NOTE

Some Supplements on the *Antidesma pleuricum* Tul. (Euphorbiaceae), a Neglected Species in the Flora of Taiwan

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ABSTRACT: We described the plant, *Antidesma pleuricum* Tul. (Euphorbiaceae), a neglected species in the Flora of Taiwan. After a review of relavant literature and specimens of Taiwanese and Philippine's *Antidesma* spp., *A. hontaushanense* C. E. Chang was treated as a synonym to *A. pleuricum*. A distributional map and color photographs of *A. pleuricum* in Lanyu, and both image of the type specimen and plate of *A. hontaushanense* are provided in this paper.

KEY WORDS: *Antidesma hontaushanense*, *Antidesma pleuricum*, Euporbiaceae, Taxonomy, Taiwan.

INTRODUCTION

Antidesma L. is a genus of 150-180 species in Old World, mainly in Asia, only a few species in Africa, Madagascar, Australia and the Pacific islands (Hsieh et al., 1993; Govaerts et al., 2000; Radcliffe-Smith, 2001; Boufford et al., 2003). Based on the anomalous floral and fruit's characters, i. e. unilocular ovary, fruit and seed structure, this genus has been considered as the only member of Stilaginaceae (Airy Show, 1969, 1972, 1973, 1978). Most taxonomists considered that this genus is typical of the Euphorbiaceae from the palynological, cytological, embryological, serological and anatomical characters (Hsieh et al., 1993; Govaerts et al., 2000; Radcliffe-Smith, 2001; Boufford et al., 2003). Three species include one species represented in two varieties of this genus are native to Taiwan (Hsieh and Yang, 1969; Ying, 1992; Hsieh et al., 1993; Boufford et al., 2003), and one species: *A. bunius* (Linn.) Spreng, was introduced (Ho, 1982; Ying, 1992). *Antidesma spicatum* Blanco was listed as an uncertain species to the flora of Taiwan by Ying (1992). Yang et al. (2008) treated *A. hiirranense* Hayata as a synonym of *A. japonicum*, so there are two species listed by Yang et al. (2008).

Antidesma pleuricum Tul. is endemic to forests at low and medium elevations in Philippine archipelago (Merrill, 1923). In the report "Investigations about the characters of plant resources in Lanyu Area", *Antidesma pleuricum* was listed in the appendix: "flowering and fruit periods, and colors of flowers and fruits of the vascular plants in Lanyu" (Yang et al., 1990). Govaerts et al. (2000) reported that *A. pleuricum* distributes in Taiwan and Philippines, and treated *A. hontaushanense* C. E. Chang as a synonym to *A. pleuricum* Tul. However, no voucher was cited by Govaerts et al. (2000). Two specimens of *A. pleuricum* were deposited in the Herbarium of Taiwan Forestry Research (TAIF), one of them is male branch and the other is female one.

Antidesma hontaushanense C. E. Chang (which was firstly published as *A. hontaushanensis*) was firstly described as an endemic species to Lanyu island in 1964 (Chang, 1964). This plant is characterized with larger leaves (11-13 cm long, 6-7 cm broad), panicle composed by axillary spikes, and adaxially pubescent sepals (Figs. 1 & 2) (Chang, 1964). *A. hontaushanense* was accepted and briefly described in the first edition of the Trees of Taiwan by Liu et al. (1988). In the revised edition of the Trees of Taiwan (Liu et al, 1994; Lu et al., 2006), *A. hontaushanense* was treated as synonym to *A. pleuricum*. Li and Hoffmann (2008) mentioned that *A. hontaushanense* is only known from the type collection and available description is very poor. Because of the insufficient available information, the relationship between *A. hontaushanense* and *A. pleuricum* is difficult to be confirmed (Li and Hoffmann, 2008). Both *A. hontaushanense* and *A. pleuricum* were neglected in the 2nd edition of the Flora of Taiwan (Hsieh et al., 1993; Boufford et al., 2003) and "A Synopsis of Taiwan Seed Plants" (Yang et al., 2008).

