

# *Camellia cherryana* (Theaceae), a new species from China

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A new species of *Camellia* (Theaceae), *C. cherryana* Orel, endemic to the Sichuan–Yunnan border region, the People's Republic of China, is described and illustrated. It has variably sized, slightly coriaceous, elliptic to lanceolate leaves with a strongly acuminate apex and cuneate base; the adaxial leaf surface is glabrous and slightly pitted, mid-green and shiny, the abaxial leaf surface is sparsely pubescent, light green and shiny; the flowers are solitary, pedicellate, 5–7 cm in diam.; the corolla is two-whorled, white and the petals are soft, opaque to translucent, orbicular or almost orbicular, widely reflexed with undulate margins; the filaments are glabrous, up to 1.5 cm long, but mostly shorter; the styles are three, brown, densely pubescent, 1–1.2 cm long, basally joined but otherwise free; and the stigma is of the same colour, indistinct. The morphological evidence supports a placement in *Camellia* sect. *Heterogena*.

## Introduction

*Camellia* is a member of the tea family (Theaceae). Some 80% of the *Camellia* species are found in the People's Republic of China, where they are distributed throughout the mountainous areas of the country, mostly in the provinces of Guandong, Guangxi, Yunnan, Guizhou, Hunan and Sichuan. The other major centre of diversity for the genus is Vietnam, where almost 20% of the *Camellia* species can be found (Sealy 1958, Chang & Bartholomew 1984, Gao *et al.* 2005, Ming & Bartholomew 2007). Representatives of *Camellia* also occur within the territories of Laos, Cambodia, Myanmar, India, Taiwan, Korea and Japan. One, or possibly two, species have also been found in the Philippines (Sealy 1958, Gao *et al.* 2005).

In this paper, a new species of *Camellia* sect. *Heterogena* from China is described and its taxonomic position assessed in the light of the treatments of Sealy (1958), Chang and Bartholomew (1984) and Ming and Bartholomew (2007). While collecting under the auspices of the Kunming Institute, in the Sichuan–Yunnan border region, the plant collector and nurseryman Mr. Robert 'Bob' Cherry (Paradise Plants, Kulnura, NSW, Australia), discovered a distinctive *Camellia* with soft, opaque to translucent white petals, glabrous filaments and three styles that were free almost to the base. Only a single plant was found. The senior author was unable to find another specimen that matched this plant in any pertinent herbarium collection and the Bob Cherry specimen is here described as a new species, *C. cherryana*. It is apparently confined

to a mountainous area of rainforest situated at an altitude of between 1600–1700 m above sea level. Further searching of the relevant area is required to better determine the distribution of the species.

Analysis of the morphological characteristics places *C. cherryana* within sect. *Heterogena* (*sensu* Sealy 1958). That section was originally established by Sealy (1958) and it contains ten species, namely *C. granthamiana*, *C. tennii*, *C. henryana*, *C. yunnanensis*, *C. paucipunctata*, *C. fleuryi*, *C. gaudichaudii*, *C. crapnelliana*, *C. wardii* and *C. furfuracea*. The ten species of the then newly constituted section are distinguished by perulate flowers, stamens that are free above the base and, in all but one instance (*C. granthamiana*), styles that are free above their basal union (Sealy 1958).

The proposed new species *C. cherryana* broadly fulfils the required phenotypic specifications for sect. *Heterogena*, as it has perulate flowers, with outer stamens free above the base and free styles that are joined only at the base. It should be pointed out that sect. *Heterogena* was created by Sealy (1958) to accommodate “an assemblage of otherwise diverse specimens” that did not fit into any existing section. Thus the morphology of the species in sect. *Heterogena* is diverse to a degree, where the member taxa possess many morphological characteristics of *Camellia* species placed into other sections. The following example is included to illustrate this inherent diversity and its possible origins. Some of the species included in sect. *Heterogena* possess hairy and some glabrous gynoecia

(Sealy 1958). In Sealy’s opinion, the species in sect. *Heterogena*, including the type species *C. henryana*, may have originated from plants not dissimilar to *C. flava* of sect. *Archaeacamellia* (Sealy 1958). We are of the opinion that it is beyond the scope of this paper, which only aims to describe a new species, to discuss the relationships of *Camellia* species in sect. *Heterogena*, with *Camellia* species in a number of other sections in sufficient depth and detail. However, in Tables 1 and 2 we list the differences between *C. cherryana* and the two most similar species, *C. yunnanensis* and *C. henryana*.

