



A new species of *Thismia* (Thismiaceae) from Yunnan, China

HONG-QING LI & YU-KE BI

School of Life Sciences, East China Normal University, 500 Dongchuan Road, Shanghai, 200241, China;
email: hqli@bio.ecnu.edu.cn

Thismia Griffith (1844: 221) usually grows among leaf litter in shady wet forests and comprises 47 small mycoheterotrophic species (Chiang & Hsieh 2011, Mancinelli *et al.* 2012). Individual plants live underground through most of the year, only emerging briefly to flower and fruit after periods of heavy rain (Ho *et al.* 2009). Although several species have been described in temperate regions, *Thismia* occurs mainly in tropical portions of America and Asia.

Thismia has been typically classified in tribe Thismieae within Burmanniaceae (e.g., Jonker 1938, Maas *et al.* 1986, APG III 2009). However, recent molecular phylogenetic research has indicated that *Thismia* is sister to *Tacca* Forster & Forster (1775: 69) and is not nested within the clade of Burmanniaceae, which therefore supports recognition of Thismiaceae (Merckx *et al.* 2006).

Two detailed treatments of *Thismia* have been published before. Jonker (1938) recognized 23 species within this genus and subdivided it into five sections. The second one, for Neotropical members by Maas *et al.* (1986), proposed a new subgeneric and sectional classification for *Thismia*, that is, three sections within subgenus *Ophiomeris* (Miers, 1847: 328) Maas & Maas (1986: 144) characterized by free stamens, united thecae and parietal placentas, and one section (*Rodwaya* (Schlechter, 1921: 38) Maas & Maas (1986: 166)) within subgenus *Thismia* characterized by united staminal tube, separate thecae and free placental columns. The genera *Glaziocharis* Taubert (1895: 66), *Mamorea* de la Sota (1960: 43) and *Triscyphus* Taubert (1895: 66) were included in section *Pyramidalis* Maas & Maas (1986: 161).

Eleven species of *Thismia* have been recorded in the adjacent regions of southwestern China, Vietnam, Thailand and Burma. Three of them, *T. taiwanensis* Yang, Saunders & Hsu (2002: 485), *T. huangii* Jiang & Hsieh (2011: 138) and *T. tentaculata* Larsen & Averyanov (2007: 16), are found in China. Based on morphological studies of dry and living material, as well as field observations, a new species is named and described for this region.

Thismia gongshanensis Hong-Qing Li & Yu-Ke Bi, *sp. nov.* (Fig. 1–2)

Type:—CHINA. Yunnan: Maku Village, Dulongjiang Town, Gongshan County, 2,275 m, 27°41'54.6"N, 98°18'15.62"E, 27 June 2008, Li 2008I28 (holotype HSNU!; isotype KUN!).

Thismia gongshanensis most closely resembles *T. tuberculata* Hatusima (1976: 4), but differs in having a yellow perianth, free stamens, bicarpelate parietal placentas and 2 simple stigmas.

Herbs with rhizome creeping horizontally, branched, terete, pale brownish, apex whitish, with adventitious roots and buds. Stem white, unbranched, erect, glabrous, ca. 6–10 cm high, 1.8 mm in diameter at anthesis. Leaves 4–7, translucent-whitish, elliptic-lanceolate, alternately scattered along stem, adnate, appressed, entire, scale-like, ca. 4–7 × 2–3 mm, with a single vascular trace, apex obtuse. Bracts 3, ringed, similar to leaves. Flower solitary with 1 mm pedicel. Perianth actinomorphic, 6 lobes in 2 whorls, fused to form a basa

