NOTE

The Identity of *Alpinia koshunensis* Hayata (Zingiberaceae)

Yen-Hsueh Tseng[(1)], Ching-Yu Liou[(2)], Shin-Ming Ku[(3)] and Chih-Chiang Wang[(4*)]

1. Department of Forestry, National Chung-Hsing University, 250 Kuo-Kuang Rd., Taichung 402, Taiwan.
2. Department of Habitat and Ecology, Taiwan Endemic Species Research Institute , Nantou 552, Taiwan.
3. Herbarium (HAST), Research Center for Biodiversity, Academia Sinica, 128, Sec. 2, Academia Rd., Taipei 115, Taiwan.
4. Department of Tourism and Leisure, National Penghu University. 300 Liuho Rd., Makung City, Penghu County, 880, Taiwan.
** Corresponding author. Tel: 886-6-9264115 ext 5727; Fax: 886-6-9277290; Email: ccwang@npu.edu.tw*

(Manuscript received 6 May 2009; accepted 10 August 2009)

ABSTRACT: *Alpinia koshunensis* Hayata was first publicized in 1915. After that, most authors didn't treat this species as a synonym of *Alpinia formosana* K. Schumann until 1978. Recently we checked the type of *A. koshunensis* Hayata, compared the original description and got more relevant materials. We confirm *A. koshunensis* Hayata is a unique species. A taxonomic treatment, color photographs, illustration, and distribution of this species are provided to aid the identification of this endemic plant. A detailed comparison table between *A. koshunensis* Hayata and closely related species are also provided.
Key words: *Alpinia koshunensis*; *Zingiberaceae*; Synonym; Taiwan; Plant taxonomy.

KEY WORDS: *Alpinia koshunensis*, *Zingiberaceae*, Synonym, Taiwan, Plant taxonomy.

INTRODUCTION

The genus *Alpinia* Roxb. (Zingiberaceae) comprises 300 species that are mainly distributed in the subtropical and tropical rain forests of Asia, Australia and South Pacific Islands (Wu and Larsen, 2002). Some members of the genus are well known for ethnomedicinal importances and food as spicy materials especially *A. nigra* (Gaertner) B. L. Burtt, *A. galanga* Willd., *A. conchigera* Griff., *A. siamensis* K. Schum., etc. There are ca. 51 species of *Alpinia* in China (Wu and Larsen, 2002). Thirteen taxa of *Alpinia* were previously recognized in the Flora of Taiwan (Moo, 1978). Recently, fourteen taxa were revised in the second edition of Flora of Taiwan (Wang, 2000). One new species, *A. nantoensis* Lu & Kou, was publicized (Kuo et al., 2008). In our recent systematic revision of *Alpinia* of Taiwan, one sharply distinct species was discovered. Consultation of the recent monograph on *Alpinia* (Yang and Wang, 1998; Kuo et al., 2008) and relevant literature from nearby regions (Kress et al., 2005; Wu and Larsen, 2002) support *A. koshunensis* Hayata as a unique species.

TAXONOMIC TREATMENTS

Alpinia koshunensis Hayata Icon. Pl. Formosan. **5**: 227. 1915. 恆春月桃 Figs. 1, 2, 4

Alpinia formosana sensu auct. Moo, in Fl. Taiwan 5: 834. 1978 non K. Schumann.

Plants 2.0-3.0 m. Petiole 0-1.0 cm long. Blade 30-60 by 8-20 cm, oblong to oblong-lanceolate, apex acuminate to obtuse, base cuneate, glabrous on both surface except margin villose; ligule 1 cm long, entire or bilobed, thick coriaceous, outer surface hairy. Inflorescence a terminal thyrse, pedunculate, glabrous (except lower nodes glabrescent), 15-30 cm long, ascending to erect, lower branches 1.0-2.0 cm long, with 1-3 flowers, upper ones with 1 flower; bract 1-2, deciduous. Flowers pedicellate; bracteole white 1.0-1.5 cm long, glabrous, deciduous; calyx tubular, green-white, glabrous, 1.5 cm long, shortly 3-lobed, deeply split unilaterally, corolla green-white, glabrous, sympetalous, into 3 lobes, dorsal lobe, oblong, 4 by 2 cm, lateral lobe 2, base connected, oblong, 3 by 1.2 cm; labellum chrome yellow with red stripes, convolute, 3.5 by 2.5 cm; staminodes obtuse; stamen 1; anther, 1 cm long; filament 1.5 cm long; stigma funnel shaped, apex densely hairy; style slender, 3 cm long, glabrous; epigynous glands 2, beside the base of style, brown, 0.2 cm long; ovary green, pubescent. Fruit capsular, red in mature, glabrous, ellipsoid. Seed 15-30, angled; aril white, membrance.

