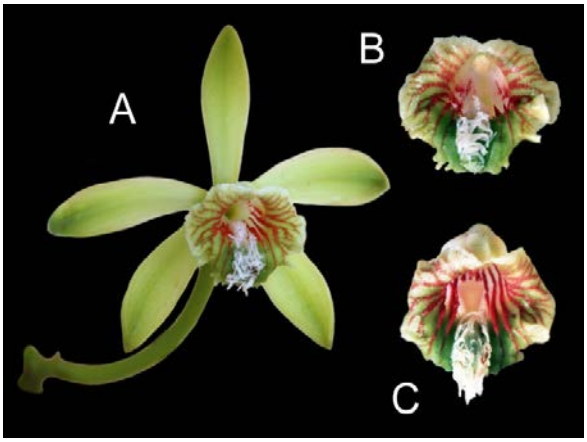

Figure 2. *Miguelia cruenta* Aver et Vuong. A: Flower, frontal view. B, C: Lip, frontal view (type – *Truong Ba Vuong 3*). All photos of T. B. Vuong, correction and design by L. Averyanov.

Notes: *Miguelia cruenta* is probably most closely related to *M. annamica*, which also has secund inflorescence branches longer than 3 cm and bears 3 or more biflorous cymes placed in one row. However, the new species differs in having a monochasial inflorescence with one short secondary branch bearing only 3–5 cymes, much longer pedicels, larger flowers, a distinctly keeled lip and a bright red coloration of the lip keels and nerves of the lip side lobes.

The unusual coloration of the lip of *M. cruenta* may indicate a syndrome of specific attraction for flying pollinators. Unfortunately, any data about pollination of this species is not yet available.

Miguela cruenta was discovered in the same locality and in similar ecological conditions as the recently described, taxonomically isolated species *Vanilla atropogon* (Schuiteman, Averyanov, Rybkova, 2013). Both species grow within its range with orchids such as *Arundina caespitosa*, *Dendrobium*

