CAMELLIA PYRIFORMIS (THEACEAE, SECTION CALPANDRIA), A NEW SPECIES FROM NORTHERN VIETNAM

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Abstract

\textit{Camellia pyriformis} is described, illustrated, and placed in section \textit{Calpandria}. Morphological features of this new species are young branches villous; leaves above pubescent, a long midrib, below pubescent; petiole falcate, densely villous; flowers solitary or geminate; pedicel very short, pubescent; bracteoles sparsely pubescent on both sides; sepals, pubescent on both sides; petals, white, glabrous; androecium 5–6 stamens, filaments completely united to form a truncated cone, glabrous, basal adnate to the petal, shallowly dentate at the apex, each filament bearing an anther; gynoecium 3-locular, densely white silky strigose tomentose, styles glabrous; capsule pyriform, pubescent; seed broad pyriform, densely villous.

Keywords: \textit{Calpandria}; \textit{Camellia pyriformis}; New species; Theaceae; Vietnam.

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1. INTRODUCTION

Camellia L. (Linnaeus, 1753) is the largest genus of the Theaceae. Section Calpandria (Blume, 1825; Stuart, 1916) is one taxon of Camellia L. It is characterized by an outer whorl of filament united to form a narrow fleshy tube with anthers on the inside (Sealy, 1958). Four species have been published: C. lanceolata (Blume, 1825; Seemann, 1859), widely distributed in Indonesia, Malaysia, and the Philippines; C. connata (Craib, 1914, 1925), widely distributed in Thailand (Chang, 1981; Ming, 2000); C. kirinoi (Ninh, 1999), widely distributed in Vietnam; and C. luteocalpandria (Yu et al., 2021), widely distributed in China.

Specimens of Camellia were collected during a 2020–2021 floristic survey in Luc Son Commune, Luc Nam District, Bac Giang Province. After analyzing and comparing the specimens with morphologically similar Camellia species (Chang, 1981; Chang & Ren, 1998; Gagnepain, 1943; Nguyen, 2017; Ming, 2000; Ming & Bartholomew, 2007; Ninh, 1999; Sealy, 1958), we concluded that this species is new to science. This new species is named Camellia pyriformis. It is placed in the section Calpandria.

2. TAXONOMIC TREATMENT

Camellia pyriformis T. S. Hoang & N. B. Trinh, sp. nov. (Figures 1, 2)

Type:—VIETNAM. Bac Giang Province, Luc Nam District, Luc Son Commune. Primary broad-leaved evergreen at an elevation of 470 m above sea level. 1 Nov. 2021, Hoang Thanh Son, Trinh Ngoc Bon, DL211201 (holotype, isotype DLU).

Description: Evergreen shrub or small tree, 2.5–4.0 m tall; new shoots purple; young branches villous. Leaves stalked, narrow elliptic to oblong-ovate, 4.5–7.0 cm long, 0.8–3.2 cm wide, thickly coriaceous; apex acuminate or narrowly acuminate, base rounded or broadly obtuse, margins regularly serrate; above dark green, shiny and pubescent along midrib; below paler green and pubescent; midrib and lateral veins sunken above, protruding below; secondary venation pinnate with 4–6 pairs of lateral veins; petiole falcate, slightly curved, round, pale green, 2.0–5.0 mm long, densely villous. Flowers solitary or geminate, axillary, 1.2–1.5 cm diameter; pedicel very short, 2.0–5.0 mm long, pubescent; bracteoles 2–3, scales to orbicular, 1.0–1.5 mm long, 1.0–1.5 mm wide, sparsely pubescent on both sides, margins ciliate, persistent; sepals 4–5, suborbicular, 1.0–2.5 mm long, 1.5–3.0 mm wide, pubescent on both sides, margins ciliate, persistent; petals 6–7, white, free to the base, obovate to oblong-lanceolate, 3.0–4.5 mm long, 2.5–3.0 mm wide, glabrous, united with filament tube approximately 0.2 mm at the base. Androecium 5 stamens, filaments completely united to form a truncated cone, 1.5–2.0 mm long, light pink, glabrous, basal adnate to the petals, shallowly dentate at the apex, each filament bearing an anther; anthers, approximately 1.5 mm, light yellow. Gynoeicum 3-locular, ovary superior, ovate, 1.2–1.4 mm long, 1.0–1.3 mm wide, densely white, silky, strigose, tomentose; styles stout, about 1 mm long, 3-fide, glabrous. Capsule pyriform, pubescent, 10.0–12.0 mm long, 6.5–7.5 mm wide, 1-loculed with 1 seed, columella abortive, pericarp thinly leathery. Seed broad pyriform, 7.0–7.5 mm long, 6.0–6.3 mm wide, black, densely villous.
Phenology: Flowers from August to October; fruits from November to December.

