

**CAMELLIA VELUTINA (THEACEAE, SECT. CHRYSANTHA),
A NEW SPECIES FROM NORTHERN VIETNAM**

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Abstract

Camellia velutina V.T. Pham, V.D. Luong & Aver. found in Phu Tho province, northeastern Vietnam is described and illustrated. The comparison between the new species and closely related species is provided.

Key words: *Camellia*, New species, Plant diversity, Theaceae, Vietnam.

Introduction

Camellia is the largest genus of Theaceae family, which comprises from 120 to 280 species spreading from Bhutan, northeastern India, China and Japan to Indonesia and Philippines (Sealy, 1958; Chang & Bartholomew, 1984; Ming, 2000; Gao *et al.*, 2005; Ming & Bartholomew, 2007; Xie *et al.*, 2018). Regions of Southern China and Northern Vietnam represent richest area for the genus diversity (Chang & Bartholomew, 1984). In Vietnam until now were reported 34 species (Pham, 1999; Orel *et al.*, 2013, 2014^{a, b}; Le & Luong, 2016; Luong *et al.*, 2016). Most *Camellia* species occurring in Vietnam have yellow flowers and belong to the section *Chrysantha* Chang (1979). This section comprises here 20 species (*C. aurea*, *C. crassiphylla*, *C. cucphuongensis*, *C. euphlebica*, *C. flava*, *C. hakodae*, *C. hamyensis*, *C. hirsuta*, *C. hulungensis*, *C. kirinoi*, *C. limonia*, *C. luongii*, *C. murauchii*, *C. petelotii*, *C. phanii*, *C. rosmannii*, *C. tamdaoensis*, *C. thanxaensa*, *C. tienii* and *C. tonkinensis*) having wide distribution throughout the country (Tran, 1998^{a, b}; Tran & Hakoda, 1998; Pham, 1999; Hakoda *et al.*, 2007; Tran & Le, 2013; Yang *et al.*, 2014; Le & Luong, 2016). In addition, two new Vietnamese species belonging to *Chrysantha* section, namely *C. ninhii* and *C. tuyenquangensis* were described and published during last two years. (Luong & Le, 2016; Le *et al.*, 2017).

Six years ago, in 2011 we found one more unusual *Camellia* species in Xuan Son National Park of Phu Tho province of northern Vietnam. The species had yellow flowers typical for species of *Chrysantha* section. After study of relevant literatures on all species of this section (Sealy, 1958; Chang & Bartholomew, 1984; Tran, 1998^{a, b}; Tran & Hakoda, 1998; Pham, 1999; Ming, 2000; Gao *et al.*, 2005; Hakoda *et al.*, 2007; Ming & Bartholomew, 2007; Tran & Le, 2013; Yang *et al.*, 2014; Le & Luong, 2016; Luong & Le, 2016; Le *et al.*, 2017) and specimens in largest national herbariums, such as DLU, HN, HNU, VNM, VNMN we did not find any species, which could fit well with our specimens. In early of 2017 we collected more specimens of mentioned species in *locus classicus*. Study of them confirms unique specifics of this unusual plant. Therefore, we describe it here as a new species for science.

Camellia velutina V.T. Pham, V.D. Luong & Aver.,
Sp. Nov. (Figs. 1, 2)

Holotype: Vietnam, Phu Tho province, Tan Son district, Xuan Son commune, Du village, Tan Lua Mountain, Xuan Son national park, around point 21°08'05.3"N, 104°56'58.6"E, primary broad-leaved evergreen closed valley forest on solid crystalline highly eroded limestone mountains at elevation 350–400 m a.s.l., small tree, very rare, 8 Jan. 2017, Nguyen Thi Lieu, Do Cong Thuan, Trinh Ngoc Bon, Luong Van Dung, DL 170102 (DLU).

