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***Camellia proensis* (Theaceae, sect. *Piquetia*), a new species from Southern Vietnam**

QUACH VAN HOI^{1,2*}, LUONG VAN DUNG³, ROMAN V. DOUDKIN^{2,4}, LEONID V. AVERYANOV⁵, BUI BAO THINH², NGUYEN THI LIEU³ & LUU HONG TRUONG⁶

¹ Tay Nguyen Institute for Scientific Research, Vietnam Academy of Science and Technology, Xo Viet Nghe Tinh str. 116, Dalat, 66107, Vietnam.

² School of Natural Sciences, Far Eastern Federal University, Sukhanova str. 8, Vladivostok, 690090, Russia.

³ Faculty of Biology, Dalat University, Phu Dong Thien Vuong str. 01, Dalat, 66106, Vietnam.

⁴ Botanical Garden-Institute, Far-East Branch, Russian Academy of Sciences, Makovskii str. 142, Vladivostok, 690024, Russia.

⁵ Komarov Botanical Institute, Russian Academy of Sciences, Prof. Popov str. 2, St. Petersburg, 197376, Russia.

⁶ Southern Institute of Ecology, Vietnam Academy of Science and Technology, Mac Dinh Chi str. 1, Ho Chi Minh city, 71500, Vietnam.

*Corresponding author: quachvanhoi@gmail.com

Abstract

A new species of the genus *Camellia* L. (Theaceae) from Southern Vietnam is described and illustrated under the name *Camellia proensis*. Morphological differences between *C. proensis* and closely related species in the genus *Camellia* L. (sect. *Piquetia*) were identified. *C. proensis* is easily distinguishable from *C. honbaensis*, *C. piquetiana* and *C. longii* by the yellow flowers; from *C. dalatensis* by the glabrous twigs and leaves; from *C. dongnaiensis* by light yellow flowers; from *C. sonthaiensis* by mature fruit flat-globose, 4.0–5.5 cm tall and 8.5–10.0 cm wide. Ecological environment and distribution were also provided for this new species. The images and type specimens of this species were processed and stored in Vietnam (holotype, isotypes, DLU).

Keywords: *Camellia proensis*, Lam Dong, taxonomy, Theaceae, Vietnam.

Introduction

Camellia L. is the largest genus in the Theaceae family, with about 280 species (Chang & Bartholomew 1984, Ming & Bartholomew 2007). Distribution of this species ranges from Nepal, Bhutan, Northeastern India, Myanmar, China, Japan, to Southeast Asia (Ho 1999, Ninh 2002, Ming & Bartholomew 2007). According to Ho (1999), about 30 species of *Camellia* were recorded in Vietnam. Later, Ninh's statistics showed that there were 50 species (Ninh 2002). So far, more than 95 species of *Camellia* have been reported in Vietnam (Le *et al.* 2020). Vietnam is the center of diversity for *Camellia* species. Recently, many more new species of *Camellia* were discovered and described in Vietnam (Orel 2006, Tran & Luong 2012, Ninh & Dung 2013, Orel *et al.* 2014, Dung *et al.* 2016, Truong *et al.* 2018, Nguyen *et al.* 2018, Pham *et al.* 2019, Do *et al.* 2019, Nguyen *et al.* 2020, Do *et al.* 2020).

In a field trip to Pro Commune, Don Duong District, Lam Dong Province, Vietnam, in 2015, the authors discovered a *Camellia* species with yellow flowers but did not see the fruit. After many field trips, we collected the flowers and fruits. We then compared the morphological characteristics with previously published species and conducted a thorough review of specimens from the following herbaria: HN, VNM, and DLU (herbarium codes follow Thiers (2020)). We also used digital images on the web from the Muséum National d'Histoire Naturelle (<https://science.mnhn.fr/>), Chinese Virtual Herbarium (<http://www.cvh.ac.cn/>) and Jstor Global Plant (<https://plants.jstor.org/>). After an exhaustive review, we were unable to find any matches to this *Camellia*. Particular attention compared

the collected samples with other closely related species. We will name this new species *Camellia proensis*, based on the classification system of Chang & Bartholomew (1984) and confirm its placement in Section *Piquetia* (Pierre 1877, Sealy 1958).

Taxonomic description

Camellia proensis L.V.Dung, Doudkin & Q.V.Hoi, *sp. nov.* (Figs. 1, 2)

Type:—VIETNAM. Lam Dong Province, Don Duong District, Pro commune, 800–1100 m elev., 8 March 2015, *Quach Van Hoi, Luong Van Dung DUNG.150301* (holotype, isotypes, DLU!).