Specimens Examined: TAIWAN. Pengtung County, Mantsuo Township, en route from Funtsuesa to Longkun, *elev. ca.* 5 m, on sunny grassland, 26 Jun. 2001, Yen-Hsueh Tseng 2667 (TCF); same loc., 6 Dec. 2009, Yen-Hsueh Tseng 4548 (TCF); Mudan Township, Hsihai, elev. ca. 100 m, on sunny grassland, 27 Feb. 2005, Yen-Hsueh Tseng 3939 (TCF).

Note: *Alpinia koshunensis* Hayata closely resembles *A. zerumbet* (Persoon) B. L. Burtt & R. M. Smith, but it is distinct from the latter by having erect inflorescence,

臺灣大學學術期刊資料庫

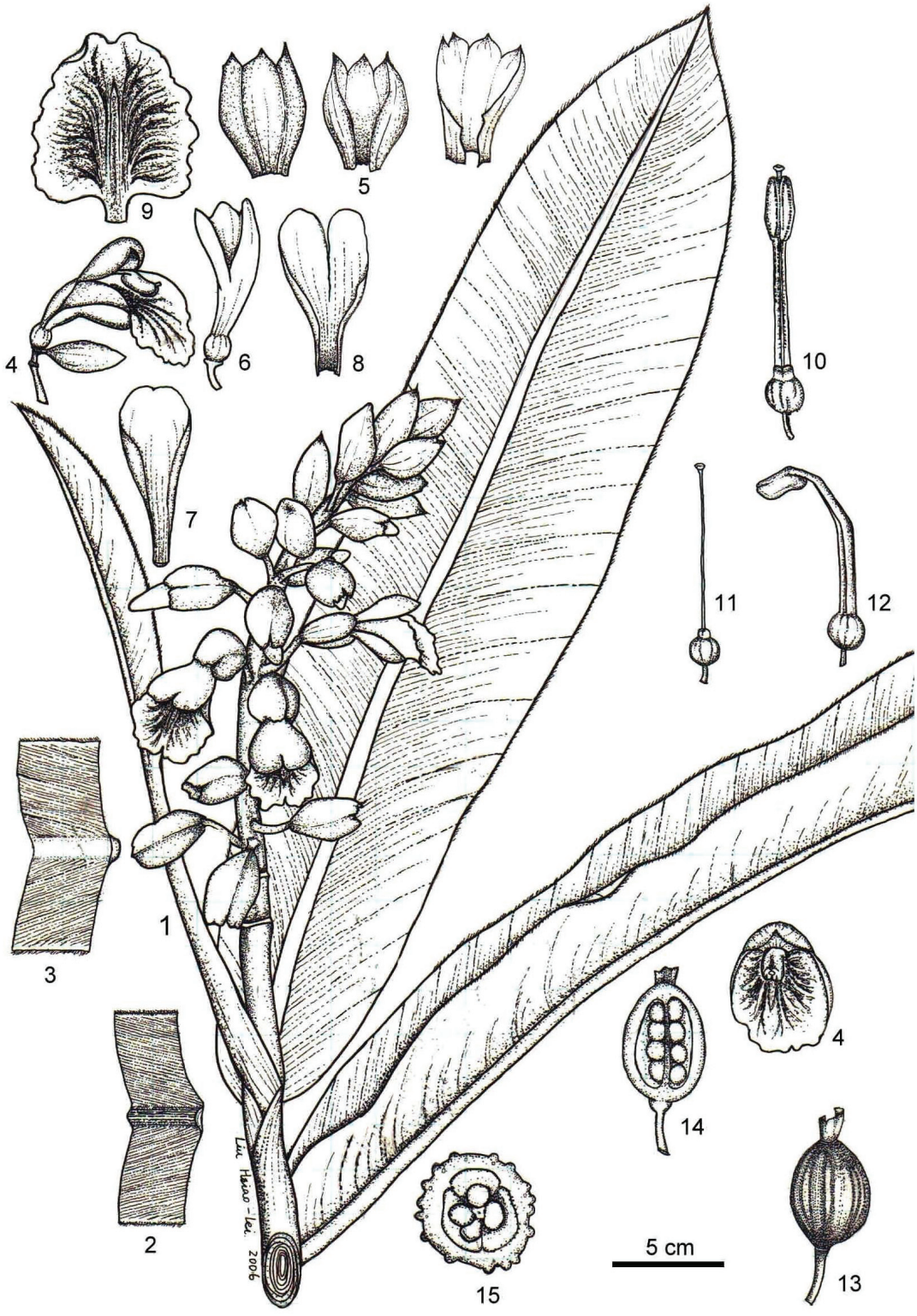


Fig. 1. ***Alpinia koshunensis Hayata.*** **1: Habit. 2: Lack of blade. 3: Front of blade. 4: Flowers. 5: Bracteole. 6: Calyx tubule. 7: Dorsal lobe. 8: Lateral lobes. 9: Llabellum. 10: Stamen. 11: Pistil. 12: Lateral surface of stamen. 13: Ccapsule. 14: Longitudinal section of capsule. 15: Cross section of capsule.**

