

A new species of *Camellia* Section *Dalatia* (Theaceae) from Vietnam¹

George Orel and Anthony S. Curry

*National Herbarium of New South Wales, Royal Botanic Gardens and Domain Trust,
Mrs Macquaries Road, Sydney, NSW 2000, Australia
Author for correspondence: george.orel@rbgsyd.nsw.gov.au*

Abstract

A new species of *Camellia* L. (Theaceae) endemic to the Da Lat Plateau in southern Vietnam is described and illustrated: *Camellia hongiaoensis* Orel & Curry. The newly described species possesses mostly solitary, axillary or terminal flowers; bracts 5; sepals 3–5, transitional to petals (petaloids); petals 7–10; the outer whorl consisting either of sepals or petaloids is distinct, a random arrangement of petals in a tight and uneven spiral, numerous proximally fused stamens and gynoecium 4- or 5-carpellate.

Introduction

Camellia L. (Theaceae) is well represented in Vietnam and China, with its species located throughout these countries. Vietnam is considered a major centre of diversity for the genus, with about 20% of all the species located within its borders (Sealy 1958, Chang and Bartholomew 1984). The genus is characterized by having seeds without wings and capsules dehiscent from the apex (Sealy 1958). Several new species have been discovered in southern Vietnam recently, increasing the number of indigenous *Camellia* species (Orel and Wilson 2010, 2012; Orel et al 2012). The new species published here was recently publicized in popular literature under the misapplied name of *C. krempfii* (Gagnep.) Sealy (Anonymous 3 November 2013). Comparisons of the published descriptions of *C. krempfii* (Gagnepain 1941, Sealy 1958; Chang and Bartholomew 1984), the materials published by Anonymous (3 November 2013, 8 March 2014, 31 May 2014), and specimens collected by the authors, revealed a number of morphological discrepancies between *C. krempfii* and the new species, e.g. in petiole length, leaf size, the number of secondary veins, flower size, shape and colour, number of sepals and petals and length of the styles.

In this paper, the new species *Camellia hongiaoensis*, belonging to *Camellia* sect. *Dalatia* Orel from Vietnam is described.

¹ This paper is dedicated to our colleague Elizabeth Anne Brown (1956–2013), who was a botanist at the National Herbarium of New South Wales



Fig. 1. Adult leaves and flower buds of *Camellia hongiaoensis* (G. Orel & A.S. Curry OC36). Image: A. Curry



Fig. 2. Developing flower buds of *Camellia hongiaoensis* (G. Orel & A. S. Curry OC36). Image: G. Orel

Camellia hongiaoensis Orel & Curry sp. nov.*C. krempfii* auct. non (Gagnep.) SealyTYPE: Vietnam. Khanh Hoa Province: in the vicinity of the City of Nha Trang, Luong Van Dung, Cuong Quang Truong & Pham Huu Nhan, *Orel & Curry OC36*, 28 Nov 2013 (holotype, NSW).**Diagnosis**

Camellia hongiaoensis is similar to *C. luteocerata*, the type species for *Camellia* sect. *Dalatia* Orel, in that it possesses mostly solitary, coral pink flowers with a distinct white margins; axillary or terminal flowers; perules (bracteoles) that cover the peduncle, 10–12 corolla parts (cf. 11–13 in *C. luteocerata*); distinctly recognizable outer whorl consisting of sepals which are transitional to petals (petaloids); a random arrangement of petals in a tight and uneven spiral, numerous proximally fused stamens and gynoecium 4- or 5-carpellate. However, *C. hongiaoensis* differs from *C. luteocerata* in that it possesses mature leaves 35–41 cm long (not leaves 22–27.5 cm); 20–23 (not 8–10) pairs of secondary veins; flowers 9–10.5 cm diam. (not 5.5–6.5 cm diam.), campanulate (not oblongoid); peduncle 1.5–2 cm long (*C. luteocerata* flowers are sessile); bracteoles 10–2 (none); bracts 5 (6 perules); sepals 3–5 (sepals absent); petals 7–10 (not 11–13); styles 4, free to base, basally tomentose (not single, 5-parted and glabrous); ovary hairy (not glabrous).