Description:—Small tree, 5–6 m tall. Young branches glabrous, light brown buds. Leaves oblong-elliptic, apex acuminate, base rounded or acute, adaxial and abaxial surfaces glabrous, 7.5–8.5 cm wide, 33–35 cm long; petioles 1–2 cm long, glabrous; lateral veins almost parallel, midrib and lateral veins clearly show in the abaxial surfaces, margin denticulate. Flowers 1–3 in the axillary, flower buds globose, 1.3–1.7 cm wide, flower 4.0–5.5 cm diameter, peduncle branched or not, 3.0–5.5 cm long, glabrous. Bractlets 2–3, light green, triangular, dropping quickly before the fruiting season, glabrous, 1–2 mm wide 1.5–3.0 mm tall. Sepals 5, hemisphere, persistent, light green, pubescent on the outside, glabrous on the inside, 6–12 mm tall, and 9–15 mm wide. Petals 5–6, almost round to obovate, light yellow, pubescent on the outside, glabrous on the inside, 1.7–1.8 wide and 1.7–2.4 cm tall. Stamens numerous, in 4–5 whorls, 1.5–2.0 cm long, outer filaments basally connate into a tube, filament tube 5–7 mm tall and adnate to the base of petals, pubescent at the base of inner filaments. Ovary globose, tomentose, 3.5–4.0 mm tall and 4–5 mm wide, has grooves, the ovary has 4–5 locular. Styles ripped 4–5 to base, tomentose to $\frac{1}{2}$ from the base, 1.5–1.8 cm long. Fruit flat-globose, 4.0–5.5 cm tall and 8.5–10.0 cm wide, sparse hair, capsule five locular, 1-locular with two seeds, pericarp 1–1.3 cm thick. Seeds spherical, hemispherical or wedge-shaped, glabrous, 1.6–2.0 cm wide, 2.3–2.6 cm long.

Affinity:—*Camellia proensis* morphologically similar to *C. sonthaiensis* in glabrous young branches and leaves; sepals 5, hairy on the outside; petal light yellow, hairy on the outside, from which it is distinguished by the size of mature fruit, 3.0–3.5 cm in diameter, 1.5–2.0 cm deep (*C. sonthaiensis*), 4.0–5.5 cm tall, 8.5–10.0 cm wide (*C. proensis*).

Etymology:—The species is named after the location where the authors first found this plant. Pro is the name of Pro commune, Don Duong District, Lam Dong Province, Vietnam.

Habitat:—This species is distributed in the evergreen broadleaf forest, the foot of the mountain where the slope is low, along the sides of the stream with relatively high humidity, or near the edge of the forest, where there is plenty of light. The species is distributed at elevations 800–1100 m, Pro commune, Don Duong District, Ta Nang Commune, Duc Trong District, Lam Dong Province.

Phenology:—These species produce buds and start to flower from January to March. Flowers bloom in late February, bearing fruits from August to October.

Note:—*Camellia proensis* has characteristics flowers 1–3 on a short bracteate shoot in axils of old leaves; flowers pedicellate, nodding. Bractlets 2–3, dropping quickly before the fruiting season; sepals 5, persistent; petals 5–6, inter petals united with outermost filaments. Gynoecium superior, ovary 4–5 locular, tomentose; styles 4–5, free. The new species has many characteristics of the section *Piquetia* (Pierre) Sealy as flowers are borne on a short shoots in the leaves' axils, usually, 3–5 flowers on a shoot but sometimes one only. Flowers pedicellate, nodding, pedicel very stout, thickened upwards; bracteoles 2–3, persistent; sepals 5, persistent; petals eight or more; stamen free above the union with the petals, puberulous inside; gynoecium densely hairy; styles 5 or 6 (Pierre 1877, Sealy 1958). Therefore *Camellia proensis* is classified into section *Piquetia*. Currently, the species in the sect. *Piquetia*

occurring in Vietnam are: *C. dalatensis*, *C. dongnaiensis*, *C. honbaensis*, *C. longii*, *C. piquetiana* and *C. sonthaiensis* (Pierre 1877, Sealy 1958, Orel 2006, Tran & Luong 2012, Orel *et al.* 2014, Truong *et al.* 2018). The new taxon is easily distinguishable from *C. honbaensis*, *C. piquetiana* and *C. longii* by the yellow flowers; from *C. dalatensis* by the glabrous twigs and leaves; from *C. dongnaiensis* by light yellow flowers; from *C. sonthaiensis* by mature fruit flat-globose, 4.0–5.5 cm tall and 8.5–10.0 cm wide.



FIGURE 1. *Camellia proensis*. A, B. Young twig. C, E. Flowering shoot and arrangement of petals. D. Open flower. F, G. Fruits. H. Seeds. Photos by Quach Van Hoi.