Distribution, habitat, and conservation status: The tree usually grows on the edge of shallow creeks or on flat ground near streams. It grows under the canopy of mixed bamboo and wood forest in association with *Bambusa nutans*, *Trema orientalis*, *Xylopia vielana*, *Archidendron robinsonii*, *Wendlandia acuminata*, *Canarium parvum*, *Ardisia depressa*, *Elaeocarpus griffithii*, *Vernonia arborea*, *Archidendron clypearia*, *Licuala spinosa*, *Antidesma montanum*, *Schizostachyum dullooa*, *Carex cruciata*, *Tacca chantrieri*, and *Justicia fragilis*.

*Camellia pyriformis* is known from two populations of less than 50 individuals that occupy an area of less than 1 hectare, growing under the canopy of mixed bamboo and wood forest along rivers at an elevation of 140–470 m. This area has not yet been protected and is threatened by deforestation and agricultural expansion. Therefore, *C. pyriformis* is accessed as Critically Endangered (CR) according to the IUCN Standards and Petitions Committee (2019).

Etymology: The specific epithet comes from its characteristic pyriform capsule.

Vernacular name: Trà anh đào.

Additional specimens examined:—VIETNAM. Quang Ninh Province, Ha Long City, Hoa Binh Commune, Dong Son Ky Thuong Nature Reserve, primary broad-leaved evergreen at an elevation of 240 m above sea level. 1 Sep. 2020, Hoang Thanh Son, Trinh Ngoc Bon, VAFS4521 (VAFS). Quang Ninh Province, Ha Long City, Vu Oai Commune, Dong Son Ky Thuong Nature Reserve, primary broad-leaved evergreen at an elevation of 140 m above sea level. May 2022, Hoang Thanh Son, VAFS6152 (VAFS).

Note: The new species has many characteristics of section *Calpandria* such as flowers solitary or geminate, axillary; bracteoles 2–3, scales to orbicular, persistent; sepals 4–5, suborbicular, persistent; petals 6–7, free to the base, obovate to, united with filament tube at the base. Androecium 5 stamens, filaments completely united to form a fleshy tube, basal adnate to the petal, shallowly dentate at the apex, each filament bearing an anther. Gynoecium 3-locular, ovary superior; styles stout, 3-fide. Therefore, the new species is classified into section *Calpandria*. Prior to this article, section *Calpandria* included a total of 4 species worldwide, namely, *C. connata*, *C. lanceolata*, *C. kirinoi*, and *C. luteocalpandria*. The new species is similar to *C. connata* and *C. lanceolata* by flower white, filaments completely united, ovary 3, pubescent, style united but differs from *C. connata* by perules pubescent (vs. perules glabrous), and from *C. lanceolata* by petals glabrous on both sides (vs. petals tomentose or velutinous). The new species is similar to *C. kirinoi* and *C. luteocalpandria* by filaments completely united, ovary 3, pubescent, style united but differs from *C. kirinoi* by flower white, stamens 5–6, style glabrous (vs. flower light yellow, stamens 20–22, style tomentose) and from *Camellia luteocalpandria* by flower white, and capsule broad pyriform (vs. flower yellow, capsule oblate or subglobose). The known species of *Camellia* sect. *Calpandria* can be distinguished using the following key, which is summarized in Table 1.
Key to the species of *Camellia* sect. *Calpandria*

