Thismia huangii (Thismiaceae), a New Species from Taiwan

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ABSTRACT: *Thismia* Griff. (Thismiaceae), comprises about 35 species. Heretofore, one species was recorded from Kaohsiung County in southern Taiwan. In the course of our botanical inventory, a new species, *Thismia huangii* P. Y. Jiang et T. H. Hsieh, was collected from northwestern part of the island. *Thismia huangii* is close to *T. rodwayi* F. von Muller and *T. americana* Pfeifer, but can be distinguished from the latter by its orange perianth, dark-orange or red annulus, long hairy connectives, and stigma lobe with one long hair. A taxonomic description, line drawing, pollen morphology in SEM observation, chromosome number, distribution information, and color photographs of the floral characters are provided.

KEY WORDS: New species, Thismiaceae, *Thismia huangii*, Taiwan, taxonomy.

INTRODUCTION

The genus *Thismia* Griff. (Thismiaceae) consists of ca. 35 species (Mabberley, 2008; Chantanaorrapint, 2008) in the world and mainly distributes in tropical regions.

In Taiwan, only one species *Thismia taiwanensis* S. Z. Yang, R. M. K. Saunders & C. J. Hsu has been recorded from Kaohsiung County (Yang et al., 2002; 2010). Due to their rare occurrence and very small habit, many new species or new distributions have been reported by many authors in recent years (Tsukaya and Okada, 2005; Chantanaorrapint and Sridith, 2007; Larsen and Averyanov, 2007; Chantanaorrapint, 2008; Ho et al., 2009).

In 2008, a fruiting specimen of *Thismia* was found at Sumakusu, Hsinchu County, in northwest Taiwan. Flowering specimens of the species were found in the same area in next May (Fig. 1A). This species is easily distinguished from *Thismia taiwanensis*. In the former flowers are orange, and both inner and outer perianth lobes lack appendages or have very short appendages, while in the latter flowers are white, and both the inner and outer perianth lobes bear elongate appendages (inner, 5-8 mm long; outer, 28-33 mm long) (Ho et al., 2009). We consider this species as new to science and name it *Thismia huangii* P. Y. Jiang et T. H. Hsieh (Fig. 1B). The new species belongs to section *Rodwaya* which has vermiform, horizontally creeping, branched, cylindrical roots, anthers united into a tube, and thecae separated from each other (Mass et al., 1986).

Thismia huangii is close to *T. rodwayi* F. von Muller and *T. americana* Pfeifer. *Thismia rodwayi*, distributed in Australia, New Zealand, and Tasmania, has 12-crenate ring annulus, 2-lobed connectives, two nectaries, and stigma lobes without hairs, but *T. huangii* has a smooth annulus; truncate connectives, no nectaries, and stigma lobes with hairs (Fig. 2). *Thismia americana* of central North America has blue-green perianth, white annulus, connectives with very short hairs, and many hairs on stigma lobes (Pfeiffer, 1914), but *T. huangii* has orange perianth, dark-orange or red annulus, connectives with long hairs, and a long hair on each stigma lobe (Fig. 2).

A taxonomic description, line drawing, pollen, chromosome number, distribution information, and color photographs of this *Thismia huangii* are presented below.

MATERIALS AND METHODS

Materials used in this study were collected from the native habitats. Pollen grains were dehydrated in an ethanol series and dried in air. Dried grains were coated with gold and examined using SEM.

Root tips were collected from the wild habitat for cytological study. They were pretreated with a mixture of 70 ppm cycloheximide and 250 ppm 8-hydroxy-quinoline (1 : 1) at about 18-20ºC for 3-4 h. and fixed for 1-3 h in a mixture of 45% acetic acid and absolute ethanol (1 : 3) at about 18-20ºC, and then preserved in 70% ethanol at 4ºC. Then they were macerated for 1-3 min in 1 N HCl at 60ºC, washed for 10 sec and digested for 1-2 h in 4 % pectinase. Finally, the root tips were squashed in modified Sharma's solution (Sharma, 1982). The number of chromosomes in the cells of root tips was determined with light microscopy. The chromosome complement was photographed with a digital camera (Nikon, D70).