## Notes on the classificatory system of Ming

In Ming’s classificatory system (Ming & Bartholomew 2007), *Camellia* sect. *Heterogena* contains 13 species of Chinese provenance, namely *C. szechuanensis*, *C. pubifurfuracea*, *C. yunnanensis*, *C. tenii*, *C. mileensis*, *C. paucipunctata*, *C. gaudichaudii*, *C. granthamiana*, *C. crapnelliana*, *C. furfuracea*, *C. pachyandra*, *C. wardii*, *C. szemaoensis*, plus *C. fleurii*, which is of Vietnamese origin (Sealy 1958, Ming 1999). In comparison, the classificatory systems of Sealy (1958) and Ming (Ming & Bartholomew 2007) appear to be superficially similar, yet a number of differences exist. Sealy (1958) based his sect. *Heterogena* on *C. henryana*, which was designated as the type species for the section. In Ming’s taxonomic treatment, *Camellia* species from *C. sect. Furfuracea*, *C. subg. Protoca-*

**Table 1.** Comparison of selected vegetative characters for *Camellia yunnanensis*, *C. henryana* and *C. cherryana*.

	<i>C. yunnanensis</i> *	<i>C. henryana</i> *	<i>C. cherryana</i>
Bark	rusty-brown to purplish-brown	smooth or exfoliating	medium grey
Leaf shape	oblong, elliptic to ovate	oval, elliptic to oblong ovate or oblong	elliptic to lanceolate
Leaf apex	bluntly acuminate to bluntly acute, or caudate	acuminate to long acuminate	strongly acuminate
Leaf base	cuneate to rounded	cuneate or rounded or rounded	cuneate
Leaf margins	serrulate or serrate serrulate or crenulate	serrate	
Petiole length	sessile or 2.0 to 6.0 mm	3.0 to 7.0 mm	8.0 to 10.0 mm
Primary vein	puberulate	villous	villous

\*Data from Sealy (1958), Chang and Bartholomew (1984), Gao *et al.* (2005) and Ming and Bartholomew 2007.

*mellia*, *C.* sect. *Pseudocamellia*, together with *Glyptocarpa*, were subsumed into sect. *Heterogena sensu* Ming and Bartholomew (2007). Further, Ming and Bartholomew (2007) divided the genus *Camellia* into only two subgenera, namely subg. *Thea* and subg. *Camellia*.

If their criteria are recognised, then in general terms the proposed new species, *C. cherryana*, meets the requirements outlined for subg. *Thea* (flowers clearly pedicellate, bracteoles differentiated from sepals, sepals persistent) but not those for subg. *Camellia* (flowers apparently sessile, bracteoles undifferentiated from sepals). Ming (Ming & Bartholomew 2007), however, while retaining the sectional name *Heterogena*, did not accept a specific status for *C. henryana*, merging it with various other taxa under the varietal name *C. yunnanensis* var. *yunnanensis* (Ming & Bartholomew 2007). Ming and Bartholomew (2007), perhaps to enable them to include a further five *Camellia* species in this section, slightly modified Sealy's sectional description. For example: flowers sessile or sub-sessile (Sealy 1958), flowers sub-sessile (Ming & Bartholomew 2007); flowers terminal or axillary (Sealy 1958), flowers sub-terminal or axillary (Ming & Bartholomew 2007); stamens united with petals at the base, then free (Sealy 1958), outer stamens basally connate (Ming & Bartholomew 2007); styles 3–5 free or united (Sealy 1958), styles 3–5 distinct (Ming & Bartholomew 2007). However, the term 'distinct' does not adequately describe the morphology of styles. The essential features of the styles, e.g. their structure, shape, length, colour and the quality of their surface are not supplied. Fur-

