



Hemiboea malipoensis, a new species of Gesneriaceae from southeastern Yunnan, China

LI-XIA ZHANG¹, YUN-HONG TAN^{2*}, JIAN-WU LI², BIN WEN², JIAN-TAO YIN² & QIN-YING LAN²

¹Key Laboratory of Dai and Southern medicine of Xishuangbanna Dai Autonomous Prefecture, Yunnan Branch Institute of Medicinal Plant, Chinese Academy of Medical Sciences, Jinghong, Yunnan 666100, China

²Key Laboratory of Tropical Forest Ecology, Key Laboratory of Tropical Plant Resource and Sustainable Use, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Mengla, Yunnan 666303, China

*Author for correspondence. E-mail: tyh@xtbg.org.cn

Abstract

Hemiboea malipoensis, a new species of Gesneriaceae from southeastern Yunnan, China, is here described and illustrated. Based on morphological and molecular evidence, it was found to be similar to *H. magnibracteata* and *H. cavaleriei* var. *pau-cinervis* by conspicuous involucre and anthers fused by entire adaxial surfaces, but can be easily distinguished from the latter two species by its magnificent spherical involucre, 3.5–4.5 cm in diameter, cymes with 4–10 flowers, corolla larger, 4.5–5.5 cm long, pale yellow-yellow, corolla tube glabrous, Calyx lanceolate, 5-parted from the base.

Key words molecular phylogeny, morphology, *Hemiboea*, taxonomy

Introduction

Hemiboea C.B. Clarke is a medium-sized genus of Gesneriaceae mostly occurring in China, comprises 24 species and 5 varieties (Li & Wang 2004). In recent years, four new species and one new variety were found in Guangxi (Xu *et al.* 2010, 2012, Wei *et al.* 2010, Huang *et al.* 2011, Wen *et al.* 2011, 2013, Pan *et al.* 2012, Zhou *et al.* 2013). In addition, the Chinese endemic genus *Metabriggia* Wang (1983: 1), was revised and merged within *Hemiboea* based on molecular and morphological evidence (Weber *et al.* 2011), *M. ovalifolia* Wang (1983: 2) and *M. purpureotincta* Wang (1983: 3), were combined to *Hemiboea ovalifolia* (W.T. Wang) A. Weber & Mich. Möller and *H. purpureotincta* (W.T. Wang) A. Weber & Mich. Möller (Weber *et al.* 2011). Thus, this genus comprises at least 30 species and six varieties in China.

During floristic surveys of southeastern Yunnan between 2010 and 2012, few new species were discovered and described (Tan *et al.* 2012, 2013). We also collected some specimens of *Hemiboea* that morphologically did not match the description of any of the known species. This specimen differed in having magnificent larger spherical involucre, 3.5–4.3 × 3.5–4.0 cm in diameter, Corolla pale yellow-yellow, glabrous. It belongs to *H.* section *Subcapitatae* Clarke (1888: sub tab. 1798). Based on a detailed examination of the morphological and anatomical characters of this plant and possible relatives (Li 1983, 1987, Wang *et al.* 1990, 1998, Weitzman *et al.* 1997, Li & Wang 2004, Li & Liu 2004, Xu *et al.* 2010, 2012, Huang *et al.* 2011, Wen *et al.* 2011, 2013, Pan *et al.* 2012, Zhou *et al.* 2013), as well as specimens of different herbaria (PE, IBK, IBSC, KUN, HITBC, VNM), we concluded that it is a new species which we hereby describe and illustrate. We also obtained molecular data to determine the phylogenetic placement of the species here described.

Materials and methods

The DNA sequences of *trnL-trnF* intergenic spacer and *ITS* of species of *Hemiboea*, *Henckelia*, and *Metabriggsia* were downloaded from Genbank. Sequences were aligned with Clustal X1.83 (Aiyar 2000) and adjusted manually using

Etymology:—The species is named after the type locality, Malipo county in Yunnan Province.

Additional specimens examined (paratypes):—CHINA. Yunnan: Malipo County, Xiajinchang, 29 October 2012, *Yun-Hong Tan 6950* (HITBC).

Acknowledgements

We thank Dr. Libing Zhang and the reviewers for their constructive suggestions and help with revising the manuscript. We also thank Yun-Xi Zhu for the illustration. We are grateful to Yan Liu (Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and the Chinese Academy of Sciences) providing the photographs of *H. magnibracteata*, and to Bo Pan (Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and the Chinese Academy of Sciences) for providing the photographs of *H. cavaleriei* var. *paucinervis*. We are also grateful to Yi-Wen Cui for editing the photographs. This work was supported by the National Science and Technology Infrastructure Program (08ZK121B02, 08ZK121B01) and the special program for public health of traditional Chinese medicine named “Investigation and monitoring in the raw material resources of Chinese medicine needed in the National basic medicine”(Fiscal agency [2011] No. 76) and Special program for Chinese pharmaceutical industry named “Protection and utilization of regional representative Chinese medicine resources”(201207002).