1a. Flower white

2a. Perules glabrous .................................................. *C. connata*

2b. Perules pubescent

3a. Petals glabrous on both sides; filaments completely united to form a truncated cone ........................................... *C. pyriformis*

3b. Petals strigose-tomentose on the back, velutinous on the face; filaments completely united to form a drum-shaped fleshy tube ............... *C. lanceolata*

1b. Flower yellow

4a. Petals outer side pubescent .................................... *C. kirinoi*

4b. Petals both sides glabrous .................................. *C. luteocalpandria*

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**Figure 1. *Camellia pyriformis* T. S. Hoang & N. B. Trinh**

Notes: (a) Branch with leaves; (b) Bud; (c) Flower bud; (d, e) Flowers; (f) Gynoecium; (g) Fruit; (h) Seed.

Source: Photos by Hoang Thanh Son and Trinh Ngoc Bon.
Figure 2. Camellia pyriformis T. S. Hoang & N. B. Trinh

Notes: (a) Leaves (adaxial surface); (b) Detail of the abaxial surface (apart); (c) Flower (lateral view); (d) Flower (top view); (e) Sepals; (f) Petals; (g) Androecium; (h) Stamens; (i) Gynoecium with sepals; (j) Fruit; (k) Seed.

Source: Drawn by Luong Van Dung.
Table 1. Morphological comparison of the species of *Camellia* sect. *Calpandria*

<table>
<thead>
<tr>
<th>Character</th>
<th><em>C. pyriformis</em> (Ninh, 1999)</th>
<th><em>C. kirinoii</em></th>
<th><em>C. luteocalpandria</em> (Yu et al., 2021)</th>
<th><em>C. lanceolata</em> (Sealy, 1958)</th>
<th><em>C. connata</em> (Sealy, 1958)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit</td>
<td>shrub or tree, 2.5–4.0 m tall</td>
<td>shrub or tree, 1.5–2.0 m tall</td>
<td>shrub or small tree, 3.0–4.0 m tall</td>
<td>shrub or small tree, 4.0–9.0 m</td>
<td>shrub or small tree, 3.0–9.0 m</td>
</tr>
<tr>
<td>Young branches</td>
<td>densely villous</td>
<td>white hirsute</td>
<td>densely spreading grayish-yellow villous</td>
<td>hirsute or villous</td>
<td>densely hirsute</td>
</tr>
<tr>
<td>Leaf blade shape</td>
<td>narrow elliptic to oblong-ovate</td>
<td>narrow elliptic</td>
<td>oblong</td>
<td>elliptic or oblong-elliptic, sometimes ovate</td>
<td>elliptic or oblong-elliptic, sometimes oblanceolate-elliptic</td>
</tr>
<tr>
<td>Leaf size</td>
<td>4.5–7 cm long, 0.8–3.2 cm wide</td>
<td>9.5–13.5 cm long, 3.0–4.5 cm wide</td>
<td>7.0–10.0 cm long, 2.5–3.5 cm wide</td>
<td>14.5 cm long, 2.0–6.2 cm wide</td>
<td>(5.5)–6.0–9.0 cm long, (2.2)–2.5–4 cm wide</td>
</tr>
<tr>
<td>Leaf apex</td>
<td>acuminate or narrowly acuminate</td>
<td>apex acuminate to caudate</td>
<td>obtuse to bluntly acuminate</td>
<td>short and blunt to short and bluntly acuminate</td>
<td>cuneate to wide cuneate or almost round</td>
</tr>
<tr>
<td>Leaf base</td>
<td>rounded or slightly cordate</td>
<td>rounded or slightly cordate</td>
<td>narrow to wide cuneate, rarely rounded</td>
<td>cuneate to wide cuneate or almost round</td>
<td>cuneate to wide cuneate or almost round</td>
</tr>
<tr>
<td>Adaxial</td>
<td>pubescent along midrib</td>
<td>glabrous</td>
<td>densely villous along midvein</td>
<td>glabrous or short pubescent along the midrib</td>
<td>glabrous or obscurely puberulous along the midrib</td>
</tr>
<tr>
<td>Abaxial</td>
<td>pubescent</td>
<td>pubescent</td>
<td>villous along the midrib and lateral vein</td>
<td>villous</td>
<td>sparsely pilose or villous along the midrib</td>
</tr>
<tr>
<td>Petiole</td>
<td>2.0–5.0 mm long, densely villous</td>
<td>1.0–2.0 mm long, hirsute</td>
<td>petioles 1.0–2.0 mm long, villous</td>
<td>3–8 (10.0–12.0) mm long, hirsute and becoming glabrous</td>
<td>(3)–4.0–7.0 mm long, densely hirsute</td>
</tr>
<tr>
<td>Flower</td>
<td>solitary or geminate, axillary</td>
<td>solitary, axillary</td>
<td>solitary or rarely geminate, axillary</td>
<td>1–2 (more) at the top of such shoots</td>
<td>solitary, terminal or axils of the uppermost leaves</td>
</tr>
<tr>
<td>Flower diameter</td>
<td>1.2–1.5 cm</td>
<td>1.0–2.0 cm</td>
<td>1.5–2.0 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedicel</td>
<td>about 2.0 mm long, pubescent</td>
<td>1.0–1.5 mm long, pubescent</td>
<td>1.0–2.0 mm long, sparsely grayish-yellow pubescent</td>
<td>about 2.0 mm long</td>
<td>about 3.0 mm long</td>
</tr>
<tr>
<td>Bracteole</td>
<td>2–3, scales to orbicular, sparsely pubescent on both sides</td>
<td>5–6</td>
<td>2, or rarely 3, abaxially grayish-yellow pubescent, adaxially glabrous</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Morphological comparison of the species of *Camellia sect. Calpandria* (cont.)