ther, when compared with sect. *Heterogena sensu* Sealy, Ming's modified and enlarged section is even more diverse than the original section established by Sealy. Ming's addition of further three *Camellia* species, namely *C. szechuanensis*, *C. pubifurfuracea* and *C. pachyandra*, which possess three "distinct" types of styles (3–4, 5 and 3–4 styles respectively), introduces an additional element of incompatibility into an already too diverse section and widens its terms of reference.

In view of these facts, we placed the proposed new species, *C. cherryana*, within sect. *Heterogena sensu* Sealy (1958), as its morphology tends to follow the requirements for the section as published by Sealy (1958). It should be noted that in the taxonomic systems proposed by Chang and Bartholomew (1984), and in the treatment published by Gao *et al.* (2005), sect. *Heterogena* is not recognized as an independent section. Chang and Bartholomew (1984) distributed the constituent species of sect. *Heterogena* mostly amongst sects. *Archaeacamellia*, *Stereocarpus*, *Paracamellia*, *Pseudocamellia*, *Corralina*, *Furfuracea* and *Brachyandra*. Under this scheme, the type species of sect. *Heterogena*, *C. henryana*, was included in sect. *Pseudocamellia*.

Analysis of pertinent taxonomic data gained from the evaluation of the newly proposed *Camellia* species indicates a number of morphological characteristics that suggest affinities with sects. *Furfuracea* (Chang 1981, Chang & Bartholomew 1984) and *Pseudocamellia* (Sealy 1958), both of which Ming and Bartholomew (2007) incorporated into their newly redefined sect. *Heterogena*. The authors considered

**Table 2.** Comparison of selected reproductive characters for *Camellia yunnanensis*, *C. henryana* and *C. cherryana*.

	<i>C. yunnanensis</i> *	<i>C. henryana</i> *	<i>C. cherryana</i>
Perule number	8 to 12	9 to 10	14 to 17
Petal number	7 to 12	7 to 10	4 to 6
Androecium	1.4 cm to 2.5 cm	1.8 cm to 2.5 cm	1.5 cm
Stamens	free or united	united	partially united
Gynoecium length	1.4 cm to 3.5 cm	1.0 cm to 2.1 cm	2.5 cm to 3.5 cm
Styles	glabrous	glabrous or hairy	densely pubescent
Style number	3 to 7	3	3
Seed capsules diam.	3.5 cm to 8.0 cm	2.2 cm to 4.0 cm	1.5 cm to 2.5 cm
Seed capsules shape	globose, subglobose to oblate	globose to oblate	globose to ovoid

\*Data from Sealy (1958), Chang and Bartholomew (1984), Gao *et al.* (2005) and Ming and Bartholomew 2007.

placement of the new *Camellia* species in sect. *Furfuracea*, according to the criteria of Chang (1981) and Chang and Bartholomew (1984), or in sect. *Pseudocamellia*, according to the criteria of Sealy (1958) and Chang and Bartholomew (1984), but neither was judged as appropriate, since the morphological traits in common were few and rather superficial.