臺灣大學學術期刊資料庫

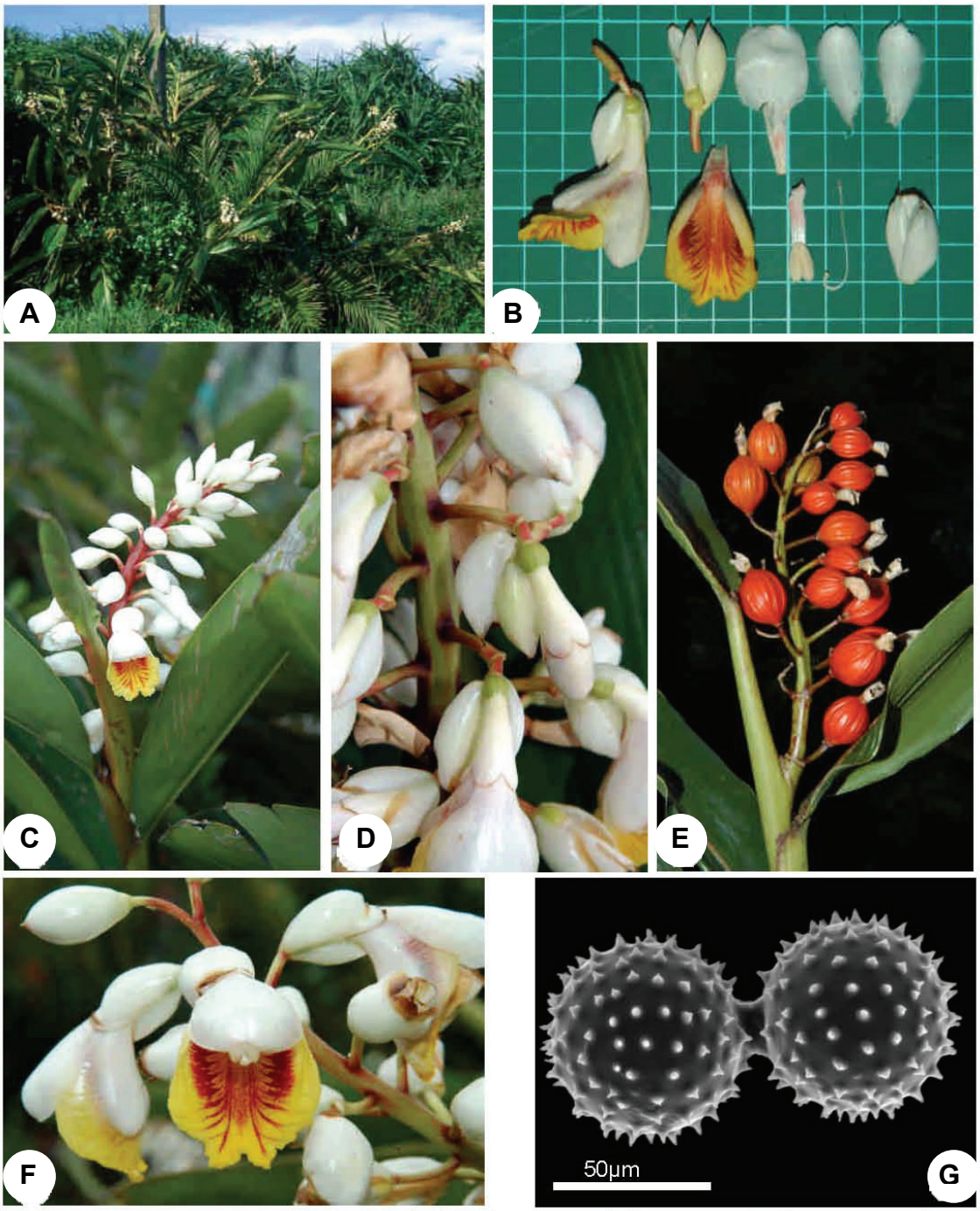


Fig. 2. *Alpinia koshunensis Hayata* .A: Habit. B: Parts of flower. C: Inflorescence. D: Rachis. E: Infructescence. F: Flowers. G: Pollen SEM.

glabrous peduncle, glabrous rachis and glabrous pedicle, (vs. pendulous inflorescence, pubescent peduncle, pubescent rachis and pubescent pedicle) and usually with thick coriaceous (vs. herbaceous) leaves (Fig. 3). These two species occupy different ecological niches. In Taiwan, Alpinia *koshunensis* Hayata is found in sunny grasslands