Paratype: Vietnam, Phu Tho province, Tan Son district, Xuan Son commune, Du village, Tan Lua Mountain, Xuan Son national park, around point 21°08'05.4"N, 104°56'55.1"E, primary broad-leaved evergreen closed forest on solid crystalline highly eroded limestone mountains at elevation about 600 m a.s.l., treelet about 4 m tall in alluvial valley between remnant limestone mountains, flowers yellow, very rare, 16 November 2011, P.V. The, N.T. Vinh, CPC 4636 (LE) (Fig. 3).

Evergreen shrub or small tree, 3–5 m tall; branches glabrous. Terminal and axillary leaf buds dark green; scales glabrous, ovate, concave, apex subacute, ca. 0.4 mm long and 0.7 mm wide; mature leaf glabrous, leaf blade, coriaceous, oblong to elliptic, shortly acuminate, broadly cuneate to almost rounded at base, 15–22 cm long and 5–11 cm wide, adaxial surface glossy dark green, abaxial surface pale green with sparse small dark brown dots, margins denticulate; lateral vein 7–10 pairs, prominent on abaxial surface, reach to each other by tertiary veins, not reaching margins; petiole terete, glabrous, 1.2–1.6 cm long, 0.35–0.45 cm in diam. Inflorescence terminal or axillary, of 1 flower; flowers bright yellow, widely opening, 5–6.5 cm in diam.; peduncle stout, cylindrical, glabrous, 1–1.3 cm long, 0.5–0.6 cm in diam.; floral bracts 2(–3), persistent, ovate, concave, acute, 3–5 mm long, 2–4 mm wide, adaxial surface velutinous; tepals 5, transitional to the petals, deltoid to orbicular, concave, rigid, but not woody, 3–11 mm long, 5–17 mm wide, adaxial surface velutinous; petals 10(–11), unevenly spaced, spirally arranged,

broadly ovate or ovate, concave, 1.2–4.5 cm long, 1.5–3 cm wide, velutinous on both surfaces (could be observed with magnification), rigid, inner petals thinner than outer petals, becoming papyraceous and wavy toward apex, basally free; stamens numerous (around 300), in 4–5 whorls, outer whorl fused at the base; filaments glabrous,

1.5–2.5 cm long, 1.0 mm or less wide near the base; anthers bright yellow, longitudinally dehiscent; styles three, free from the base, 2–2.5 cm long, 1 mm or less wide at the base, glabrous; stigma indistinct; gynoecium superior, conoid, ca. 5 mm long and 4.5 mm wide at the base, glabrous, consists of 3 fused carpels. Fruit not seen.