Fig. 1. *Thismia huangii* P. Y. Jiang et. T. H. Hsieh. showing habitat (A), flower (B), fruit with elongated pedicel (C), SEM micrograph of pollen with microporforation on tectum (D), and somatic chromosome 2*n* = 18 (E).

TAXONOMIC TREATMENTS

Thismia huangii P. Y. Jiang et. T. H. Hsieh. *sp. nov.*

Species T. rodwayi F. von Muller et *T. americana Pfeifer similis, sed in anulo endistinco, lobi stigmatis cum pilus longiore solitarius differt* – Typus: Taiwan: Sumakusu, Hsinchu County, ca. 1500 m, 24˚35' N, 121˚21' E, 9 Jul 2009, *T. H. Hsieh and P. Y. Chiang 3031* (holotype: TAI; isotypes: Herbarium of National University of Tainan). Figs. 1 & 2.

Small herbs, holomycotrophic, achlorophyllous, pubescent. Rhizome creeping, branched, fleshy, terete, to 1mm diam., whitish when young, pale brownish when old. Leaves whitish, alternate, 6-7 per stem, scale-like, lanceolate, 3-5 mm long, apex obtuse to acute; largest leaves just below flower, smallest leaves at base of stem. Flowers solitary, sometimes several clustered on rhizome, subsessile or pedicel to 5 mm long, floral tube white, tepals 6, fused to form a basal perianth tube, 3 mm wide at base, 6-8 mm wide at apex; inner tepals 3, larger than outer tepals, pale orange or

