

Research note

## ***Camellia trichoclada* (Rehder) S.S.Chien (Theaceae): A Newly Recorded Shrub in Taiwan**

Sheng-Zehn Yang,<sup>1)</sup> Ho-Ming Chang,<sup>2)</sup> Chien-Fan Chen,<sup>3)</sup> Mong-Huai Su<sup>4,5)</sup>

### **[ Summary ]**

We report on a newly recorded shrub, *Camellia trichoclada* (Rehder) S.S.Chien, section *Theopsis*, genus *Camellia*, family Theaceae, from a mountainous area near Chinshuiying, southern Taiwan. It is morphologically related to *C. transarisanensis* (Hayata) Cohen-Stuart and *C. transnoensis* (Hayata) Cohen-Stuart, but has markedly smaller leaves and a rounded to acute leaf base. In this article, a description, line drawing, photos, and key to the Taiwanese species of the section *Theopsis* are provided.

**Key words:** *Camellia trichoclada*, flora of Taiwan, Theaceae, *Theopsis*.

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<sup>1)</sup> Department of Forestry, National Pingtung Univ. of Science and Technology, 1 Xuefu Rd., Neipu Township, Pingtung 91201, Taiwan. 國立屏東科技大學森林系, 91201屏東縣內埔鄉學府路1號。

<sup>2)</sup> Endemic Species Research Institute, 1 Minsheng E. Rd., Jiji Township, Nantou 55244, Taiwan. 特有生物研究保育中心, 55244南投縣集集鎮民生東路1號。

<sup>3)</sup> Division of Forest Planning, Forestry Bureau, 2 Hangchou S. Rd., Sec. 1, Taipei 10050, Taiwan. 林務局森林企劃組, 10050台北市杭州南路一段2號。

<sup>4)</sup> Department of Forestry and Nature Conservation, Chinese Culture Univ., 55 Huagang Rd., Yangmingshan, Taipei 11114, Taiwan. 中國文化大學森林暨自然保育學系, 11114台北市陽明山華岡路55號。

<sup>5)</sup> Corresponding author, e-mail:smh2@faculty.pccu.edu.tw 通訊作者。

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## 研究簡報

## 毛枝連蕊茶-台灣山茶科新記錄灌木

楊勝任<sup>1)</sup> 張和明<sup>2)</sup> 陳建帆<sup>3)</sup> 蘇夢淮<sup>4,5)</sup>

## 摘 要

本文報導一種產於台灣南部浸水營山區之新紀錄山茶科、山茶屬、連蕊茶組灌木—毛枝連蕊茶 [*Camellia trichoclada* (Rehder) S.S.Chien]，此物種之形態與台灣產之阿里山茶 [*C. transarisanensis* (Hayata) Cohen-Stuart] 與泛能高山茶 [*C. transnokoensis* (Hayata) Cohen-Stuart] 相近，但葉片明顯較小且葉基呈現圓至銳形，而可與後兩者區分。本文提供毛枝連蕊茶之分類描述、手繪圖、生態照片，以及台灣產同組植物之檢索表，以做為鑑識之基礎。

關鍵詞：毛枝連蕊茶、台灣植物誌、山茶科、連蕊茶組。

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*Camellia* L. is the largest genus of the Theaceae and includes around 120 species worldwide (Ming and Bartholomew 2007). A taxonomic overview of Taiwanese native *Camellia* was presented in the *Flora of Taiwan*, second edition, in which 12 species were recognized (Hsieh et al. 1996). Thereafter, *C. buisanensis* Sasaki was transferred to the genus *Pyrenaria* based on its morphological characteristics (Su et al. 2004), and the newly-found *C. kissi* Wall. was reported (Su et al. 2008). Recently, *C. formosensis* was elevated from a formation to a species status, on the basis of morphology and DNA research (Su et al. 2007, 2009).

During a botanical expedition to Mt. Kutzulun, 1 peak of the main ridge of the Central Mountain Range in southern Taiwan, in 2003, the corresponding author found an unknown *Camellia* plant that was characterized by leaves smaller than all recorded congeners in Taiwan. However, there was no sufficient floral or fruit characteristic for species identification. Later in 2004, when executing an investigation project, the team of the first

author found another 3 populations of the unknown *Camellia* plant and obtained several flowering samples. After a careful review of the literature and specimens, this plant was determined to be *C. trichoclada* (Rehder) S.S.Chien, which was formerly known to be endemic to southeastern China (Ming and Bartholomew 2007).