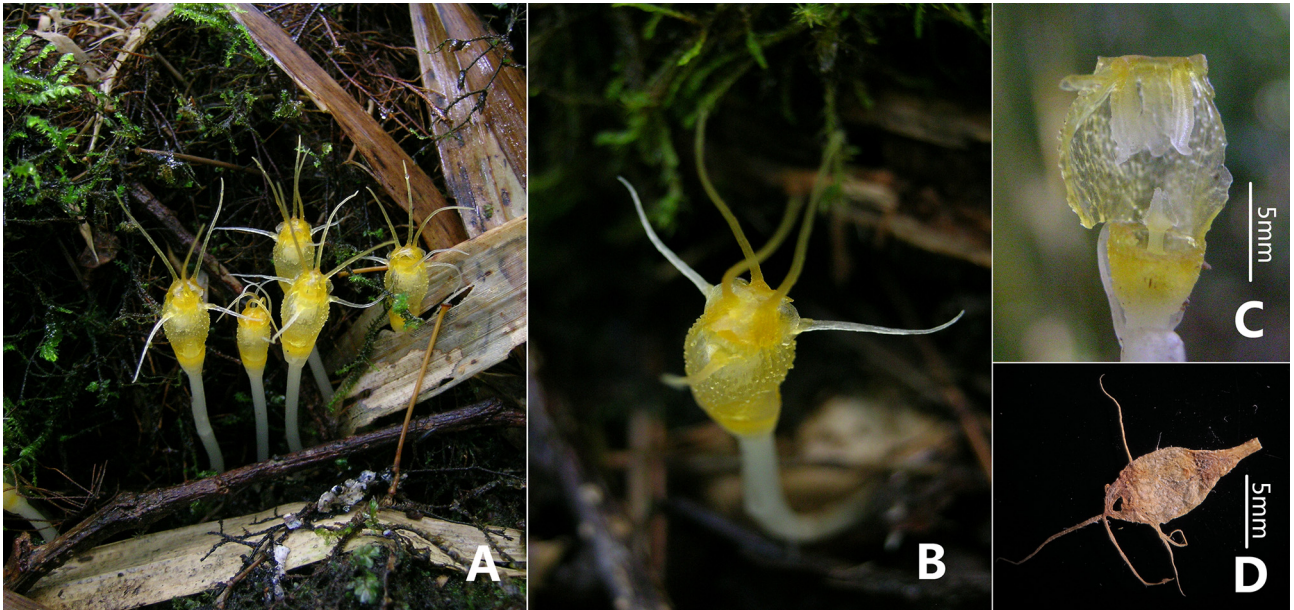


FIGURE 1. Morphology of *Thismia gongshanensis*. A. Habit. B. Magnified flower. C. Dissected flower, showing stamens, style and stigmas. D. Flower from holotype.