***Camellia cherryana* Orel, sp. nova** (Fig. 1)

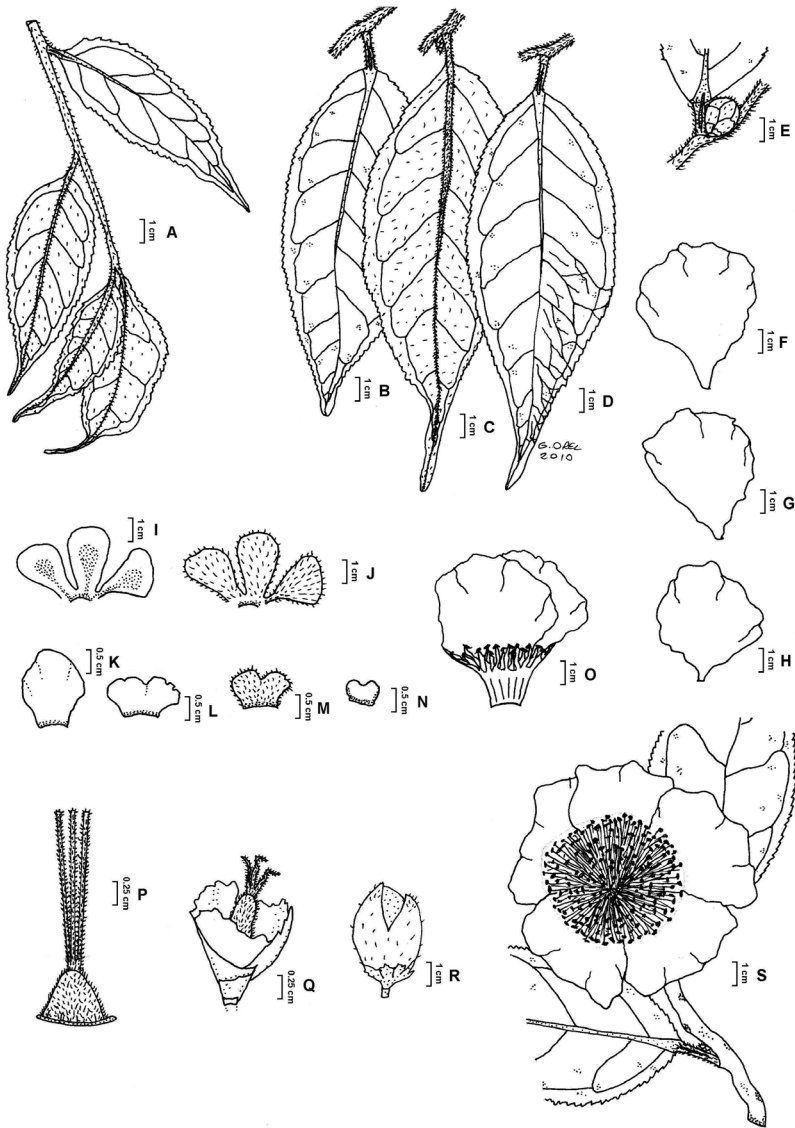
*Camelliae henryanae filamentis exterioribus partim connatis, stylis 3, liberis praeter bases affinis sed petiolis longioribus (8–10 vice 3–7 mm), corolla tantum 4–6 mera (vice 7+) et staminibus brevioribus (usque ad 15 vice 18–20 mm) differt.*

TYPE: People's Republic of China. Sichuan Province, steep, forested ridge of unnamed mountain on Sichuan-Yunnan border, ca. 125 km NW of Kunming, 19 Nov. 1992 *R. Cherry 912* (holotype NSW; isotype SYS).

ETYMOLOGY. The specific epithet honours Mr. Robert 'Bob' Cherry, the eminent Australian plant collector, breeder and nurseryman (Kulnura, NSW, Australia).

Perennial, small, evergreen shrub to 3 m high; single stemmed, upright habit; with semipendulous outer branches, juvenile branches finely pubescent, yellowish, becoming orange towards tips, turning entirely light brown and slightly pubescent on semi-mature branches; mature branches glabrous, light gray and smooth to slightly furrowed; trunk light grey with random medium-dark gray blotches and slightly furrowed; adult leaf petiole linear or slightly falcate, lacking lateral compression, slender, sometimes slightly wider at distal end, shallowly channelled on adaxial side, uniformly medium-green, pubescent with short white hairs, leaf petiole 8–10 mm long and 2–4 mm thick; petiole ascending, at about 45° angle to midrib; axillary leaf buds dull green to grey, pubescent, elliptic, with a soft, sharp apex, slightly compressed; terminal leaf buds also pubescent, laterally flattened, proximally scaled, with soft, sharp apex; juvenile leaves shiny, red-coppery in colour, later yellowish-green, soft, slightly waxy, lamina slightly lustrous on both sides, variable in size and shape, adaxially glabrous, abaxially sparsely pubescent, margins finely serrate; mature leaves