Antidesma spicatum Blanco was recorded as an endemic species to the Philippines, which is common in primary forests in low elevations (Merrill, 1923). Ho (1982) described this plant in Chinese and illustrated with a color photograph. Ho (1982) mentioned that *A. spicatum* occurs in Lanyu and Philippines, but no

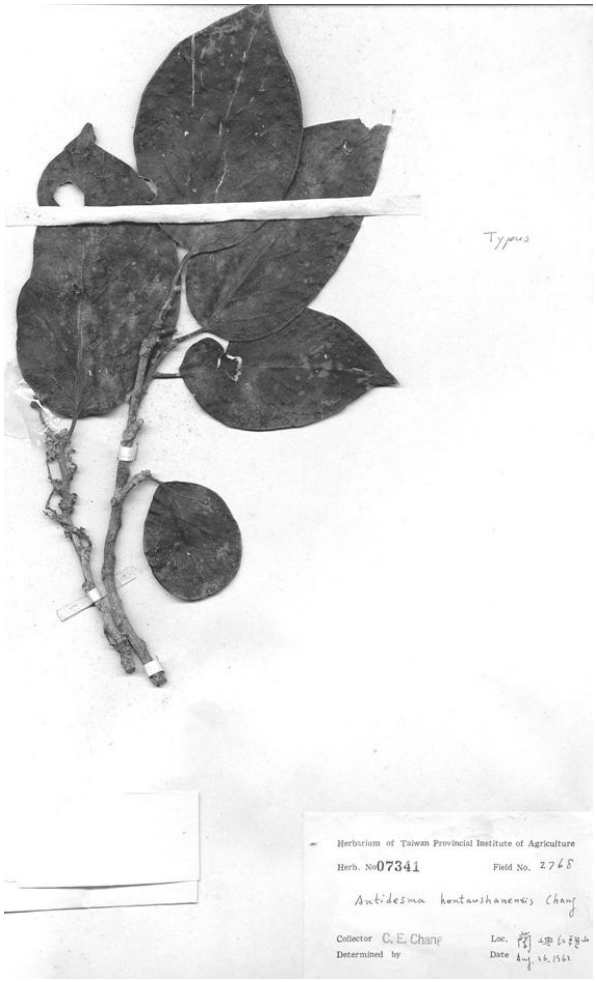


Fig. 1. Type specimen's image of *Antidesma hontaushanense* C. E. Chang.

voucher was cited. Ho (1982) described this plant with broadly ovate to elliptic leaf blades (11-17 cm long, 7.5-10 cm wide), solitary raceme or composed into a panicle, and purple-black drupes when mature. Ying (1992) considered that characters of *A. spicatum* described by Ho (1982) is similar to characters of *A. pentandrum* (Blanco) Merr., and listed the plant *A. spicatum* as an uncertain species to the flora of Taiwan.

In a botanical survey in Tienchih trail, Lanyu, the first author collected a male-flowering specimen of *Antidesma* sp. with conspicuous ciliate blades margins, racemose panicles, hairy racemes, pedicels, and sepals on the abaxial surfaces (Figs. 3A & B). In order to determine the specimen, the first author tried to search the original cited paper of *A. hontaushanense* according to the literature cited by Liu et al. (1988, 1994) and Lu et al. (2006). The first author can't find any related information of any *Antidesma* spp. in "Bull. Tai. Prov. Pingt. Inst. Agr. 6: 2, 1964" cited by Liu et al. (1988, 1994) and Lu et al. (2006) until the corresponding author offered the original cited paper of *A. hontaushanense*. *A. hontaushanense* was published by C.-E. Chang (1964) in Forest. J. For. Assoc. Taiwan Prov. Inst. Agric. Pingtung. The first and the corresponding authors also revised the type specimens of *A. hontaushanense* (*C. E. Chang 2768*) (Fig. 1), and specimens of *Antidesma* spp. deposited in the Herbarium of Taiwan Forestry Research (TAIF). Besides, several relative literatures of Euphorbiaceae (Chang, 1964; Liu et al., 1988; Li and Hoffmann, 2008) were examined by the first and the corresponding authors, too. After these works, the authors considered the specimen collected by the first author fit characters of *A. hontaushanense*. Besides, the first author collected several fruiting specimens of *A. hontaushanense* in other mountain areas in Lanyu in another botanical survey (Figs. 3C-F).