The filaments of *C. trichoclada* are connate and glabrous, which present a diagnostic characteristic of the section *Theopsis* Cohen-Stuart (Sealy 1958, Ming 2000). In Taiwan, formerly 3 known species were classified into this section, namely *C. nokoensis* (Hayata) Hayata, *C. transarisanensis* (Hayata) Cohen-Stuart, and *C. transnokoensis* (Hayata) Cohen-Stuart. Since *C. trichoclada* was confirmed as new to Taiwan, a key to the 4 species is appropriate.

#### Key to the species of *Camellia*, section *Theopsis* in Taiwan

1. Leaves < 2.5 cm long, base rounded to acute ..... *C. trichoclada*
1. Leaves > 2.5 cm long, base cuneate to

attenuate

2. Winter bud scales pilose .....*C. nokoensis*

2. Winter bud scales glabrous or margin ciliolate

3. Calyx hairy .....*C. transarisanensis*

3. Calyx glabrous or margin ciliolate.....  
.....*C. transnokoensis*

### Taxonomic treatment

*Camellia trichoclada* (Rehder) S.S.Chien, Contrib Biol Lab Sci Soc China Bot Ser 12:100. 1939. Sealy, Rev Gen *Camellia* 81, fig. 35. 1958. Hung T.Chang, Fl Reipubl Popularis Sin 49(3):163. 1998. T.L.Ming, Monogr Gen *Camellia* 182, pl. 34. 2000. T.L.Ming & B.M.Barthol., Flora China 12:387. 2007. Type: CHINA, Chekiang Prov., Taishun County, Aug. 10, 1926, *Y.L.Keng 324* (isotype: PE). 毛枝連蕊茶 (Figs. 1, 2).

*Thea trichoclada* Rehder, J Arnold Arbor 8:176. 1927.

*Theopsis trichoclada* (Rehder) Nakai, J Jpn Bot 16:707. 1940.

Shrub, 1~3 m tall, highly branched. Young branchlets slender, with small leaves set closely together and distichously arranged, villi spreading, grayish to yellowish-brown; winter buds oblong-ovoid, apex acuminate, 3~10 mm long, scales glabrous or margin ciliolate. Leaves coriaceous to thinly coriaceous, ovate to elliptic ovate, 1~2.2 (2.5) cm long, 0.6~1.2 (1.5) cm wide, apex obtuse to slightly emarginate, base rounded to acute, sometimes subcordate, margin crenulate-serrulate, midribs hirtellous, secondary veins 4~6, sometimes obscure; petioles 1~1.5 mm long, hirsute. Flowers ca. 2 cm across, axillary or subterminal, solitary or 2- or 3-clustered; pedicel 2~4 mm long, glabrous; bracteoles 4 or 5, unequal, suborbicular to broadly ovate, largest one 0.5~1 mm long, glabrous; calyx 2~4 mm wide; lobes 5, suborbicular to broadly ovate, 1~2 mm wide, glabrous,

margin ciliolate; petals 5 or 6, white, obovate to obovate-elliptic, 0.8~1.5 cm long, 0.6~1.2 cm wide, basally connate; filaments 1~1.2 cm long, glabrous, 1/2 basally connate; ovary glabrous; style trifid, 0.9~1.2 cm long, glabrous. Capsule subglobose, around 1.0 cm across. Seed usually 1, globose. Flowering November to February.