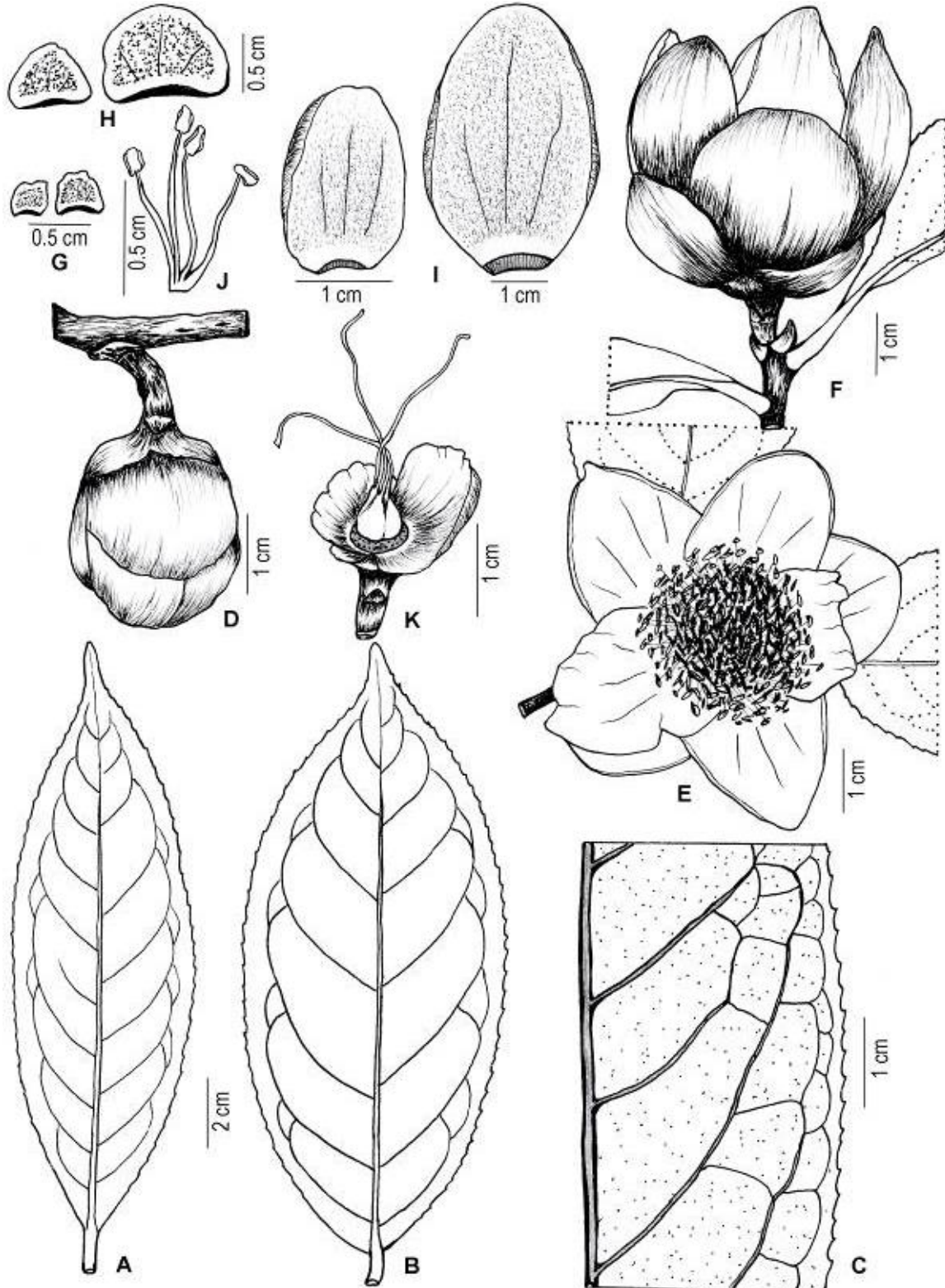


Fig. 1. *Camellia velutina* V.T. Pham, V.D. Luong & Aver.

A, B, leaves. C, abaxial leaf surface. D, flower bud. E, flower, frontal view. F, flower, side view. G, floral bracts. H, tepals. I, petals. J, stamens. K, styles and gynoecium. Drawn from specimens DL 170102 (DLU) and CPC 4636 (LE) by V.D. Luong.



Fig. 2. *Camellia velutina* V.T. Pham, V.D. Luong & Aver.

A. sterile branch of plant in natural habitat. B. leaf. C. terminal leaf bud. D. flower bud. E. opening flower, side view. F. opening flower, frontal view. G, H. flower, side and half side views. I. fully open flower, frontal view. J. gynoecium. K. stamens. Scale bars: B = 5 cm; C, D, E, F, J = 1 cm; G, H, I = 2 cm; K = 0.5 cm. Photos by V.T. Pham and V.D. Luong.

Table 1. Comparison of morphological characters of *Camellia velutina* and closely related species.