<table>
<thead>
<tr>
<th>Character</th>
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<th><em>C. kirinoii</em> (Ninh, 1999)</th>
<th><em>C. luteocalpandria</em> (Yu et al., 2021)</th>
<th><em>C. lanceolata</em> (Sealy, 1958)</th>
<th><em>C. connata</em> (Sealy, 1958)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepal</td>
<td>pubescent on both sides</td>
<td>7–8, outer side pubescent</td>
<td>sepal 4–6, outer side pubescence and concentrated at the middle and upper part, inner side glabrous</td>
<td>(4) 5–8, outer side glabrous to strigose-tomentose, inner side glabrous to velutinous</td>
<td>10–11, glabrous</td>
</tr>
<tr>
<td>Perules (bracteole and sepal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petal</td>
<td>6–7, white, free to the base, both sides glabrous</td>
<td>7–8, light yellow, outer side pubescent</td>
<td>petals 6–8, yellow, both sides glabrous</td>
<td>4 or (5)–6–9 white, outer side strigose-tomentose, inner side velutinous</td>
<td>5, white</td>
</tr>
<tr>
<td>Stamen</td>
<td>5–6, glabrous</td>
<td>20–22</td>
<td>7–8(–12), glabrous</td>
<td>4–7, glabrous</td>
<td></td>
</tr>
<tr>
<td>Ovary</td>
<td>3, densely white silky strigose tomentose</td>
<td>3, densely grayish-yellow pubescent</td>
<td>3, densely yellow silky strigose tomentose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Style</td>
<td>glabrous, united</td>
<td>densely tomentose</td>
<td>basal 1/2 pubescent, apex 3-lobed</td>
<td>hairy or glabrous</td>
<td>tomentose</td>
</tr>
<tr>
<td>Capsule</td>
<td>pyriform, pubescent</td>
<td>globose, pubescent</td>
<td>oblate or subglobose, apex obtuse or beak acute</td>
<td>subglobose or broad pyriform</td>
<td>subglobose, slightly pubescent along grooves</td>
</tr>
<tr>
<td>Seed</td>
<td>broad pyriform, densely villous</td>
<td>hemispherical or subglobose, densely reddish-brown pubescence</td>
<td>irregularly plano-convex, cuneate-convex, or tetrahedral, prominent hilum</td>
<td>plano-convex, prominent hilum</td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES