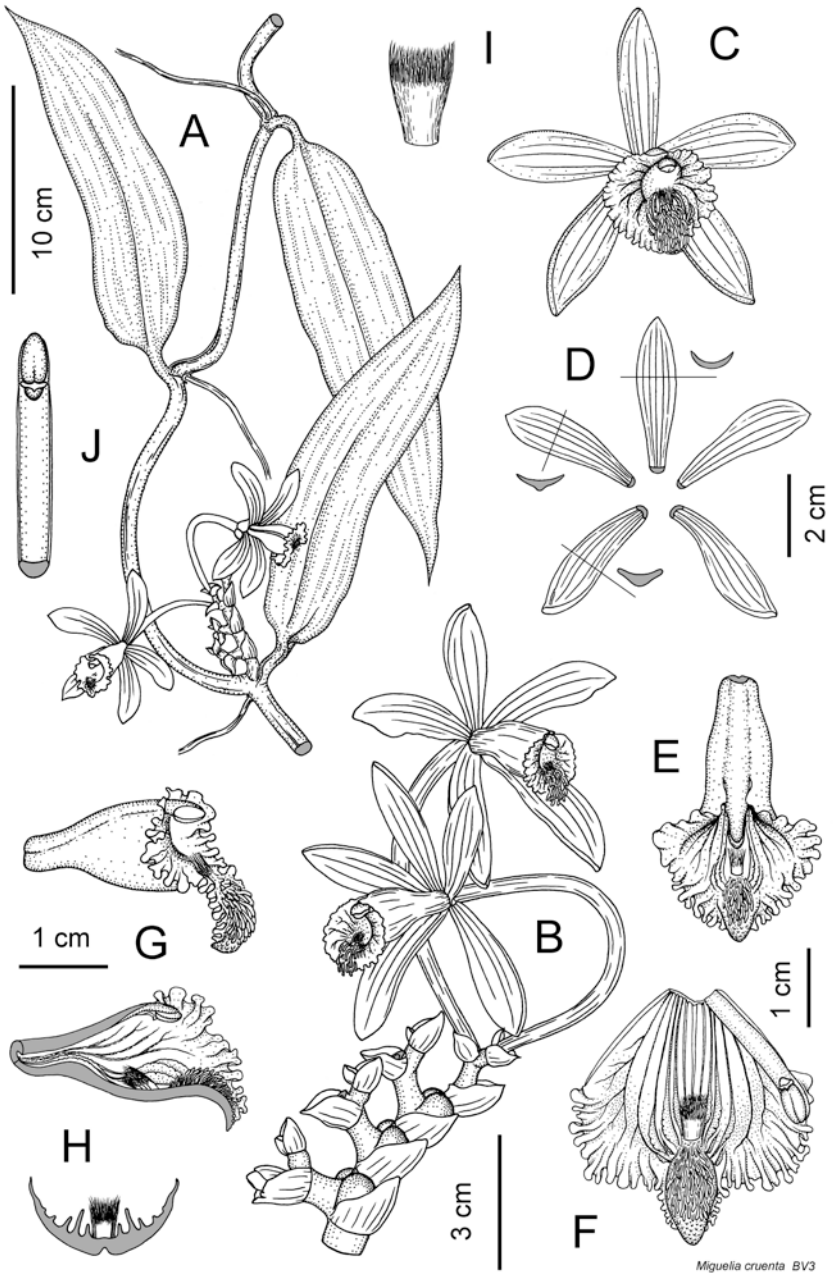

Fig. 3. *Miguelia cruenta* Aver. et Vuong. A: Portion of flowering stem. B: Inflorescence with flowers. C: Flower, frontal view. D: Flattened sepals and petals. E: Lip, view from above. F: Dissected and flattened lip. G: Lip, side view and its sagittal section. H: Transverse lip section in its middle part. I: Frontal view of individual scarious scale of the central callus. J: Column, frontal view. All drawn from the type – *Truong Ba Vuong 3* by L.Averyanov.

pachyphyllum, *Eria lasiopetala*, *Erythrorchis altissima*, *Trias nasuta*, as well as species of *Bulbophyllum*, *Cephalantheropsis*, *Cleisostoma* and *Trichoglottis.* Forests in this habitat are reported as humid and include such typical woody species as *Barringtonia* cf. *augusta*, *B.* cf. *macrostachya*, *Dillenia* sp., *Diospyros buxifolia*, *Dipterocarpus alatus*, *Elaeocarpus darlacensis*, *Fagraea auriculata*, *Ficus* sp., *Hydnocarpus* cf. *clemensorum*, *Irvingia malayana*, *Pandanus* sp., *Parkia* cf. *sumatrana*, *Podocarpus neriifolius*, *Vatica cinerea*, as well as woody vines like *Ampelopsis* sp., *Ancistrocladus* sp., *Entada* sp., *Gnetum* sp., *Plectocomia elongata* and various species of *Calamus.* The new species was observed as a rare plant and perhaps needs special attention for its protection.

ACKNOWLEDGEMENTS

Field explorations that resulted in the discovery of *Miguelia cruenta* were funded by the Conservation and Research Foundation (U.S.A.). Laboratory work on this paper was supported by the U.S.A. National Geographic Society grant "*Exploration of primary woods along constructed highway Hanoi - Ho Chi Minh for their sustainable conservation* (*in limits of Ha Tinh and Nghe An provinces of central Vietnam*)" #9129-12. The authors are grateful to Andre Schuiteman for fruitful discussions about species relationships and to Nguyen Hanh, Director of Hon Ba natural reserve for his help in the field work organization. We also cordially thank Dr. Daniel Harder for his generous editing of the text.

LITERATURE CITED

Averyanov, L. V. 2011. The orchids of Vietnam illustrated survey. Part 3: Subfamily Epidendroideae. Turczaninowia **14(2)**: 15–100.

Cameron, K. M. 2011a. *Vanilla* Orchids; Natural History and Cultivation. Timber Press. Portland & London. 212 pp.

Cameron, K. M. 2011b. *Vanilla* Phylogeny and Classification. In D. Havkin-Frenkel & F. C. Belanger. Handbook of Vanilla Science and technology. Wiley-Blackwell Publishing Ltd. Oxford. P. 243–254.

Chen Sing-chi and P. J. Cribb. *Vanilla* Plumier ex P. Miller. 2009. In Z. G. Wu, P. H. Raven, Hong D.Y. (eds). Flora of China. Vol. **25**. Science Press & MBG Press. Beijing & St. Louis. P. 167–168.

Schuiteman, A., L. Averyanov and R. Rybkova. 2013. *Vanilla atropogon*, a new species from Vietnam. Orch. Journ. **1(1)**: 10–16.

Soto Arenas, M. A. and P. Cribb. 2010. A new infrageneric classification and synopsis of the genus *Vanilla* Plum. ex Mill. (Orchidaceae: Vanilinae). Lankesteriana **9(3)**: 355–398.

World Checklist of Selected Plant Families. http://apps.kew.org/wcsp/home.do [Accessed 8 Oct. 2014].