

Research paper

Camellia kissi Wallich (Theaceae): A Newly Recorded Tree from Taiwan

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【 Summary 】

During our botanical exploration of the mountains of Chihpen, Taitung County in September 2005, we collected an unknown *Camellia* which was subsequently identified as *Camellia kissi* Wallich, a species widely distributed from the Himalayas to South China. The newly recorded species is easily distinguished from its congeners in Taiwan by the pyriform capsules. In the present article, a description, line drawing, photos taken in the wild, and a key to the species of *Camellia* section *Paracamellia* in Taiwan are provided. The conservation status for *C. kissi* is also evaluated.

Key words: *Camellia*, *Camellia kissi*, flora, *Paracamellia*, Taiwan, Theaceae.

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研究報告

落瓣油茶－台灣新記錄樹木

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摘要

2005年9月，我們在台東縣知本的山區發現了一種未知的山茶屬植物。根據形態特徵，該植物被鑑定為落瓣油茶(*Camellia kissi* Wallich)，為台灣新記錄植物。本種可以其梨形蒴果的特徵與台灣產同屬植物區分。本文提供落瓣油茶的描述、手繪圖、生態照片以及與台灣同組種類的檢索表。此外，也評估了它的保育等級。

關鍵詞：山茶屬、落瓣油茶、植物誌、短柱茶組、台灣、山茶科。

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INTRODUCTION

Intensive exploration of the flora of Taiwan was carried out during the period of Japanese governance from 1895 to 1945. Thereafter, few tree species were added to the flora of Taiwan. Recently, *Castanopsis chinensis* Hance was reported as a newly recorded tree to Taiwan (Chou et al. 2006). In fact, it had been reported by A. Henry (1896) more than a century ago. In 2003, *Pinus fragilissima* Businsky, a new species of hard pine, was described from Taiwan (Businsky 2003). However, the cited specimens were collected a long time ago (in 1931, *Tanaka 10453*, paratype of *P. fragilissima*), but were misidentified as either *P. taiwanensis* Hayata (Businsky 2003) or *P. massoniana* D. Don (Li 1963). Other cases similar to *P. fragilissima* Businsky were *Eurya septata* Wu et al. and *Symplocos juiyenensis* Wang and Ou. They were collected early but erroneously annotated as *E. chinensis* R. Br. (Wu et al. 2003) and *S. stellaris* Brand (Wang and Ou 1999), respectively. Besides the taxa mentioned above, during the past 2 decades, only a few species such as *Bretschneidera sinensis* Hemsley (Lu et al. 1986) and *Bredia quadrangularis* Cogn. (Yeh and Yeh 2006) were added to the woody flora of Taiwan before our recent discovery.

In September 2005, when collecting specimens in the mountains of Chihpen, Taitung County, southeastern Taiwan, we found an unknown *Camellia* plant in a broadleaf forest. A combination of characters of sessile flowers, free petals, caducous perules, basally united filaments, and 3-loculed villose ovaries, undoubtedly indicated that the new *Camellia* plant belongs to the section *Paracamellia* defined by Sealy (1958).

The most marked character of the unknown *Camellia* plant might be the pyriform capsules. Among the members of the section *Paracamellia*, there are only 2 species, *C.*

fluviatilis Hand.-Mazz. and *C. kissi* Wallich with such a trait (Sealy 1958, Chang and Ren 1998). Both are morphologically close except that *C. fluviatilis* has narrower leaves (mostly < 1.5 cm) (Chang and Ren 1998). The width of the leaf blades of the unknown *Camellia* plant ranges 2~2.5 cm, thus matching the description for *C. kissi*. A detailed study of specimens and a literature review (e.g., Wallich 1820, 1832, Loudon 1838, Sealy 1958, Chang and Ren 1998, Ming 2000) revealed that the new *Camellia* plant is *C. kissi*.

The taxonomy of the genus *Camellia* from Taiwan was summarized in the *Flora of Taiwan*, 2nd edition, vol. 2, in which 12 taxa were recorded (Hsieh et al. 1996). Nevertheless, *C. buisanensis* Sasaki was recently transferred to the genus *Pyrenaria* (Su et al. 2004). Consequently, 11 taxa are currently recognized. According to the descriptions by Hsieh et al. (1996), 3 species belong to the section *Paracamellia* in Taiwan, namely *C. brevistyla* (Hayata) Coh.-Stuart, *C. hengchunensis* Chang, and *C. tenuiflora* (Hayata) Coh.-Stuart. Since *C. kissi* is confirmed as new to Taiwan, a key to the 4 species is appropriate.

