

Gastrodia albida (Orchidaceae), a new species from Taiwan

Tian-Chuan Hsu^{1,*} & Chen-Meng Kuo²

¹ Herbarium (TAIF), Taiwan Forest Research Institute, No. 53, Nanhai Rd., Taipei 10066, Taiwan (*corresponding author's e-mail: lecanorchis@gmail.com)

² Herbarium (TAI), Institute of Ecology and Evolutionary Biology, National Taiwan University, No. 1, Sect. 4, Roosevelt Rd., Taipei 10090, Taiwan (e-mail: kuocm@ntu.edu.tw)

Received 23 Nov. 2009, revised version received 11 Mar. 2010, accepted 12 Mar. 2010

Hsu, T. C. & Kuo, C. M. 2011: *Gastrodia albida* (Orchidaceae), a new species from Taiwan. — *Ann. Bot. Fennici* 48: 272–275.

A new species, *Gastrodia albida* T.C. Hsu & C.M. Kuo (Orchidaceae), is described and illustrated from Taiwan. *Gastrodia albida* is closely related to *G. theana* but differs by having a perianth tube indistinctly striate outside, larger and oblong-ovate petals, narrower lip with truncate base, and by the absence of a rostellum. *Gastrodia albida* is predicted to be self-pollinated based on the morphological and ecological features.

Gastrodia is a holomycotrophic orchid genus comprising more than 50 species distributed mainly in Asia and Oceania. During our recent field investigation, a *Gastrodia* species with significantly different floral morphology from the ten known species in Taiwan (Leou 2000, Chung & Hsu 2006, Chen *et al.* 2009) was discovered in the forests of Wulai Township, Taipei County.

Gastrodia albida T.C. Hsu & C.M. Kuo, *sp. nova* (Figs. 1–3).

Species Gastrodiae theanae affinis, sed petala 1.5 mm longa, 1 mm lata, labellum 2.2–2.5 mm latum, rostellum absens.

TYPE: Taiwan. Taipei County, Wulai Township, Pataoerhshan, 800 m, 12.VI.2007 *T. C. Hsu* 838 (holotype TAI; isotype TAIF). — PARATYPES: Taiwan. Taipei County, Wulai Township, Pataoerhshan, 800 m, 2006 *T. C. Hsu* 530 (TAI, TAIF); Taipei County, Wulai Township, Yun Hsien Holiday Resort, 600 m, 2007 *T. C. Hsu* 877 (TAIF); same locality, 2008 *T. C. Hsu* 1421 (TAIF).

Terrestrial, achlorophyllous herbs. Roots few, slender, ca. 0.8 mm in diameter. Rhizome tuberous, fusiform, 1.5–5 cm long, 3–10 mm in diameter, grayish brown, covered with numerous scales and root-hair-like unicellular hairs. Scales verticillate, lanceolate, pale yellowish brown, 1–2 mm long. Inflorescence erect, 1–5 cm long, ca. 2 mm in diameter, underground part whitish, aboveground part pale orange-brown, peduncle 3–4 noded, with tubular, membranous sheaths; rachis often less than 5 mm long. Bracts membranous, ovate to ovate-oblong, pale brownish, 2–6 mm long, 1.5–4 mm wide. Pedicel and ovary 5–25 mm long, ovary 2–2.5 mm in diameter. Flowers (1–)2–3(–7), erect, bell-shaped, obovate in dorsal view, not widely opening, 4–7 mm in diameter. Sepals and petals united, forming a 5-lobed perianth tube. Sepals fleshy, thickened, subsimilar, 9–14 mm long, connate with each other for 1/5–1/6 of their length and with petals for more than 4/5 of their length, whitish on both surfaces, distinct verruculose outside, apex incurved, brownish tinged; free portion of dorsal