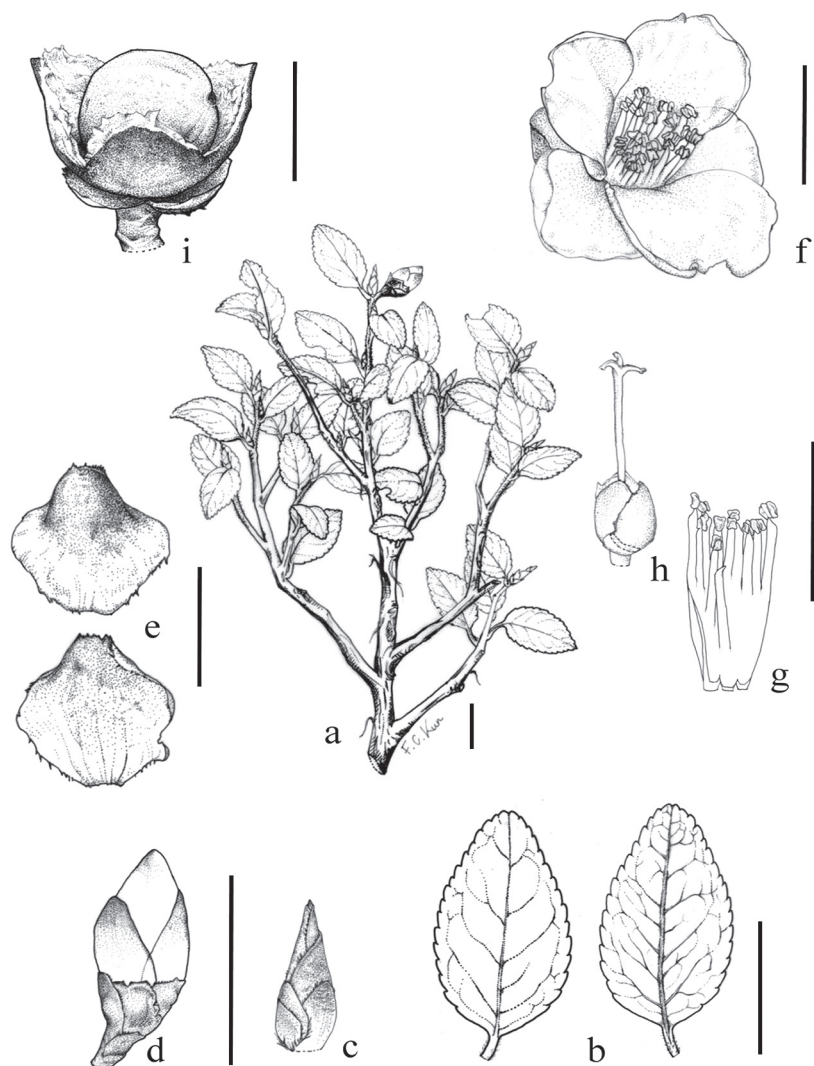
Distribution in Zhejiang (Chekiang) and Fujian Provs., southeastern China. In Taiwan, known only from the southern Central Mountain Range, including Mt. Kutzulun, Mt. Tahan, and Mt. Chachayalai, at elevations of 1000~1600 m.

Specimens examined: **CHINA: Zhejiang Prov.**, Jingning, *s.d.*, *J.X.Wang 1252* (PE); Pingyang County, June 29, 1959, *X.Y.Zhang 5898* (KUN, PE); *ibid.*, Nov. 25, 1959, *Hangzhou Botanical Garden 7412* (PE); Taishun City, Nov. 12, 1960, *M.F.Yeh 006* (PE); *ibid.*, *s.d.*, *J.X.Wang 1303* (PE); **Fujian Prov.**, Yungtai County, Tuenchienlen, Hulang-ping, Oct. 6, 1942, *L.Yong 5493* (PE); *s.loc. & s.d.*, *L.K.Lin 1693* (KUN).

**TAIWAN: Pingtung County**, Mt. Chachayalai, Aug. 3, 1994, *C.K.Liao 064* (PPI); Mt. Kutzulun, 1600 m, Oct. 20, 2003, *M.H.Su 397, 398* (TAI); Mt. Tahan, 1200~1400 m, Nov. 14, 2004, *C.F.Chen 918* (PPI); *ibid.*, 1000~1500 m, *K.P.Lo 635* (PPI); *ibid.*, 1000~1200 m, July 28, 2005, *C.F.Chen 1652* (PPI). **Taitung County**, Tawu, 1100~1300 m, Apr. 2, 2005, *C.F.Chen 1331* (PPI).