Furthermore, we revised the two specimens of *A. pleuricum* from the Philippines which are deposited in herbarium TAIF, and relative literatures of Euphorbiaceae (Merrill, 1923; Chang, 1964; Ho, 1982; Liu et al., 1988; Hsieh et al., 1993; Liu et al, 1994; Govaerts et al., 2000; Radcliffe-Smith, 2001; Lu et al., 2006; Li and Hoffmann, 2008). Ciliate blades margins, racemose panicles, hairy racemes, pedicels, and sepals on the abaxial surfaces could be found on the vouchers of *A. pleuricum* (*A. Loher 14945* (TAIF), *C. Sulit 2-26* (TAIF)). After these works, we accepted the viewpoint of Govaerts et al. (2000), Liu et al. (1988, 1994), Lu et al. (2006) and treated *A. hontaushanense* as a synonym to *A. pleuricum*. According to collecting sites of the vouchers of *A. pleuricum* deposited in herbaria HAST, PPI, and TAIF, we drawn a distribution map of *A. pleuricum* in Lanyu (Fig. 4). Herein, we described *A. pleuricum*, offered a distribution map in Lanyu (Fig. 4) and color photographs (Fig. 3) of this species which is neglected in the Flora of Taiwan. The type specimen's image (Fig. 1), plate of *A. hontaushanense* by Cheng (1964), and relative information of *A. hontaushanense* were offered, too. Since the latest taxonomic treatments about Taiwanese *Antidesma* spp. were published by Yang et al. (2008), we adopted their viewpoints and offered a key for members of the genus *Antidesma* in Taiwan.

TAXONOMIC TREATMENTS

1. *Antidesma pleuricum* Tul. Ann. Sci. Nat. Bot., sér. 3 15: 213. 1851. Merrill, An Enumeration of Philippine Flowering Plants 2: 417, 1923; Govaerts et al., World Checklist and Bibliography of Euphorbiaceae (with Pandaceae) 1: 178-201, 2000.
紅頭五月茶 Figs. 1-4