Key to the species of *Camellia* section *Paracamellia* in Taiwan

1. Leaves thickly coriaceous, midrib glabrous, margin entire or shallowly serrate only in upper 1/2; fruits oblong... *C. hengchunensis*
1. Leaves thinly coriaceous, midrib villose, margin fully serrate; fruits globose or pyriform
 2. Leaves > 5 cm long, apex caudate; fruits pyriform..... *C. kissi*
 2. Leaves < 5 cm long, apex acuminate to obtuse; fruits globose
 3. Leaves obovate..... *C. tenuiflora*
 3. Leaves oblong *C. brevistyla*

TAXONOMIC TREATMENT

Camellia kissi Wallich, *Asiat. Res.* 8:429. 1820; et *Pl. Asiat. Rar.* III:36, t. 256. 1832; Loudon, *Arbor. Frutic. Br.* I:390, fig. 99.

1838; Sealy, *Rev. Gen. Camellia* 197, fig. 91. 1958. Chang and Ren, *Fl. Reipubl. Popularis Sin.* 49(3):24. 1998. Ming, *Monogr. Gen. Camellia* 303. 2000. Figs. 1~3.

A small tree, up to 8 m high; bark pale



Fig. 1. *Camellia kissi* Wallich. 1. Reproductive branch. 2, 3. Petals. 4. Sepal. 5. United stamens. 6. Ovary.



Fig. 2. A reproductive branch of *Camellia kissi* Wallich.



Fig. 3. A pyriform capsule of *Camellia kissi* Wallich.

gray, glabrous, usually sprouting from base; branchlets villose when young, glabrous when old; shoots lanceolate, pubescent to villose. Leaves oblong-ovate to oblong-lanceolate, apex caudate-acuminate to caudate, tip acute, base attenuate to rounded-attenuate, 5~8 cm long, 2~2.5 cm wide, margin fully serrulate, thinly coriaceous; upper surface bright deep green, glabrous; lower surface pale green, loosely villose when young then glabrous; midrib villose on both surfaces; petioles 3~7 mm, pubescent. Flowers solitary, axillary (nearly terminal); perules caducous, lowermost lunate, tiny, uppermost semi-orbicular to broad-ovate, glabrous inside, pubescent outside, 2~5 mm long, with a membranous

margin; petals 5 or 6, caducous, free, white, obovate or ovate, tip emarginate to round, 8~15 mm long, 3~6 mm wide, glabrous; stamens 4~8 mm long, glabrous, filaments united at base; ovary 3-loculed, with single ovule per locule, 2~3 mm long, densely tomentose, style 1, 2~3 mm long, shallowly trifold to nearly free, glabrous. Capsules pyriform, 1.2~2.0 cm long, 1.0~1.8 cm across, usually 1- or 2-seeded, villose when young, glabrous and woody when mature.

Distribution: Nepal, India, Bhutan, Indochina, and South China. Taiwan, in a broad-leaf forest at Chihpen, Taitung County, at about 1200 m in elevation.

Specimens examined:

CHINA. Hainan Prov.: Locality unknown, Sept. 23, 1935, *F. C. How* 73694 (IBK); Po-tin Co., Aug. 10, 1935, *F. C. How* 73415 (IBK); Same locality, Oct. 24, 1936, *C. K. Lan* 28085 (IBK). **Hong Kong:** Bride's Pool, Dec. 1, 1976, *Y. S. Lau* 2811 (HK); Lions Nature Education Centre, Aug. 25, 2003, *M. H. Su* 248 (TAI); Lung Chu Tam, Jan. 1991, *P. S. Choi* 539 (HK); Kadoorie Farm, Nov. 3, 1976, *G. Barretto s. n.* (HK); Pat Sin Leng Nature Trails, Nov. 1980, *L. T. Lo* 631 (HK); Tai Mo Shan, Nov. 7, 1975, *collector unknown* (HK); same locality, 300 m, Sept. 1, 2006, *C. H. Tsou and M. H. Su* 2259, 2276, 2280, 2281 (HAST). **Guangxi Prov.:** Sanssu Co., Nov. 14, 1958, *C. C. Chang* 12411 (IBK). **Guangdong Prov.:** Hwaiji Co., Aug. 5, 2004, *C. H. Tsou et al.* 1926 (HAST); Lien-shan Co., Aug. 5, 2004, *C. H. Tsou et al.* 1927, 1928 (HAST); Lofushan, Dec. 23, 1928, *Y. Tsiang* 1711 (IBK); same locality, Dec. 12, 1932, *S. P. Ko* 52484 (IBK, IBSC); Lonmen Co., Sept. 27, 1956, *S. C. Lee* 200021 (IBSC); same locality, 380 m, Oct. 14, 1958, *Z. F. Wei* 121894 (IBK, IBSC); Sanon District, 3080 ft (939 m), Apr. 1932, *T. M. Tsui* 234 (IBSC);