Characters	<i>C. velutina</i>	<i>C. petelotii</i>	<i>C. phanii</i>	<i>C. rosmanii</i>	<i>C. hakodae</i>	<i>C. euphlebia</i>	<i>C. flavida</i>
Floral bracts							
Number	2(-3)	(6-)8-10	-	6	5-6	(7-)8	5-6
Size (mm)	3-5 × 2-4	2-3 × 3-5	-	-	-	1-3 × 3-5	1.5-2.5 × 2-3.5
Hairs	adaxial surface velutinous	glabrous	-	-	-	adaxial surface sericeous	adaxial surface puberulent
Tepals/Sepals							
Number	5	5	-	6	5	5	5
Shape	deltoid to orbicular	ovate to broadly ovate	-	subrotund	broadly lunate or suborbicular	semi-orbicular to broadly ovate	
Size (mm)	3-11 × 5-17	(4-)6-8 × 6-9	-	-	-	4-5 × 5-7	3.5-5 × 4.5-6
Petals							
Number	10(-11)	10-14	16-18	15	16-17	7-9	7-13
Shape	broadly ovate or ovate	broadly elliptic, elliptic to suborbicular	-	-	suborbicular to elliptic	suborbicular, broadly obovate to obovate-elliptic	obovate to obovate-elliptic
Size (cm)	1.2-4.5 × 1.5-3	1.5-3.5 × 1-1.8	-	-	2-5.3 × 2.3-3.5	1-4 × 2-2.5	1.2-2.5 × 0.9-1.5
Hairs	both surfaces velutinous	abaxial surfaces puberulous	both surfaces pubescent	-	both surfaces pubescent to glabrous on innermost	glabrous	-
Fusion	basally free	inner petals basally connate for 6-8 mm	-	-	-	basally connate for 5-10 mm	inner petals basally connate for ca. 2 mm
Stamens							
Hairs	glabrous	glabrous	pubescent at the base	-	pubescent	glabrous	glabrous
Fusion	outer whorl fused at the base	outer whorl basally connate into a 7-10 mm tube	outer filaments united about 10-15 mm from the base	outer whorl fused at the base	outer filaments united 1/3-1/2 of their length	outer whorl basally connate for 1-1.5 cm	outer whorl basally connate for 3-5 mm
Gynoecium							
Shape	conoid	globose	-	-	-	ovoid	globose



Fig. 3. Paratype of *Camellia velutina* V.T. Pham, V.D. Luong & Aver. at LE herbarium.

Etymology: Species name refers specific short soft indumentum on its flower tepals.

Diagnostic characters: The distinct peduncle, small floral bracts, yellow flowers, three carpels of gynoecium and separate styles indicate that the new species belongs to *Chrysantha* section having 20 species in the flora of Vietnam (Tran, 1998^{a, b}; Tran & Hakoda, 1998; Pham, 1999; Hakoda *et al.*, 2007; Tran & Le, 2013; Yang *et al.*, 2014; Le & Luong, 2016). The described species in its morphology is most close to *C. petelotii*, *C. phanii*, *C. rosmannii*, *C. hakodae*, *C. euphlebica* and *C. flavida*, particularly in such characters, as shrub or small tree habit, hairy perianth and 3-free style. These related species can be easily distinguished by characters indicated in following Table 1.

Distribution: Northeastern Vietnam (Phu Tho province, Tan Son district). Endemic.

Habitat, phenology and conservation status: *Camellia velutina* grows in primary broad-leaved evergreen valley forest on solid crystalline highly eroded limestone mountains at elevation 350–600 m a.s.l. between remnant limestone hills composed with rocky solid limestone. It flowers from October to January. Although two field

surveys were specially made only two individuals of this species were found. Special field works are necessary for conservation assessment of this rare ornamental species having certain significance for national economy as outstanding ornamental plant. Though the area of species belong to Xuan Son national park, the plant is highly threatened due to high market demands for wild yellow-flowered *Camellias* intensively collected and offered for sale by local collectors. Current conservation status of this species in IUCN terms and categories may be estimated provisionally only as ‘Data Deficient’ (DD) due to deficit of currently available data (Anon., 2017).

Vernacular name: Vietnamese: Trà hoa vàng xuân sơn

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