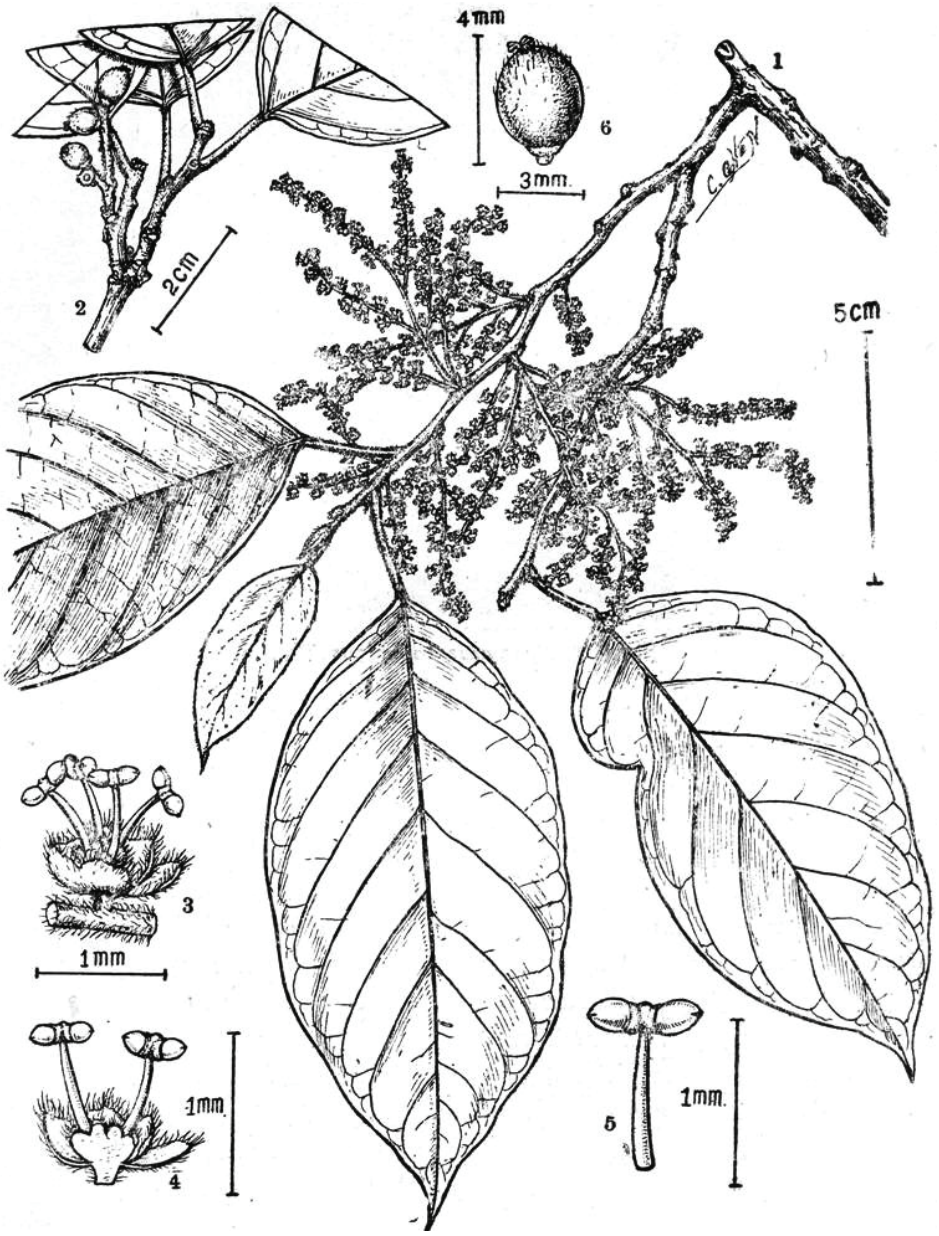


Fig. 2. Plate of *Antidesma hontaushanense* C. E. Chang, illustrated by Chang (1964). 1: A branch with male inflorescences. 2: Another branch with fruits. 3: A male flower. 4: The same in vertical section. 5: A stamen. 6: A fruit.

Antidesma hontaushanense C. E. Chang. Forest. J. For. Assoc. Taiwan Prov. Inst. Agric. Pingtung 6: 2, pl. 2. 1964; C.-E. Chang No. 2768 (Typus!); Liu et al., Trees of Taiwan: 458-460, 1988; Li and Hoffmann, Flora of China 11: 209-215, 2008.

Shrubs; branches terete, gray-brownish; branchlets and terminal buds densely pubescent. Stipule lanceolate, apex acute, petiole 1-1.5 cm, densely pubescent; leaf blade elliptic or obovate-elliptic, base rounded to obtuse, apex acuminate into a acute tip, 3.5-13 cm long, 3-7 cm wide; blade chartaceous, glabrous or sparsely pubescent on both surfaces, margin entire with conspicuous marginal cilia, cilia 0.3-0.5 mm long, midvein and lateral veins coated with antrorse hairs, reticulate veins prominent. Inflorescence an axillary raceme or composed to a panicle, raceme axis densely pubescent, bractlet ovate, apex round to acute, 1.5-2 mm long, adaxially pubescent. Flowers dioecious; male flowers solitary or 3-5 fasciculate, bractlets obovate, ca. 0.5 mm, apex obtuse, densely pubescent; pedicel ca. 0.2 mm long, densely pubescent; sepals 3 or 4, broadly ovate, ca. 0.6 mm long, 0.8 mm wide, densely pubescent on abaxial surface, hairs to 0.5 mm long;

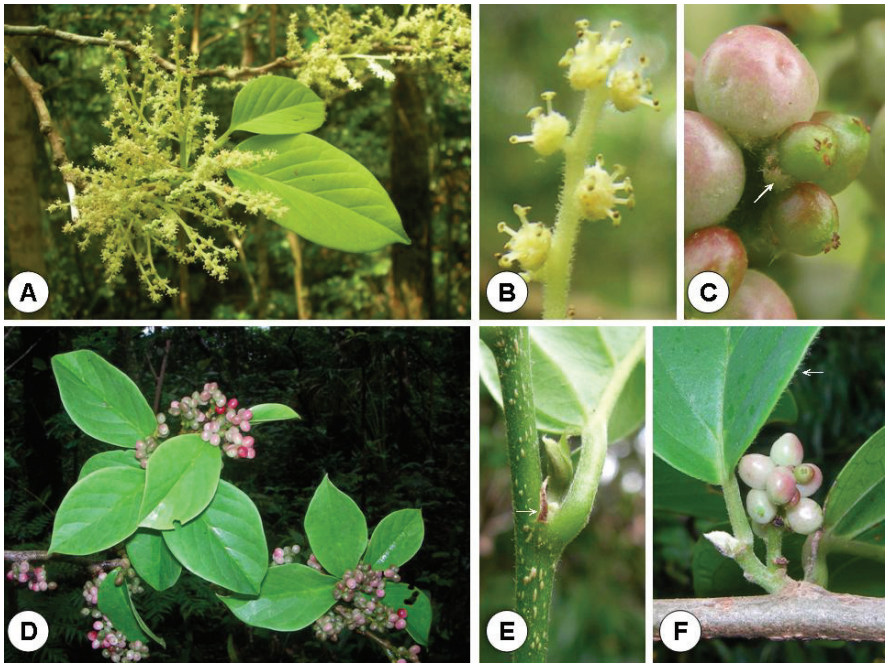


Fig. 3. *Antidesma pleuricum* Tul. A. Flowering male panicles, with two juvenile leaves. B. Part of raceme of male inflorescence, showing the pubescent axis and pubescent sepals. C. Immature drupes, showing the pubescent sepals (↗). D. Fruiting habit with mature leaves. E. Part of the pubescent juvenile branch, stipule (→), and pubescent petiole. F. Part of the fruiting branch and ciliate blade margin (←).