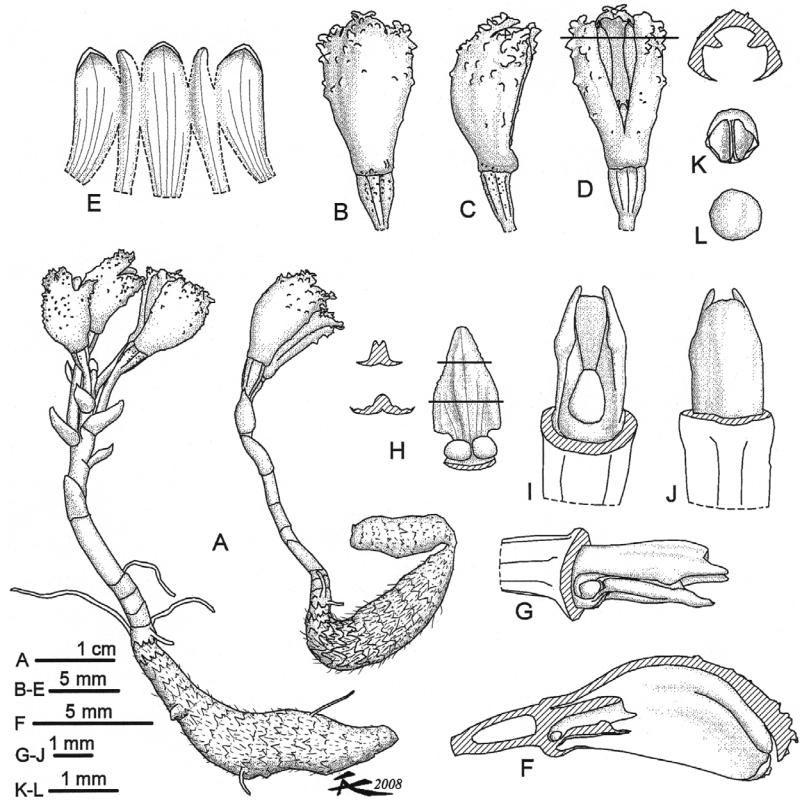


Fig. 1. *Gastrodia albida* (from the holotype). — **A**: Habit. — **B–D**: Flower. — **E**: Flattened perianth tube. — **F**: Longitudinal section of the flower. — **G**: Column and lip. — **H**: Lip. — **I and J**: Column. — **K and L**: Anther cap.

sepal semiorbicular, ca. 2 mm long, 3 mm wide. Petals connate with sepals, free portions brownish, ovate-oblong, ca. 1.5 mm long, 1 mm wide, connate portions distinctly thickened and tinged orange-yellow inside, forming a pair of ridge-like structures inside perianth tube. Lip free from floral tube, white tinged orange-yellow at base and reddish at apex and margin, 3.5–4 mm long, 2.2–2.5 mm wide, hypochile with two whitish, globose, sessile, nectarless calli, ca. 1 mm in diameter; epichile elongated-deltoid, disc thickened and 2-ridged in middle, the ridges higher and tinged grayish-green near apex. Column white, straight, stout, 4–4.5 mm long, ca. 1.8 mm wide, with a pair of lateral wings distally; edges of lateral wings parallel to column, tips superior to anther; column foot very short; rostellum absent; stigma located near base. Anther hemispheric, 0.6–0.8 mm long, pollinia 2. Capsule ellipsoid, 1–1.7 cm long; pedicel elongating to 10–30 cm long in fruit. Seeds fusiform, 1.7–2.2 mm long.

DISTRIBUTION AND HABITAT: *Gastrodia albida* appears to be endemic to Taiwan. The only population found so far is located in slightly disturbed broadleaved forests from 500 to 900 m in northern part of the island. It flowers mainly in June and fruits from late June to July.