Perennial, medium to large, sparsely branched, evergreen shrub up to 6 m high, upright habit; sometimes multi-stemmed, main stem up to 25 cm thick at base; secondary branches relatively thin and ascending at c. 45°; adult bark smooth or very slightly furrowed, grey to greyish-brown with a few randomly distributed green areas (some lichen growth present); new shoots light green with randomly distributed light brown corky areas, rather dull, turning grey to light brown on semi-mature branches; adult branches of the same colour as trunk; petiole pronouncedly falcate, rounded in transverse section, rather stout, sometimes proximally slightly twisted around its longitudinal axis, shiny, mid-green with a light-brown corky areas, 2–3(–3.5) cm long, 0.5–0.7 cm wide, c. 0.5 cm thick; axillary leaf buds rudimentary, short and wide, with a sharp apex, light green and shiny; developing leaves very narrowly elliptic, soft, pendulous, rather brittle, of light lilac colour, later purplish-green with distinct sheen, glabrous, irregularly and narrowly serrate, margins indistinctly undulate, venation well developed; mature leaves narrow elliptic, irregularly and finely serrate, margins undulate, glabrous, slightly coriaceous, adaxial surface mid green, rather dull, lighter green and dull below, 35–41 cm long, 9.5–10.5 cm wide; base cordate to amplexicaul; apex variable, cuspidate; blade midrib narrowly sunken adaxially, prominent abaxially, 4–5 mm wide proximally, less than 1 mm distally, light green to yellow-green, rather dull on both sides, secondary venation pinnate, distinctly brochidodromous, with 20–23 pairs of veins adaxially sunken, abaxially slightly prominent, tertiary venation distinct, well-developed, evenly distributed, adaxially more prominent, abaxially almost invisible, adaxially sunken, prominent abaxially, quaternary venation very fine, well-developed and distinct, may be a subset of the tertiary venation; areolation well-developed, meshes unevenly tetragonal to hexagonal of relatively inconstant size, maximum areole dimensions 1.1 × 0.7 mm (tertiary), 3 × 7 mm (quaternary). Flowers pedunculate, campanulate or almost so, pendulous, terminal and axillary, mostly solitary, sometimes geminate, rarely in groups of three, without scent; flower buds numerous, ellipsoid to oval, sparsely hairy, with appointed but blunt distal end, later almost orbicular, pendulous, coral pink with distinct white petal margins, developing petals and sepals tightly overlapping; peduncle falcate, pendulous, rather stout, 1.5–2 cm long, distally 0.75 mm wide, proximally 0.5 mm; pink to light pink, base of peduncle covered by 10–12 small, overlapping, tightly adpressed and undifferentiated bracteoles; flowers 9–10.5 cm diam., waxy, rigid, coral pink to dark pink with distinctly white sepal and petal margins; bracts 5, in two uneven, slightly overlapping whorls, 3+2 or 2+3, triangular, slightly concave, tomentose, rigid but not woody, waxy, slightly keeled, red, with margin partially translucent, very narrow; outer whorl of 2 or 3 bracts, 1.5 cm long, 1.2 cm wide; inner whorl of 3 or 2 bracts, 1.5 cm long, 1.5 cm wide, bracts tightly adpressed to each other and to the sepals; sepals 3 to 5, transitional to the petals, orbicular, concave, rigid but not woody, coral pink with a distinct white margins, variable in size, up to 3.5 cm long, 2.5–3 cm wide, but may be smaller; petals 7–10, unevenly spaced, arranged in a spiral, 3.5–4.5 cm long, 3.5–4.5 cm wide, glabrous, not shiny, rigid, brittle, waxy, concave, unevenly obovate, without emarginations or striations, petal margin white, sometimes partially translucent, wavy; stamens numerous, in a tight circular formation c. 2.5 cm diam.; filaments c. 2.5 cm long, creamy white distally, pinkish proximally, glabrous, less than 1 mm wide, but slightly wider and laterally compressed at the base, in two distinct series, outer filaments joined for c. 5 mm to each other, inner filaments free; anthers bright yellow, later darker, c. 3 mm long, 2 mm wide, divided laterally into two even halves, dorsifixed; styles 4, 3.5–4 cm long, slightly wider proximally, free to base, basally finely tomentose, otherwise glabrous, whitish yellow, lilac to dark purple at base, slightly sinuous; stigma light yellow to yellow, indistinct, asymmetric, c. 1–2 mm long, less than 1 mm wide; ovary superior, barrel-shaped, slightly wider



Fig. 3. Open adult flower of *Camellia hongiaoensis* showing petals and stamens (G. Orel & A. S. Curry OC36). Image: G. Orel