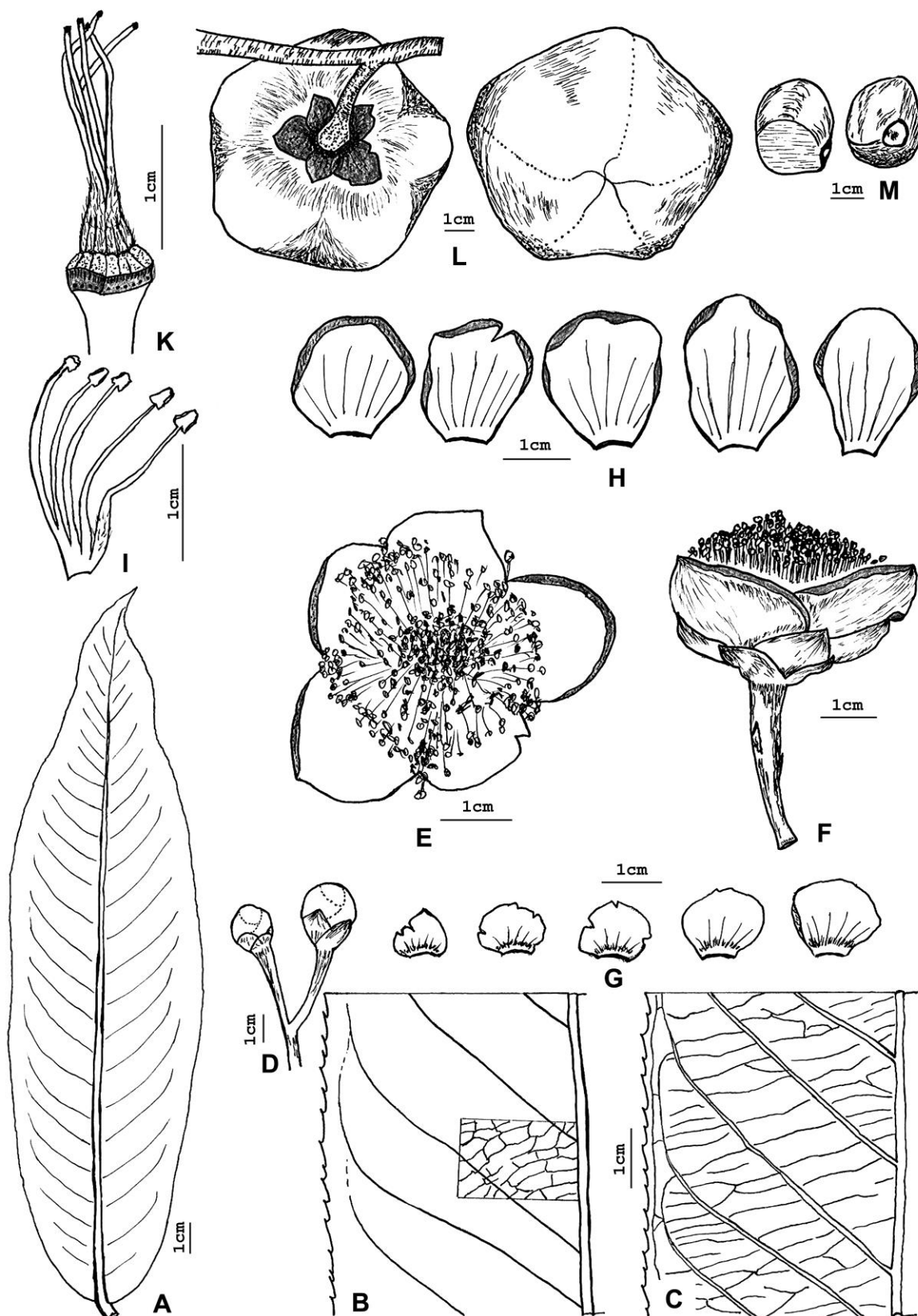


FIGURE 2. *Camellia proensis*. **A.** Leaf. **B.** Venation of leaf (adaxial surface). **C.** Venation of leaf (abaxial surface). **D.** Flower bud. **E, F.** Flower. **G.** Sepals. **H.** Petals. **I.** Stamens. **K.** Styles and gynoecium. **L.** Fruit. **M.** Seed. Drawings by Luong Van Dung.

Key to *Camellia proensis* and related species:

| | |
|---|------------------------|
| 1a. Flowers red | 2 |
| 1b. Flowers orange or yellow | 3 |
| 2a. Ovary 3 | <i>C. honbaensis</i> |
| 2b. Ovary 5 | 4 |
| 3a. Flowers orange | <i>C. dongnaiensis</i> |
| 3b. Flowers yellow | 5 |
| 4a. Petal 5–6, campanulate | <i>C. longii</i> |
| 4b. Petal 8 or more, rotate | <i>C. piquetiana</i> |
| 5a. Young branches and leaves hairy | <i>C. dalatensis</i> |
| 5b. Young branches and leaves glabrous | 6 |
| 6a. Leaves narrowly lanceolate; ovary (3)–4; mature fruits capsular, corky shape, 3.0–3.5 cm in diameter, 1.5–2.0 cm tall | <i>C. sonthaiensis</i> |
| 6b. Leaves oblong-elliptic; ovary 4–5 locular; mature fruits capsular, flat-globose, 8.5–10.0 cm wide, 4.0–5.5 cm tall | <i>C. proensis</i> |

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