### NOTES

*Camellia trichoclada* was first reported by Alfred Rehder as *Thea trichoclada* (Rehder and Wilson 1927), when he studied the materials that Ernest H. Wilson brought from eastern China (Howard 1972). In their publication, Rehder noted the marked characters



**Fig. 1.** *Camellia trichoclada* (Rehder) S.S.Chien. a, Habit; b, leaf: right, upper surface; left, lower surface; c, leaf bud; d, flower bud; e, petal: upper, outer surface; lower, inner surface; f, flower; g, united stamens; h, calyx and style with trifid stigma; i, dehiscent capsule with 1 seed. All scale bars = 1 cm.

of the small leaves and rounded leaf base, and his opinion was also followed by several monographic studies on *Camellia* (Sealy 1958, Ming 2000, Ming and Bartholomew 2007). According to the description from the above literature, leaves of *C. trichoclada* should be the smallest (mostly < 2.2 cm) among species of the section *Theopsis*, which

provides a diagnostic character for *C. trichoclada*. Meanwhile, we examined the isotype which is stored in PE (i.e. Y.L.Keng 324), and the newly found plant appears to have similar characteristics. Therefore, this plant was determined to be *C. trichoclada*.

Another trait, i.e., the long spreading hairs on the young branchlets (Fig. 2c), was