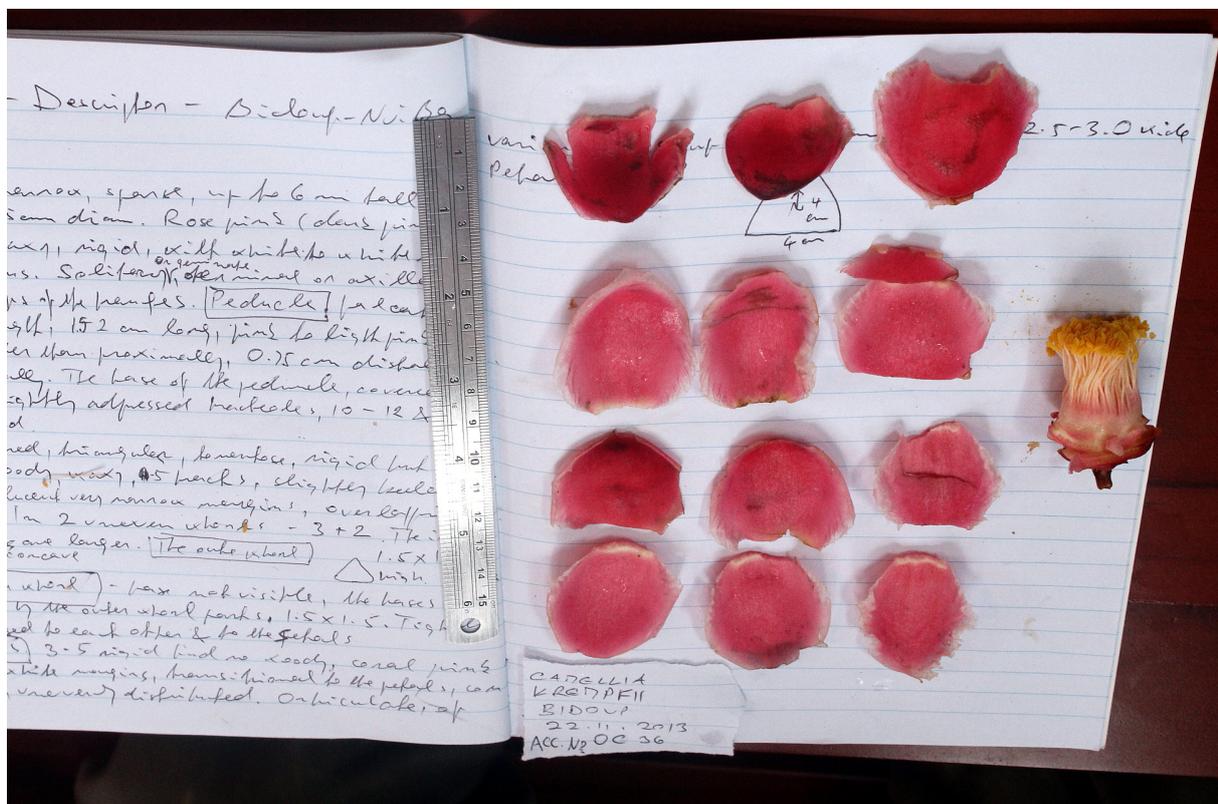


Fig. 4. Adult flower parts of *Camellia hongiaoensis* (G. Orel & A. S. Curry OC36). Image: A. Curry

distally, narrower proximally, 4- or 5-carpellate, finely tomentose at base, light yellow, lilac to purple distally, longitudinal striations distinct and evenly spaced, 7–8 mm wide, 7.5–8.5 mm long, but sometimes smaller; adult fruit 4–4.5 cm wide, 2–2.5(–3) cm thick, pendulous, capsule strongly oblate, sutures 3 or 4, well-defined, yellowish brown with light green areas on upper parts, style remnants persistent and folded over centre of capsule; adult seed glabrous, light brown, shiny, laterally compressed, of various sizes.

Phenology. The new species was collected in flower in late November. The relatively large number of mature flowers may indicate that October to January is the main flowering period for this species.

Distribution. *Camellia hongiaoensis* is known from the type location which is situated in the Khanh Hoa Province in the vicinity of the Honba Mountain. The precise provenance details of this species are withheld for conservation reasons.

IUCN Red List category. Approximately ten adult trees were located in the small area around the type locality. However, no detailed, wider search was undertaken. Given this situation, we consider the IUCN category of Data Deficient (DD) to be appropriate (IUCN 2011).

Etymology. The specific epithet refers to the Hon Giao geographical area in the Province of Khanh Hoa in Vietnam where this species was collected.

Discussion. This new species was found in the southern part of the Central Coast of Vietnam, outside the confines of the geographical area which is considered to be the natural range of *Camellia* species belonging to sect. *Dalatia* (Orel and Wilson 2010). Thus the new discovery considerably extends the geographical range for *Camellia* species belonging to this section. *Camellia hongiaoensis* occurs in a relatively small geographical area which is a part of the thick residual rainforest where it forms a part of the dense understorey. The new species tolerates filtered sunlight and damp atmospheric conditions, with seasonally water-logged soils that are relatively poor, but well-draining.

It should be noted that *C. hongiaoensis* was recently publicized in popular literature (Anonymous 3 November 2013) under misapplied name of *C. krempfii* (Gagnep.) Sealy. Detailed morphological studies which compared the descriptors of *C. krempfii* (Gagnepain 1941; Sealy 1958; Chang and Bartholomew 1984; Ho 1991) and *C. hongiaoensis* indicate a number of morphological differences (refer to Table 1).