floral disk pubescent, stamens (2-)3~4(-5); filaments 0.8-1 mm. Sepals and disks of female flowers as in males'; ovary pubescent. Drupes subglobose, ca. 5 mm long, 4 mm wide, 3-4 mm thick, reddish when mature, puberulent.

Specimens examined: Philippines. Prov. Luzon, Balacbac Rizal, Jun 1912, A. Loher 14945 (TAIF), Battan Isl., Oct – Dec 1915, C. Sulit 2-26 (TAIF). Taiwan. Pingtung Co., Hungchun Township, Kenting Park, 23 May 1996, S.-Z. Yang 27143 (PPI); Taitung Co., Lanyu Township, Aopenling, 29 Sep 2009, M.-J. Jung 4594 (TAIF, PPI), Hsiaotienchin, 22 Sep 2009, M.-J. Jung 4528 (TAIF, PPI), Hungtoushan, 26 Aug 1962, C.-E. Chang 2768 (PPI, Typus of A. hontaushanense!), 30 Sep 1998, T.-T. Chen 9301 (TAIF), Langtao East Stream, 30 Jan 1978, C.-E. Chang 11681 (PPI), Lanyu, 26 Apr 1962, C.-E. Chang 2806 (PPI), 6 Sep 1962, C.-E. Chang s. n. (PPI), 16 Feb 1970, C.-E. Chang 6130 (PPI), 17 Feb 1970, C.-E. Chang 6168 (PPI), 20 Feb 1970, C.-E. Chang 6224 (PPI), 22 Nov 1979, C.-E. Chang 12433, 12434 (PPI), 22 Oct 1985, S.-Y. Lu 17546 (TAIF), Lanyu Light House, 19 Sep 2009, M.-J. Jung 4512 (TAIF, PPI), Shasheshan, 25 Feb 1993, C.-C. Liao 1182 (HAST), 23 Sep 2009, M.-J. Jung 4545 (TAIF, PPI), Tienchih, 20 Nov 2003, C.-I Huang 1523 (HAST), 29 Aug 2009, M.-J. Jung 4487 (TAIF), 26 Sep 2009, M.-J. Jung 4567 (TAIF, PPI), Wangnanfen, 29 Jul 1988, C.-E. Chang 19701 (PPI).

Distribution: Philippines and Taiwan, Sparse forests about 100-500 m in elevations in Lanyu, Taiwan.

Notes: There are two differences between the description and the illustrated plate of *A. hontaushanense* (Fig. 2) by Chang (1964). At first, male inflorescence of *A. hontaushanense* was described as axillary spikes, but a short and pubescent pedicel could be found in each male flower in the plate (Fig. 2). Short and pubescent pedicels also could be found in vouchers and fresh specimens collected by the first author (Fig. 3B). In the second, sepals (perianth) were described around 1 mm in diameter, but the sepals illustrated by Chang (1964) were significantly shorter than 1 mm according to the scale of the plate (Fig. 2).

There are also two supplements between description of *A. hontaushanense* by Chang (1964) and the research result by the first author. Leaf blades were: "…glabrous except the midrib covered with pubescent," (Chang, 1964). The vouchers which the first author examined have pubescent midrib and lateral veins. Blade margins of the examined voucher were conspicuously ciliate (Fig. 3F), but this character was not mentioned by Chang (1964).