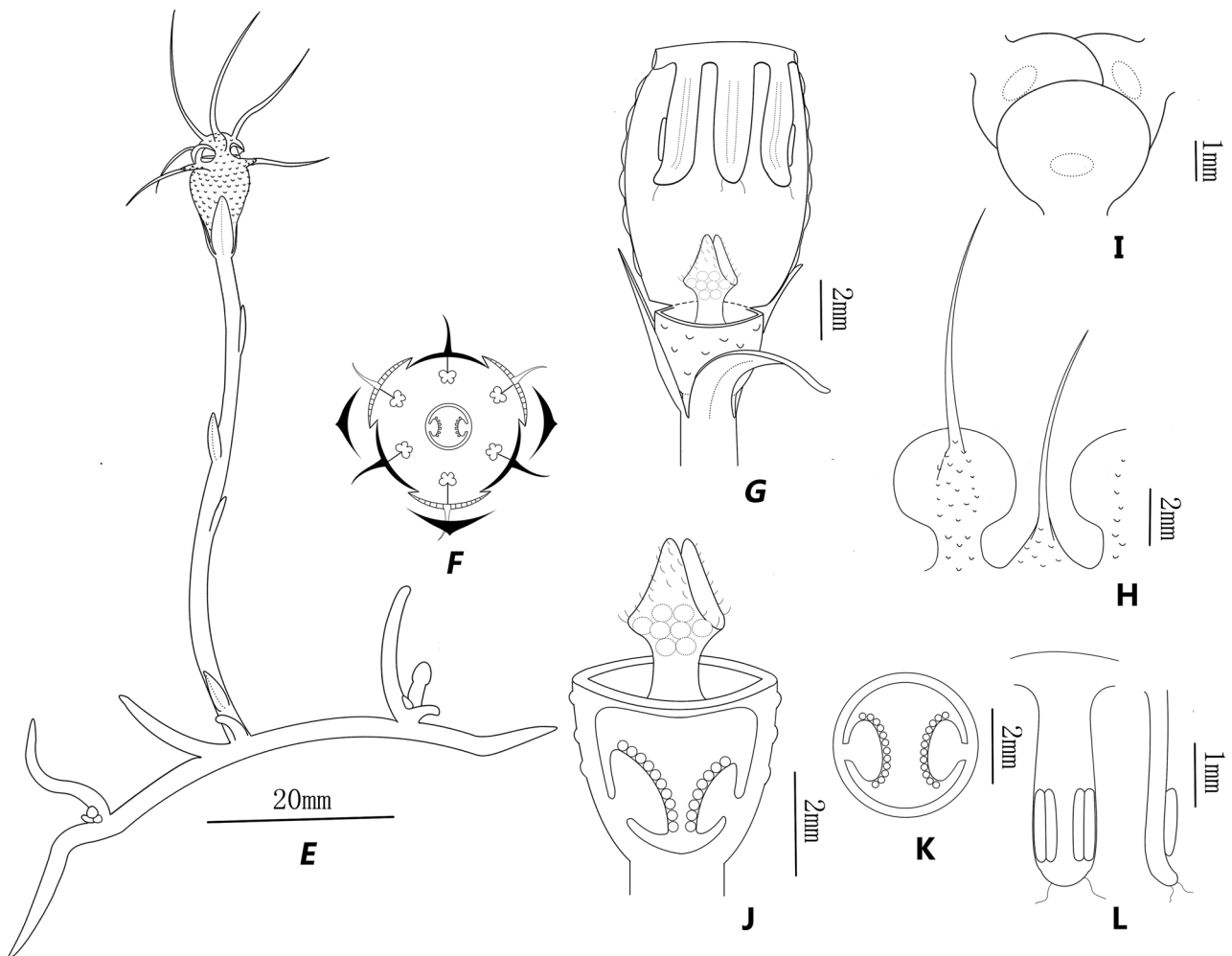


FIGURE 2. Diagrammatic drawing of *Thismia gongshanensis*. E. Flowering plant. F. Floral diagram. G. Dissected flower. H. Perianth-lobes with appendages. I. Imbricate inner tepals. J. Longitudinal section of ovary. K. Cross section of ovary. L. Stamens seen from adaxial and side.

tube, which is translucent-yellow, urceolate, densely tuberculate externally, 7.5 mm long, 6.5 mm in diameter, with 12 vertical ribs on the inside of the tuber; upper part of the tube forming a bright yellow annulus (3.6 mm outer diameter); outer (smaller) perianth lobes dark yellow, wide-triangular, 2.2 mm long (excluding appendage) and 2.5 mm wide, radiating outward, with revolute margins, clasping subulate appendages, translucent-white, 7–11 mm long, abaxially; inner perianth lobes yellow, wide-spathulate, 4.5 × 4.0 mm, upper part suborbicular, apically imbricate, arching inward distally and forming a mitre over the perianth chamber, dorsal keel ending in an erect subulate appendage (translucent-yellowish, 10–15 mm long). Stamens 6, 3.4 mm long, hanging down from the inner margin of the annulus separately; filaments yellow, flattened, 1.7 × 0.7 mm; connective elongate, white, apex recurved towards the wall of perianth tube, with a few hairs; individual stamen with two thecae, 1.2 mm long, adaxial, thecae separate. Ovary inferior, obconical, 3.3 mm long, 3.8 mm in diameter; carpels 2, unilocular with two parietal placentas, ovule numerous; style yellowish, cylindrical, hollow, 1.1 mm long, 0.6 mm in diameter; stigmas 2, simple, triangular, yellowish with white apex, 1.8 × 1.4 mm, with abaxial pubescence and basal yellow glands. Fruit and seed not seen.

Distribution:—Known only from the type locality at Maku Village, Dulongjiang Town, Gongshan County, Yunnan Province, China.

Ecology:—This species grows among leaf litter in shady wet bamboo forest. The dominant species is *Chimonobambusa* Makino (Poaceae). Other accompanying species include: members of genera *Aeschynanthus* Jack (Gesneriaceae), *Agapetes* D. Don ex G. Don (Ericaceae), *Amomum* Roxb. (Zingiberaceae), *Balanophora* J.R. Forst. & G. Forst. (Balanophoraceae), *Beccarinda* Kuntze (Gesneriaceae), *Curculigo* Gaertn. (Hypoxidaceae), *Monotropa* L. (Ericaceae) and *Myrmechis* (Lindl.) Blume (Orchidaceae). The mitriform perianth suggests myophily (Stone 1980), and a small dipteran species was found visiting *T. gongshanensis* at the time of collection.

Discussion:—*Thismia gongshanensis* most closely resembles *T. tuberculata*, which was classified in sect. *Glaziocharis* (Taubert) Hatusima (1976: 4). Both species have spathulate inner perianth lobes that are apically imbricate, arching inward distally and forming a mitre over the perianth chamber (imbricated); both whorls of perianth lobes have relatively long subulate appendages; the outer surface of the perianth tube is densely tuberculate. However, the two species are distinct: *T. gongshanensis* has longer stems (ca. 6–10 cm) at anthesis; inner tepal appendages are about 10–15 mm in length and just a little longer than outer tepal appendages; stamens are separate, pistil composed of 2 simple stigmas and 2 parietal placentas; and perianth is yellow. However, *T. tuberculata* has a shorter stem (ca. 3–4 cm) at anthesis; inner tepal appendages are up to ca. 15–20 mm in length and much longer than the outer tepal appendages; every pair of adjacent stamens is almost adnate; pistil is composed of 3 broadly triquetrous-ovate or capitate stigmas and 3 parietal placentas; the perianth is whitish.