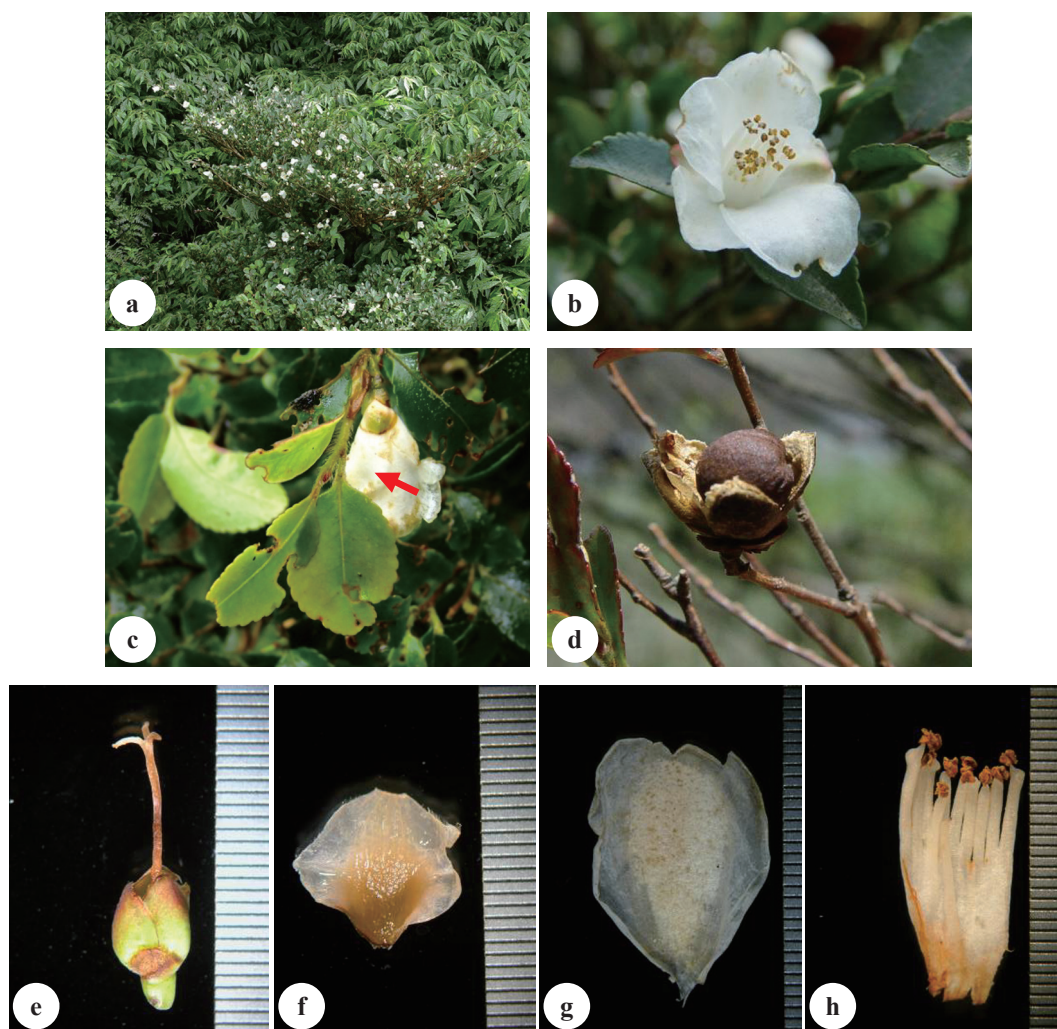


Fig. 2. Habitat, morphology and flower dissection of *Camellia trichoclada* (Rehder) S.S.Chien. a, Habitat; b, flower; c, spreading hairs (arrow); d, dehiscent capsule and seed; e, calyx and style; f, outer petal; g, inner petal; h, united stamens. e-h, scale = 0.5 mm.

also emphasized by Rehder (Rehder and Wilson 1927), and was the trait that species epithet '*trichoclada*' was based on. However, according to our examination of related specimens and field observations, some plants of *C. transarisanensis* and *C. transnokoensis* also show long spreading hairs on their young branchlets. Therefore, this should not be used as the only character for diagnosing *C. trichoclada*.

Despite *C. trichoclada* not being included in the threatened plant list of China (Fu 1992), its populations do not seem to be abundant, an assumption based on the few specimens available in herbaria, and confined collection sites for those specimens. In Taiwan, populations of *C. trichoclada* also seem to be scarce and scattered. It was only recorded in 2 of 42 plots around Mt. Kutzulun (Lo 2006), and 2 of 36 plots between Mt. Tahan

and Mt. Chachayalai (Chen 2006).

*Camellia trichoclada* is found in forests dominated by *Cyathea loheri* Christ, *Cyclobalanopsis sessilifolia* (Blume) Schottky, *Illicium anisatum* L., *Machilus thunbergii* Siebold & Zucc., *M. japonica* Siebold & Zucc., *Rhododendron formosanum* Hemsl., *Sapium discolor* Müll.Arg., and *Trochodendron aralioides* Siebold & Zucc. in the canopy layer; *Barthea barthei* (Hance ex Benth.) Krasser, *Eurya loquaiiana* Dunn, *E. leptophylla* Hayata, *Hydrangea angustipetala* Hayata, *Skimmia reevesiana* (Fortune) Fortune, and *Symplocos morrisonicola* Hayata in the shrub layer; and *Carex morii* Hayata, *Diplazium dilatatum* Blume, *Juncus effusus* L. var. *decipiens* Buchenau, *Miscanthus sinensis* Andersson, *Polygonum posumbu* Buch.-Ham. ex D. Don, and *Selaginella delicatula* (Desv. ex Poir.) Alston in the understory layer (Chen 2006, Lo 2006). Following the classification of the altitudinal zonation of Taiwanese vegetation (Su 1984), the habitat of *C. trichoclada* is inferred to be a montane evergreen broad-leaf forest, or the cloud belt zone.

The mountain area between Mt. Kutzulun and Mt. Chachayalai, usually called Chinshuiying by local botanists, is thought to possess high biodiversity and might have been a refugia during the glacial ages, according to phylogeographical research (Huang et al. 2002). For this reason, Chinshuiying was officially proclaimed to be a nature preserve of Taiwan. Although Chinshuiying was intensively explored historically, findings of new and newly recorded taxa are steadily being documented, for example, *Swertia changii* Sheng Z. Yang, Chien F. Chen & Chih H. Chen (Gentianaceae, Chen et al. 2008), *Microtrichomanes digitatum* (Sw.) Copel. (Hymenophyllaceae, Moore et al. 2003), *Hymenophyllum pilosissimum* C. Chr (Hymenophyllaceae, Moore et al. 2010), *Bulbophyllum fimbriperi-*

*anthium* W.M. Lin, Kuo Huang & T.P. Lin (Orchidaceae, Lin et al. 2006), *Nervilia tahan-shanensis* T.P. Lin & W.M. Lin (Orchidaceae, Lin et al. 2009), and also our discovery. That suggests the necessity to continue investigations in this area to determine the complete flora of Taiwan.

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