In addition to the vouchers of *Antidesma pleuricum* we cited in previous, we also examined flowering and/or fruiting specimens of *Antidesma* spp. deposited in herbarium TAIF. We accepted the viewpoint and treatments of Yang et al. (2008). Several characters are different from *A. pleuricum* and other two *Antidesma* spp. in Taiwan. Firstly, Blade margins of the most Taiwanense specimens of *Antidesma* spp. we examined were entire and glabrous, part of them were sparsely cilia (cilia fewer than 2 in 1 cm). Blade margins of *A. pleuricum* are entire and conspicuously ciliate (cilia

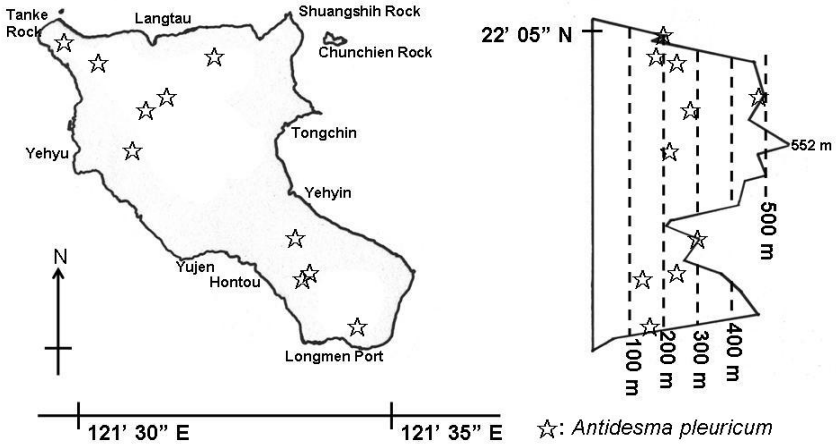


Fig. 4. Distribution map of *Antidesma pleuricum* Tul. (☆) in Lanyu.

more than 5 per 1 cm). In second, inflorescence axis and floral pedicels of other *Antidesma* spp. in Taiwan are glabrous or coated with antrorse and deciduous short hairs sparsely, but that of *A. pleuricum* are coated with persistent short hairs densely (Figs. 2 & 3B). Pedicels of male flowers are shorter in *A. pleuricum* (ca. 0.2 mm long) (Figs. 2 & 3B) than other *Antidesma* spp. in Taiwan (0.8-2.8 mm long). Besides, sepals of *A. pleuricum* are densely pubescent on adaxial surfaces (Figs. 2, 3B & C), and male flowers' floral disks are densely pubescent (Fig. 2). Sepals of other *Antidesma* spp. in Taiwan except for *A. pleuricum* are glabrous, sparsely pubescent sometimes, and the male flowers' floral disks of them in Taiwan are glabrous. According to our observation, ciliate or glabrous on blade margins, pubescence on sepals of male or female flowers, and pubescence of floral disks in male flowers are diagnostic characters to *Antidesma* spp. in Taiwan. A key to the *Antidesma* species in Taiwan was listed below.

Blade length was considered as a diagnostic character to Taiwanense *Antidesma* spp. (Chang, 1964; Liu et al., 1988, 1994). Blades of *A. pleuricum* were described as 11-13 cm in length, longer than other *Antidesma* spp. (to 11 cm) in Taiwan (Liu et al., 1988, 1994). In our observations, blades length and width of *A. pleuricum* are variable. Mature leaves on flowering branches are often shorter (3.5-5 cm) and narrower (3-4 cm) than that on vegetative branches (8-13 cm in length, 5-7 cm in width). By this reason, we didn't adopt the length and width of leaf blades as diagnostic characters to the *Antidesma* spp. in Taiwan.

A key to the *Antidesma* spp. in Taiwan

1. Blade margin conspicuously ciliate; adaxial surfaces of sepal densely pubescent; floral disks of male flowers pubescent. ……
…….. *A. pleuricum*

1. Blade margin glabrous or sparsely ciliate in occasional; adaxial surfaces of sepals glabrous or sparsely pubescent; floral disks of male flowers glabrous. ……..…… 2
2. Leaves lanceolate to elliptic-lanceolate, apex not acuminate. ……..
…….. *A. japonicum*
2. Leaves obovate, oblong-obovate, or oblong, apex acuminate. …..…
……..……. *A. pentandrum*

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臺灣植物誌疏漏種：紅頭五月茶補註

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摘要：本文描述大戟科植物：紅頭五月茶 (*Antidesma pleuricum* Tul., Euphorbiaceae) 此一臺灣植物誌疏漏種，並於檢閱臺灣及菲律賓產五月茶屬植物相關文獻及標本後，將紅頭山五月茶 (*A. hontaushanense* C. E. Chang) 處理為紅頭五月茶的同物異名。本文並提供紅頭五月茶的蘭嶼分布圖，彩色照，以及紅頭山五月茶的模式標本照片及圖版以供參考。

關鍵詞：紅頭山五月茶、紅頭五月茶、大戟科、分類學、臺灣。