Fig. 5. Longitudinal section of adult flowers *Camellia hongiaoensis*, showing stamens, with sepals and petals removed (G. Orel & A. S. Curry OC36). Image: A. Curry

Table 1. Morphological comparisons between *C. hongiaensis* Orel & Curry and *C. krempfii* (Gagnep.) Sealy. Based on Chang and Bartholomew (1984), Gagnepain (1941), Ho (1991), Sealy (1958).

	<i>C. hongiaensis</i>	<i>C. krempfii</i>
Leaf length (cm)	35–41	28.5–31
Leaf width (cm)	9.5–10.5	6–7.5
Leaf apex	variably cuspidate	bluntly acute/acuminate
Leaf base	cordate-amplexicaul	cordate
Lateral vein (pairs)	20–23	about 20
Petiole length (mm)	20–30(–35)	15
Flower (sessile/pedicellate)	pedicellate	pedicellate
Pedicle length (mm)	1.5–2	2.6
Flower Number	solitary or geminate	solitary
Flower position	terminal & axillary	terminal
Flower diameter (cm)	9–10.5	not available
Sepal number	3–5	perules 10–13
Petal number	7–10	about 10
Flower colour	coral pink to dark pink (petal & sepal margins white)	white
Stamen length (cm)	2.5	2–2.5
Filaments	outer connate for 5mm	outer connate for 7–8 mm
Filament hairiness	glabrous	basally hairy
Ovary	finely tomentose	silky
Number of locules	4 or 5	5
Ovary shape	barrel-shaped	ovoid-globose
Style number	4	5
Style length mm	35–40	15
Style hairiness	finely tomentose at base	puberulous
Styles	free	free

References

- Anonymous (3 November 2013) Krempf flower found in Vietnam after one century. In ‘TuoiTreNews (Tuôi Trê Online)’ (Tuoi Tre/Toui Tre News: Ho Chi Minh City, Vietnam) <http://tuoitrenews.vn/society/14771/krempf-flower-found-in-vietnam-after-one-century> (accessed June 2014)
- Anonymous (8 March 2014) Vietnamese “trà” flower recognized as world’s new species. In ‘TuoiTreNews (Tuôi Trê Online)’ (Tuoi Tre/Toui Tre News: Ho Chi Minh City, Vietnam) <http://tuoitrenews.vn/lifestyle/18162/vietnamese-tra-flower-recognized-as-worlds-new-species> (accessed June 2014)
- Anonymous (31 May 2014) Almost-extinct Vietnam flower breed conserved. In ‘TuoiTreNews (Tuôi Trê Online)’ (Tuoi Tre/Toui Tre News: Ho Chi Minh City, Vietnam) <http://tuoitrenews.vn/lifestyle/20002/almostextinct-vietnam-flower-breed-conserved> (accessed June 2014)
- Chang HT, Bartholomew B (1984) *Camellias*. (Timber Press, Portland)
- Gagnepain F (1941) *Ternstroemiacees Nouvelles d’Indochine. Notulae Systematicae* 10: 112–131.
- Ho PH (1991) *Cayco Vietnam*. Volume 1, part 1. (Mekong Printing, Santa Anna)
- IUCN (2011) *International Union for Conservation of Nature, Red List Categories and Criteria*, Version 3.1. <http://www.iucnredlist.org> (accessed 2 March 2011)
- Orel G, Marchant AD (2006) Investigation into the evolutionary origins of Theaceae and genus *Camellia*. *The Proceedings of the International Camellia Congress Melbourne, 13th–20th August 2006, Australia*.
- Orel G, Marchant AD (2007) Investigation into the evolutionary origins of genus *Camellia*. *Proceedings of the Second National Symposium on Yellow Camellias of Vietnam. Tam Dao, Vietnam 25 January 2007*. Vietnam National University, Hanoi and the Ministry of Agriculture and Rural Development, Hanoi, Vietnam.
- Orel G, Wilson PG (2010) *Camellia luteocerata* sp. nov. and a new section of *Camellia* (Dalatia) from Vietnam. *Nordic Journal of Botany* 28: 280–284.

- Orel G, Wilson P (2012) *Camellia cherryana* (Theaceae), a new species from China. *Annales Botanici Fennici* 49: 248–254.
- Orel G, Wilson PG, Curry AS & Luu Hong Truong (2012) *Camellia inusitata* (Theaceae), a new species forming a new section (*Bidoupia*) from Vietnam. *Edinburgh Journal of Botany* 69: 347–355.
- Sealy JR (1958) *A revision of the genus Camellia*. (The Royal Horticultural Society, London)

Manuscript received 3 April 2014, manuscript accepted 3 July 2014