on the Hengchuen Peninsula between 5 and 100 m elevations (Fig. 4). Whereas *A. zerumbet* (Persoon) B. L. Burtt & R. M. Smith is found in sunny grasslands and in semi shaded forest margins, and is widely distributed through out Taiwan below 1,000 m elevations.

臺灣大學學術期刊資料庫

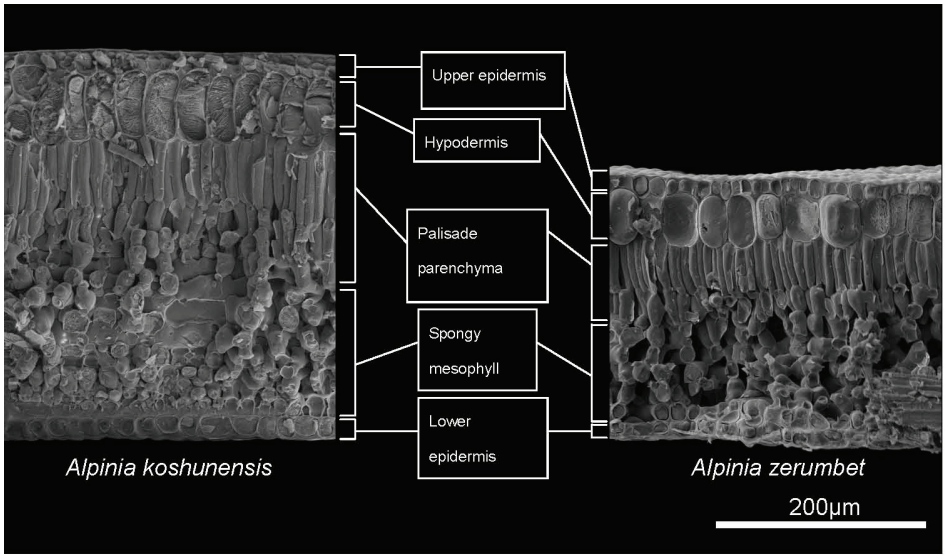


Fig. 3. Leaf SEM microphotographs of *Alpinia koshunensis*. (Tseng 4548, TCF) and *A. zerumbet* (Tseng 4552, TCF).

Table 1. Comparison of diagnostic characters among closely related species of *Alpinia koshunensis*.