variable in size, irregularly but distinctly serrate, less so at proximal end, margins slightly undulate, up to 11 cm long and 4.2 cm wide; lamina slightly coriaceous, elliptic to lanceolate, leaf apex strongly acuminate, base cuneate; adaxial leaf surface glabrous, slightly pitted, more so towards margins, pits randomly distributed, mid-green and shiny, abaxial leaf surface light green, sparsely pubescent and shiny; primary vein on adaxial leaf surface up to 4 mm wide proximally (up to 2 mm on abaxial side), less than 1 mm wide distally, light green (yellowish in pressed specimens), dull, villous and sunken adaxially, abaxially prominent and pubescent, although less so at distal end; secondary venation pinnate, brochidodromous, with 6–8(10) distally indistinct pairs of veins; veins adaxially slightly sunken, abaxially prominent; tertiary venation poorly defined, sparse and unevenly distributed, partially craspedodromous. Mature flowers slightly scented, white, shortly pedicellate, mostly axillary, sometimes terminal, always solitary; flower buds numerous, orbicular or nearly so, finely pubescent, up to 12 mm diam., bud scales prominent initially green, then mostly white, pubescent, brownish; flowers 5–7 cm diam., soft, opaque to translucent; petals white, glabrous, orbicular or almost orbicular to obovate, widely reflexed, with undulate margins, overlapping at proximal end; pedicel ca. 1 mm long, 1–2 mm wide, light green; petals arranged in two whorls, unevenly distributed around common axis, proximally joined for 5–7 mm; outer whorl of 2–3 petals, up to 3–5 cm long, 3.5–4.0 cm wide, but mostly smaller, slightly concave, slightly asymmetric, obovate to orbicular in shape, lacking keel, or striations; inner whorl of 2–3 petals, up to 3.0–3.5 cm long, 3.0–3.5 cm wide but mostly smaller, slightly concave, slightly asymmetric, obovate to orbicular in shape, lacking keel, or striations; sepals 5(6) proximally joined forming a circular structure 3.5–4.0 cm diam., variable in size, 10–14 mm long, 10–20 mm wide, greenish-white and thickened in centre and proximal end, light brown on margins, otherwise white in colour, roughly obovate, outer surface finely pubescent with white hairs, inner surface glabrous; perules 9–11, partially and proximally finely pubescent when juvenile, mostly glabrous when



**Fig. 1.** *Camellia cherryana* (from the holotype). — **A:** Juvenile leaves, adaxial and abaxial view. — **B:** Adult leaf and leaf petiole, adaxial view. — **C:** Adult leaf with axillary leaf bud, abaxial view. — **D:** Adult leaf, primary, secondary, and tertiary venation, adaxial view. — **E:** Fully developed axillary flower bud. — **F:** Petal, the first or outer whorl. — **G** and **H:** Petals, the second or inner whorl. — **I:** Sepals, outer surface. — **J:** Sepals, inner surface. — **K:** Perules, the first or outer whorl. — **L:** Perules, the second whorl. — **M:** Perules, the third pubescent whorl. — **N:** Perules, the fourth and innermost whorl. — **O:** Corolla and a part of androecium. — **P:** Adult gynoecium. — **Q:** Senescing perules, calyx and gynoecium, post anthesis view. — **R:** Adult fruit. — **S:** Branch with flowers and leaves.