Etymology:—The name of the species was chosen for the place where it was collected. Maku village is in the Dulong River watershed of Gongshan County, northwestern Yunnan, China, neighboring Burma in the west. Its Chinese name should be spelled “gongshan shui yu bei (贡山水玉杯)”.

Notes:—It has been stated that *Thismia* has 3 carpels and 3 placentas, with 3 simple or 3 bilobate stigmas or 1 capitate stigma (Jonker 1938, Maas *et al.* 1986). However, *T. gongshanensis* has 2 carpels and 2 placentas, with 2 simple stigmas; these character states are possibly derived. Thus, we keep the sectional position unplaced temporarily.

Acknowledgements

We thank Dr. Xiao-Hua Jin (Institute of Botany, Chinese Academy of Sciences) who provided help for collecting specimens, and Dr. De-Zhu Li (Kunming Institute of Botany, Chinese Academy of Sciences) who assisted us in identifying the associated plants. This study was supported by the National Natural Science Foundation of China (grant no. 31270242).

References

- APG III (2009) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* 161: 105–121.
<http://dx.doi.org/10.1111/j.1095-8339.2009.00996.x>
- Chiang, P.-Y. & Hsieh, T.-H. (2011) *Thismia huangii* (Thismiaceae), a new species from Taiwan. *Taiwania* 56: 138–142.
- de la Sota, E.R. (1960) *Mamorea singeri*, un nuevo género y especie de Burmanniaceae. *Darwiniana* 12: 43–47.
- Forster, J. R. & Forster, G. (1775) *Tacca*. *Characteres Generum Plantarum* 35: 69–70.
- Griffith, W. (1844) On the root parasites referred by authors to *Rhizantha* and their Allies. *Proceedings of the Linnean Society of London* 1: 221–223.
- Hatusima, S. (1976) Two new species of Burmanniaceae from Japan. *Journal of Geobotany* 24: 2–10.
- Ho, G.W.C., Mar, S.S. & Saunders, R.M.K. (2009) *Thismia tentaculata* (Burmanniaceae tribe Thismieae) from Hong Kong: first record of the genus and tribe from continental China. *Journal of Systematics and Evolution* 47: 605–607.
- Jonker, F.P. (1938) *A monograph of the Burmanniaceae. Mededeelingen van het Botanisch Museum en Herbarium van de Rijks Universiteit te Utrecht* 51: 1–279.
- Larsen, K. & Averyanov, L.V. (2007) *Thismia annamensis* and *Thismia tentaculata*, two new species of Thismiaceae from central Vietnam. *Rheedea* 17: 13–19.
- Maas, P.J.M., Maas-van de Kamer, H., van Benthem, J., Snelders, H.C.M., Rübsamen, T. (1986) Burmanniaceae. *Flora Neotropica Monograph* 42: 1–189.
- Mancinelli, W.S., Blum, C.T., Smidt, E.C. (2012) *Thismia prataensis* (Thismiaceae), a new species from the Brazilian Atlantic rain forest. *Systematic Botany* 37: 879–882.
- Merckx, V., Schols, P., Maas-van de Kamer, H., Maas, P., Huysmans, S., Smets, E. (2006) Phylogeny and evolution of Burmanniaceae (Dioscoreales) based on nuclear and mitochondrial data. *American Journal of Botany* 93: 1684–1698.
<http://dx.doi.org/10.3732/ajb.93.11.1684>
- Miers J. (1847) On a new genus of Plants of the family Burmanniaceae. *Proceedings of the Linnean Society of London* 1: 328–329.
- Schlechter, R. (1921) Die Thismieae. *Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem* 8: 31–45.
- Stone, B.C. (1980) Rediscovery of *Thismia clavigera* (Becc.) F.Muell. (Burmanniaceae). *Blumea* 26: 419–425.
- Taubert, P.H.W. (1895) Ueber die Verbreitung der Burmanniaceen und zwei neue Gattungen dieser Familie. *Verhandlungen des Botanischen Vereins für die Provinz Brandenburg (Berlin)* 36: 66.
- Yang, S.-Z., Saunders, R.M.K. & Hsu, C.-J. (2002) *Thismia taiwanensis* sp. nov. (Burmanniaceae tribe Thismieae): first record of the tribe in China. *Systematic Botany* 27: 485–488.