Shenzhen City, June 5, 1999, *F. W. Xing 10504* (IBSC); same locality, Sept. 1, 1999, *F. W. Xing and Y. X. Zhang 11075* (IBSC); Sin-i Co., July 1, 1929, *Y. Jiang 33862* (IBSC); same locality, Mar. 24, 1931, *S. P. Ko 51194* (IBSC); Yingde Co., Aug. 5, 1930, *J. L. Zuo 21867* (IBSC). **Sichuan Prov.:** Wusi Co., May 2, 1962, *Ni NI00052* (CDBI). **Yunnan Prov.:** Mienning, Mayetui, 1500 m, Sept. 24, 1938, *T. T. Yu 17697* (E); southwestern Gaoligongshan, Hills N.W. of Tengyueh, 7000-8000 ft (2134-2438 m), Aug. 1925, *G. Forrest 27168* (E); southwestern Gaoligongshan, Ming-kwong Valley, June 1912, *G. Forrest 8070* (E); southwestern Gaoligongshan, Shweli Salwin divide, 9000 ft (2743 m), June 1924, *G. Forrest 24358* (E); same locality, 8000 ft (2438 m), Dec. 1924, *G. Forrest 26088* (E); You-louh-shan, Che-li Co., 1150 m, Sept. 1936, *C. W. Wang 78147* (LBG).

INDIA. Manipur State: Kangla Tongbi, 3000 ft (914 m), Jan. 7, 1946, *A. A. Bullock 884* (NY).

NEPAL. Locality unknown, anno 1821, *N. Wallich 977* (K).

TAIWAN. Taitung Co.: Mt. Chuifenshan, 1200 m, Sept. 29, 2005, *M. H. Su 662, 663, 664, 665* (TAI).

THAILAND. Chiang Mai, Chom Thong, 900 m, May 31, 1979, *J. E. Vidal et al. 6247C* (K); **Sarat,** Kao Naung, 1800 m, Aug. 9, 1927, *collector unidentified 13250* (K); **Udawn,** Phu (Mt) Luang, 1050~1300 m, Jan. 8, 1966, *E. Hennipman 3556* (K).

Notes: Since the publication of the *Flora of Taiwan*, 2nd edition, quite a few new records or new taxa have been added to the flora of Taiwan, e.g., *Tripterosperrum lilungshanensis* (Chen et al. 2005), *Begonia bouffordii*, *Beg. chuyunshanensis*, *Beg. pinglinensis*, *Beg. tengchiana*, *Beg. wutaiana* (Peng et al. 2005), *Bulbophyllum fimbriperianthium*, *Eulophia pulchra* var. *actinomorpha*, *Saccolabiopsis*

wulaokenensis, *Tropidia nanhuai* (Lin et al. 2006), and *Diplazium crassiusculum* Ching (Chang et al. 2006). The discovery of *C. kissi* suggests the necessity to inventory regions that were never or seldom reached by botanists in order to fully document the complete flora of Taiwan.

Camellia kissi was first described by Wallich (1820) based on a plant from Nepal. It is now known to be widely distributed from the Himalayas to South China (Sealy 1958). The specimens that we examined showed wide ranging variations, probably due to such a broad distribution. The population we newly found is morphologically more closely related to those around the Himalayas (i.e., specimens from Bhutan, India, and southwestern Gaoligongshan, China) rather than those from South China, which is geographically closer to Taiwan. Moreover, the morphology of Taiwanese *C. kissi* was well matched with the original description based on materials from Nepal (Wallich 1820).

Despite *C. kissi* being widely distributed, it is protected by laws in Hong Kong because of its local rarity (Chau et al. 2000). In Taiwan, so far *C. kissi* has only been found on the top of Mt. Chuifen (also called Mt. Oiwake) in Chihpen, Taitung County. The estimated total number of individuals might not exceed 200. Even in the neighboring area with undamaged forests, no other population was recorded according to previous (e.g., Chen 1990, Wang et al. 2004, 2006) and our own investigations. According to the rule by the IUCN (2001), *C. kissi* should be categorized as 'endangered' (EN) and deserves conservation status for such a confined habitat and small size of the population.

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