mature or senescent, partially persistent, woody, irregularly arranged in four whorls, eventually forming an irregularly shaped involucre (which is post-anthesis remnant of fourth innermost whorl) 7–9 mm high; first (outer) whorl: two perules, unevenly semi-orbicular, roughly opposite to each other, light green, initially tightly appressed to pedicel and second whorl, slightly reflexed when mature, variable in size, 4.5–5 mm wide, 2–3 mm long; second whorl: two to three perules, semi-orbicular to amorphous in shape, slightly concave, light green and finely pubescent outside, yellow and glabrous on inner

surface, woody and slightly thickened, tightly appressed to third whorl, 7–8 mm wide, 4–5 mm long; third whorl: two perules of variable shape and size, roughly opposite to each other, slightly concave, hairy, light green, woody and slightly thickened, especially at proximal end, on average 8–10 mm wide, 4–5 mm long; fourth whorl: three perules, roughly semi-orbicular, slightly concave, light green, yellowish and glabrous on inner surface, 6–9 mm wide, 9–11 mm long; stamens relatively numerous (200–250), in a circular formation, 3.0–3.5 cm diam.; filaments glabrous, variable in length, up to 1.5 cm long, but



mostly shorter, outer filaments proximally thickened and joined for 8–10 mm forming a shallow cup, inner stamens free, bright yellow, whitish at base, up to 1 mm thick proximally; anthers versatile or nearly so, dark yellow turning dark brown on margins when mature, 1–2 mm long, up to 2 mm wide; styles three, 1–1.2 cm long (which in adult flowers soon decay to variable length, as short as 3–4 mm long), basally joined for less than 1 mm, otherwise free, brown, densely pubescent with white hairs; stigma of same colour, indistinct; ovary superior, three carpellate, irregular in shape, yellowish in colour, each carpel not always bi-locular; ovary densely pubescent, 2.5–3.5 mm high and 3–4 mm wide, basally connected to a narrow platform 4–6 mm diam. Mature fruit globose to unevenly ovoid, 15–20 mm long, 15–25 mm wide, capsule light to medium brown, surface finely textured, finely pubescent, more so distally, and usually three chambered, with one or two seeds per chamber, but capsule sometimes consists of only one large chamber that contains a single globose seed; columella pronounced and persistent after dehiscence, dehisced seed capsules may persist on plant until next season's flowering; seed roughly ovoid, globose to sub-globose, sometimes laterally compressed, medium to dark brown, finely pubescent, 10–15 mm long, 10–15 mm wide.

**PHENOLOGY.** The new species was collected at early flowering in October. The species was in full flower in November, the fruit matured in January–February, and the capsules opened in late June.

**DISTRIBUTION.** *Camellia cherryana* is known only from the type collection. The species' precise provenance details are withheld for conservation reasons.

*Camellia cherryana* shares a number of morphological characteristics with members of sect. *Heterogena*. These include partially united outer filaments and three styles (*C. henryana*); solitary and perulate flowers with a small number of petals, (*C. granthamiana*); relatively short styles (*C. tenii*); perulate and solitary flowers and sub-globose seed capsules (*C. yunnanensis*); flowers with a small number of petals and three styles that are basally united (*C. paucipunctata*); perulate flowers with a small number of petals with three short styles (*C. fleuryi*); three pubes-

cent and relatively short styles (*C. gaudichaudii*); perulate and solitary white flowers with a small number of petals and glabrous filaments (*C. crapnelliana*); perulate flowers with a small number of petals and three styles (*C. wardii*) and fragrant, perulate and few-petalled flowers with three styles and glabrous filaments (*C. furfura-cea*).

*Camellia cherryana* differs from the type species of sect. *Heterogena*, namely *C. henryana*, in a number of morphological characteristics. *Camellia cherryana* is a shrub up to 3 m high (not a shrub or a small tree 2–7 m high); leaf petiole 8–10 mm long (not 3–7 mm long); flowers with 4–6 petals (not 7–8, or sometimes 10, petals); two outermost petals not transitional to the perules (two outermost petals transitional to the perules) and androecium up to 15 mm long (not 18–20 mm long) (fide Sealy 1958).