REPRODUCTIVE BIOLOGY: *Gastrodia albida* is predicted to be self-pollinated due to the absence of rostellum and high fruit set ratio observed in the field (T. C. Hsu unpubl. data). By a careful dissection of flowers in different growing stages, we found that the pollinia of *G. albida* rapidly fragment before the flower matures, and the massulae then drop onto the stigma surface simply by gravity. We also observed in the field that the pedicels of *G. albida* elongated strongly until the dehiscence of capsules (Fig. 2A). This property is commonly reported in *Gastrodia* and is predicted to facilitate seed dispersal by wind (Pedersen *et al.* 2004).

TAXONOMIC NOTES: *Gastrodia albida* can be distinguished from the Taiwanese congeners by



Fig. 2. *Gastrodia albida* (from the type locality).
 – A: Fruiting individuals.
 – B: Flowering individual.
 – C: Dehiscent capsule.

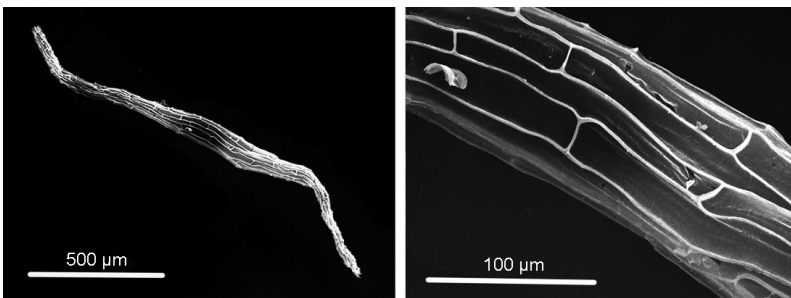


Fig. 3. *Gastrodia albida* (from T. C. Hsu 530, TAIF), SEM photographs of seeds.

having a whitish flower, hardly connate lateral sepals and a relatively short column and lip. In habit, this new species resembles *G. theana* from Vietnam. Judging from the published description and illustration (Averyanov 2005), however, *G. albida* differs from *G. theana* by its perianth tube not being striate outside, the free portions of the petals being larger and oblong-ovate, the lip being narrower and truncate at the base, and

by the absence of a rostellum. In *G. theana*, the perianth tube is distinctly striate outside, the free portions of the petals are very small (0.4–0.8 mm long, 0.2–0.3 mm wide), narrowly triangular, and the lip is 2.5–3 mm wide and cordate at base. A well-developed rostellum is also shown in the line drawing of *G. theana* (Averyanov 2005: fig. 6g) although not described in the text.

Acknowledgements

We are grateful to Mr. Shen-Kun Yu and Ms. Chun-Chu Hsu for their assistance in the field work and Dr. Shih-Wen Chung (Botanic Garden Division, Taiwan Forestry Research Institution) for his kind help with literature collection. We also thank Dr. H. A. Pedersen and anonymous reviewers for their critical comments on the manuscript.

References

Averyanov, L. A. 2005: New orchids from Vietnam. — *Rheedea* 15: 1–19.

- Chen, X., Gale, S. W. & Cribb, P. J. 2009: *Gastrodia*. — In: Wu, Z. Y., Raven, P. H. & Hong, D. Y. (eds.), *Flora of China* 25: 201–205. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis.
- Chung, S. W. & Hsu, T. C. 2006: *Gastrodia shimizuana*, a newly recorded of *Gastrodia* (Orchidaceae) in Taiwan. — *Taiwania* 51: 50–52.
- Leou, C. S. 2000: *Gastrodia*. — In: Huang, T. C., Boufford, D. E., Hsieh, C. F., Kuoh, C. S., Ohashi, H. & Su, H. J. (eds.), *Flora of Taiwan*. 2nd ed. 5: 890–896. Department of Botany, National Taiwan University, Taipei.
- Pedersen, H. A., Watthana, S., Suddee, S. & Sasirat, S. 2004: Breeding system, post-pollination growth, and seed dispersal in *Gastrodia exilis* (Orchidaceae). — *Natural History Bulletin of the Siam Society* 52: 9–26.