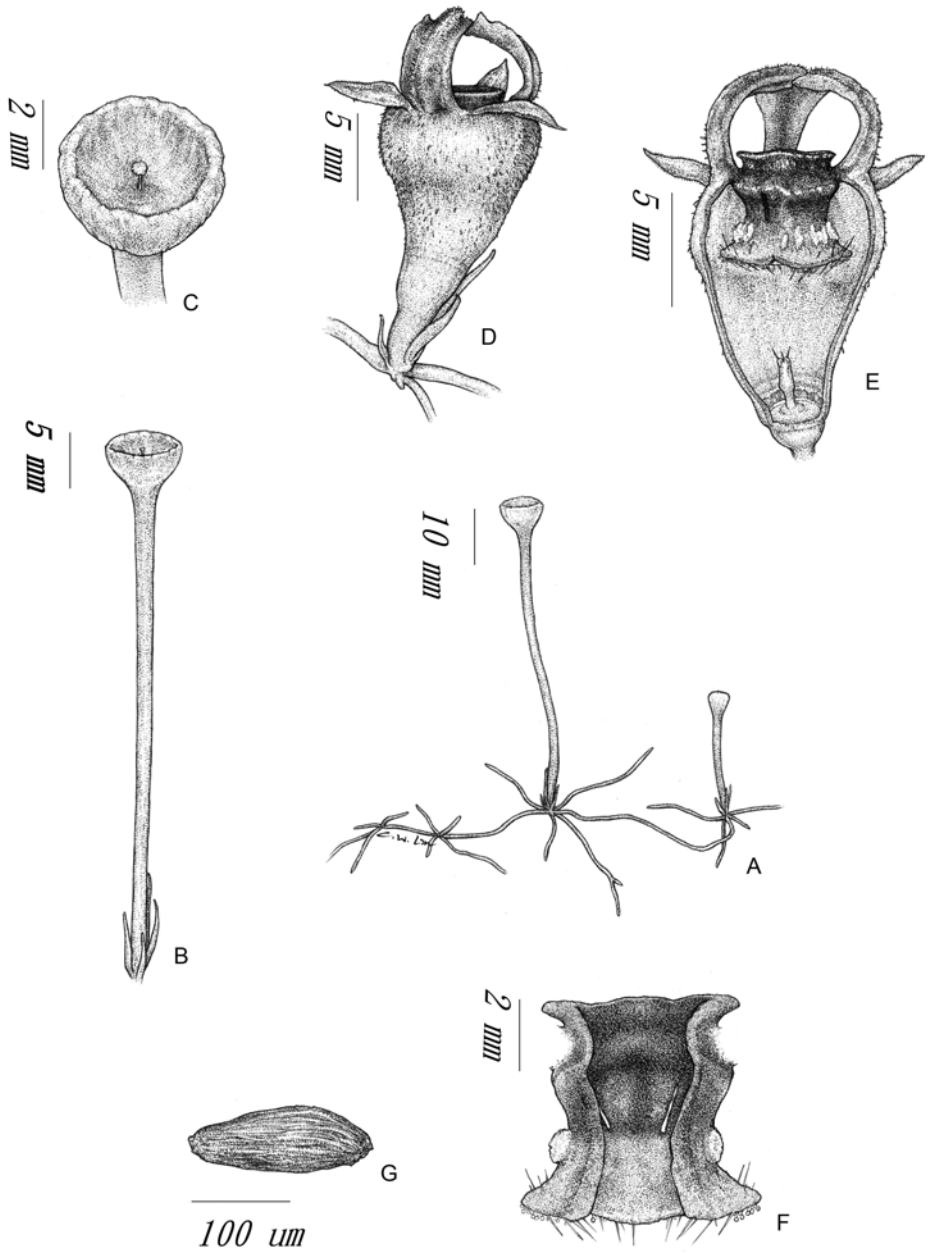

Fig. 2. Illustration of *Thismia huangii* P. Y. Jiang et. T. H. Hsieh. A: Habit. B: Fruit with elongated pedicel. C: Fruit (upper view). D: Flower. E: Dissected flower. F: Dissected annulus. G: Seed.

yellow, 7-8 mm long, 1-2 mm wide, arching inward distally and connate at apex to resemble a miter (bishop's hat), apex obtuse, dorsal keel ending in a 1 mm long, erect, finger-like appendage; outer tepal 3, pale-orange to yellow, 3 mm long, 1 mm wide, apex acuminate. Stamens 6, adnate, forming a tube around the style, pendulous from the annulus, annulus dark orange or red, connective orange or yellow, dilated and adnate along mediolateral margins to form a tube; connectives broad ovate, apex with glandular hairs and appendages; thecae attached at base of connective, separate, each one ca. 0.8 mm long, 0.5 mm wide; stigma 3-lobed, with a long hair on each lobe. Fruit capsules, fleshy, cup-shaped, 3-4 mm long, 4-5 mm wide, elongated at fruiting stage. Seed narrowly oblong, slightly twisted.

Additional specimen examined: TAIWAN. Hsinchu Hsien: Chienshih Hsiang, Sumakusu, ca. 1500 m, 24°35' N, 121°21' E, 4 Sep 2008, *P. Y. Chiang 0801* (TAI). Fruit.

Distribution: Known only from the type locality in Sumakusu, Hsinchu County, Taiwan.

Habitat and Ecology: On ground in leaf litter in bamboo forest dominated by *Phyllostachys makinoi* Hayata; elevation 1,500m (Figs. 1A & B). Flowering May; Fruiting September.

Etymology: Named in honor of Dr. Tseng-Chieng Huang, professor emeritous of National Taiwan University, Taiwan for his continuous, long-term contributions to study of the flora of Taiwan.

Pollen morphology: Pollen grains oblate spheroid, 1-porate, ca. 18-20 × 15-17 μm (P × E); tectum with microporation (Fig. 1D). Similar palynological features have also been reported for *T. luetzelburgii* (Mass-van de Kamer, 1998).

Chromosome number: Somatic chromosome number from root tips $2n = 18$ (Fig. 1E). The first reported chromosome count for *Thismia*, however, was $n = 6$-8 from *T. javanica* (Mass, 1986), indicating a need for further studies of the chromosomes.

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臺灣水玉杯屬一新種腐生植物 – 黃金水玉杯

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摘要：水玉杯屬植物為腐生性小草本，過往臺灣僅紀錄一種臺灣水玉杯，本文報導產於臺灣西北部新竹縣司馬庫斯地區另一新種 – 黃金水玉杯，本種花被裂片為橙黃色，花絲環帶為暗紅色至紅色、藥隔先端具長毛和柱頭裂片頂端具 1 根長毛等特徵而與相近種可以區別。本文提供形態描述、手繪圖、染色體數目、花粉 SEM 圖片、彩色照片以供鑑定參考。

關鍵詞：新種、水玉杯科、黃金水玉杯、臺灣、分類。