*Camellia cherryana* also differs from the remaining species in sect. *Heterogena sensu* Sealy (1958) as follows:

1. From *C. henryana*: flowers always solitary rather than geminate; styles senescing to a variable length and as short as 3–4 mm long, not permanently 1.4–2 cm long.
2. From *C. granthamiana*: 4–6 rather than 8 petals; 3 styles 1–1.2 cm long and senescing to as short as 3–4 mm long, not one stout and tapering style 2 cm long.
3. From *C. tenii*: shrub to 3 m high, with semi-pendulous outer branches and densely pubescent styles, rather than an erect shrub 1 m high, with glabrous styles.
4. From *C. yunnanensis*: 4–6 rather than 8–12 petals; three mostly free, pubescent styles rather than 5 (or 4) joined and glabrous styles.
5. From *C. paucipunctata*: shrub to 3 m high rather than a tree 6–12 m high; adult leaves devoid of scattered cork warts on their lower surface rather than adult leaves with scattered cork warts on their lower surface; gynoecium densely pubescent, not glabrous; fruit sub-globose to unevenly ovoid, never pyriform.
6. From *C. fleuryi*: white and opaque to translucent rather than yellowish corolla; filaments relatively numerous, with outer filaments proximally thickened and joined for

8–10 mm forming a shallow cup, rather than filaments very numerous and free to the base; gynoecium densely pubescent, not glabrous.

7. From *C. gaudichaudii*: adult leaves devoid of scattered cork warts on their lower surface.
8. From *C. crapnelliana*: shrub to 3 m high rather than a small tree 5–7 m high; stamens relatively numerous, not very numerous; styles soon senescing to 3–4 mm long, not permanently 1.5–1.6 cm long.
9. From *C. wardii*: shrub to 3 m high rather than a tree 6–12 m high; 9–11 rather than ca. 8 perules; styles densely pubescent rather than glabrous or hairy.
10. From *C. furfuracea*: flowers always solitary, never geminate; styles 1–1.2 cm long rather than 1.85 cm long.

*Camellia cherryana* is also similar to other perulate *Camellia* species with free styles. These include species within sects. *Paracamellia*, *Pseudocamellia* and at least one species in sect. *Camellia* (Sealy 1958). *Camellia cherryana* differs from them as follows:

1. From *C. kissii* (type of sect. *Paracamellia*): shrub to 3 m high rather than a tree up to 13 m high; flowers always solitary flowers rather than one or two flowers at the end of the shoots; petals 4–6 and proximally joined rather than 7–8 and free to the base; styles basally joined for less than 1 mm, otherwise free, rather than sometimes trifid or divided half its length or more into three arms (Sealy 1958).
2. From *C. szechuanensis* (type of sect. *Pseudocamellia*): flowers always solitary, never geminate; 4–6 rather than 8 petals; 3 styles, 1–1.2 cm long, not 3 or 4 and 8 cm long (cf. Sealy 1958).
3. From *C. hongkongensis* (sect. *Camellia*): shrub to 3 m high rather than a tree up to 10 m high; perules mostly glabrous when mature, not grayish and velutinous on the

back and more or less tawny and velutinous on the face; capsules finely textured and pubescent, not furfuraceous (cf. Sealy 1958).

4. From *C. pubifurfuracea* (sect. *Heterogena sensu* Ming & Bartholomew 2007): petals 4–6, slightly concave and slightly asymmetric, obovate to orbicular rather than up to 10, obovate-oblong; and 3 styles, not 5 (Ming & Bartholomew 2007).
5. From *C. mileensis* (sect. *Heterogena sensu* Ming & Bartholomew 2007): flowers 5–7 cm rather than 2–3 cm diam.; petals 4–6 petals, not 7–8; styles 1–1.2 cm, not 1.7 cm long (Ming & Bartholomew 2007).
6. From *C. pachyandra* (sect. *Heterogena sensu* Ming & Bartholomew 2007): petals white, never pink; styles 3, densely pubescent with white hairs, rather than 3 (or 4), glabrous and medium to dark brown; seeds finely pubescent, not smooth and grayish-brown (Ming & Bartholomew 2007).
7. From *C. szemaoensis* (sect. *Heterogena sensu* Ming & Bartholomew 2007): styles densely white-pubescent rather than distinctly glabrous; capsules light to medium brown, not reddish (Ming & Bartholomew 2007).

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