	A. koshunensis	*A. zerumbet*	*A. formosana*
Leaves	Thick coriaceous	Herbaceous	Herbaceous
Inflorescence	Erect	Pendulous	Erect
Labellum	Spread incompletely, chrome yellow with red stripes	Spread incompletely, chrome yellow with red stripes	Spread completely, pale yellow with red stripes
Capsules	Ellipsoid, ridges conspicuously	Subglobose to globose, ridges conspicuously	Conical, rims inconspicuous

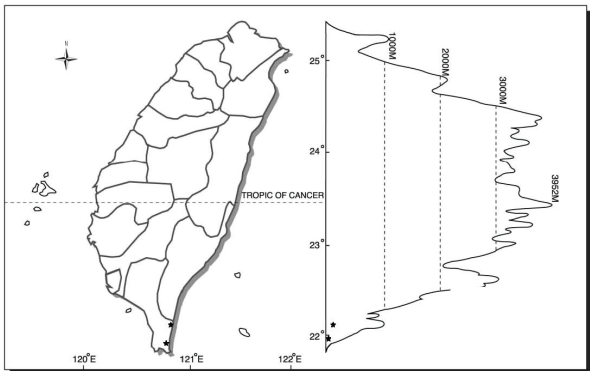


Fig. 4. Distribution of *Alpinia koshunensis* Hayata in Taiwan.

ACKNOWLEDGEMENTS

The authors thank Prof Jenn-Che Wang, Department of Life Science, National Taiwan Normal University, Prof. Fu-Yen Lu, Department of Forestry, National Chaiyi University, and Dr. Ching-I Peng, the executive of Herbarium (HAST), Research Center for Biodiversity, Academia Sinica, for their useful suggestions. We also thank Miss Hsiao-Lei Liu for the clear line drawings, Mr. Kuan-Yu Su for SEM technical support.

LITERATURE CITED

Kress, W. John, A.-Z. Liu, M. Newmon and Q.-J. Li. 2005. The Molecular Phylogeny of *Alpinia* (Zingiberaceae): A Complex and Polyphyletic Genus of Gingers. American Journal of Botany **92**: 167-178.

Kuo, Y.-M., F.-Y. Lu, M.-H. Duh and S.-L. Deng. 2008. A New Species, *Alpinia nantoensis* (Zingiberaceae), from Taiwan. Taiwan J. For. Sci. **23**:93-97.

Moo, C.-T. 1978. Zingiberaceae. In: Li, H.-L., T.-S. Liu, T.-C. Huang, T. Koyama and C. E. DeVol (eds.), Flora of Taiwan, **5:** 831-840. Epoch Publ. Co., Taipei, Taiwan.

Wang, J.-C. 2000. Zingeraceae. In Editorial Committee of the Flora of Taiwan (second edition), Flora of Taiwan, **5**: 707-724. Taipei, Taiwan.

Wu, D. and K. Larsen. 2002. Zingiberaceae. Flora of China **24**: 322.

Yang, J.-J. and J.-C. Wang. 1998. The systematic study of Taiwan *Alpinia* L. (Zingiberaceae). In: Chiu, S.-T. and C.-I Peng (eds.), Proceedings of the Cross-strait Symposium of Floristic Diversity and Conservation, National Museum of Natural Science, Taichung, Taiwan. pp. 183-198.

臺灣大學學術期刊資料庫

恆春月桃 (薑科) 再確認

曾彥學[1]、劉靜榆[2]、古訓銘[3]、王志強[4*]

1. 國立中興大學森林學系，402 台中市南區國光路 250 號，臺灣
2. 特有生物研究保育中心棲地生態組，南投縣 552 集集鎮民生東路 1 號，臺灣。
3. 中央研究院生命多樣性研究中心，115 台北市研究院路二段 128 號，臺灣。
4. 國立澎湖科技大學觀光休閒系，88046 澎湖縣馬公市六合路 300 號，臺灣。
* 通信作者。*Tel: 886-6-9264115 ext 5727; Fax: 886-6-9277290; Email: ccwang@npu.edu.tw*

(收稿日期：2009 年 5 月 6 日；接受日期：2009 年 8 月 10 日)

摘要：恆春月桃 (*Alpinia koshunensis* Hayata) 最早於 1915 年被發表，1978 年後一直被處理為臺灣月桃 (*Alpinia formosana* K. Schumann) 之同物異名。最近著者等重新檢視恆春月桃模式標本、比較原始文獻及獲得較多相關資料後，確認本臺灣特有種之存在。本文提供線繪圖、彩色照片、花粉電子掃瞄與葉肉顯微構造等以資辨識。

關鍵詞：恆春月桃、薑科、臺灣、特有種、植物分類學。

臺灣大學學術期刊資料庫