References

- Aiyar, A. (1999) The use of CLUSTAL W and CLUSTAL X for multiple sequence alignment. In *Bioinformatics methods and protocols*. Humana Press, pp. 221–241.
<http://dx.doi.org/10.1385/1-59259-192-2:221>
- Clarke, C.B. (1888) Hooker’s *Icones Plantarum*; or figures, with brief descriptive characters and remarks of new or rare plants 18: sub t. 1798.
- Huang, Y.S., Xu, W.B., Peng, R.C. & Liu, Y. (2011) A New Variety of *Hemiboea* (Gesneriaceae) from Limestone Areas in Guangxi, China. *Taiwania* 56: 240–243.
- Li, Z.Y. (1983) Taxa Nova *Hemiboeae* (Gesneriaceae). *Acta Phytotaxonomica Sinica* 21(2): 194–203.
- Li, Z.Y. (1987) A study of the genus *Hemiboea* (Gesneriaceae). *Acta Phytotaxonomica Sinica* 25(2): 81–92.
- Li, Z.Y. & Wang, Y.Z. (2004) *Metabriggsia* and *Hemiboea*. In: Li, Z.Y. & Wang, Y.Z. (Eds.) *Plants of Gesneriaceae in China*. Henan Science and Technology Publishing House, Zhengzhou, pp. 122–153.
- Li, Z. Y., & Liu, Y. (2004). *Hemiboea rubribracteata* ZY Li & Yan Liu, a new species of *Hemiboea* (Gesneriaceae) from Guangxi, China. *Acta Phytotax. Sin* 42: 537–540.
- Möller, M., Forrest, A., Wei, Y.G. & Weber, A. (2011) A molecular phylogenetic assessment of the advanced Asiatic and Malasian didymocarpoid Gesneriaceae with focus on non-monophyletic and monotypic genera. *Plant Systematics and Evolution* 292: 223–248.
<http://dx.doi.org/10.1007/s00606-010-0413-z>
- Nylander, J.A.A. (2004) MrModeltest v2. Program distributed by the author. *Evolutionary Biology Centre, Uppsala University*.
- Pan, B., Wu, W.H., & Xu, W.B. (2012) *Hemiboea pseudomagnibracteata* (Gesneriaceae), a New Species from Guangxi, China. *Taiwania* 57(2), 188–192.
- Ronquist, F., Teslenko, M., van der Mark, P., Ayres, D.L., Darling, A., Höhna, S., Larquet, B., Liu, L., Suchard, M.A. & Huelsenbeck, J. P. (2012) MrBayes 3.2: efficient Bayesian phylogenetic inference and model choice across a large model space. *Systematic biology*, 61(3), 539–542.
<http://dx.doi.org/10.1093/sysbio/sys029>
- Tan, Y.H., Hsu, T.C., Pan, B., Li, J.W., & Liu, Q. (2012) *Gastrodia albidoides* (Orchidaceae: Epidendroideae), a new species from Yunnan, China. *Phytotaxa* 66: 38–42.
- Tan, Y.H., Li, J.W., Pan, B., Wen, B., Yin, J.T., & Liu, Q. (2013) *Oreocharis glandulosa*, a new species of Gesneriaceae from southern Yunnan, China. *Phytotaxa* 131: 29–34.
<http://dx.doi.org/10.11646/phytotaxa.131.1.5>
- Wang, W.T. (1983) Genus Novum Gesneriacearum E Guangxi. *Guihaia* 3(1): 1–6.
- Wang, W.T., Pan, K.Y., Zhang, Z.Y., & Li, Z.Y. (1990) Gesneriaceae. In: Wang, W.T. (Ed.) *Flora Reipublicae Popularis Sinicae* 69. Science Press, Beijing, pp. 125–581.

- Wang, W.T., Pan, K.Y., Li, Z.Y., Weitzman, A.L. & Skog, L.E. (1998) Gesneriaceae. In: Wu, Z.Y. & Raven, P.H. (Eds.) *Flora of China*, Vol. 18. Science Press and Missouri Botanical Garden Press, Beijing and St. Louis, pp. 294–301.
- Weber, A., Wei, Y.G., Sontag, S., & Möller, M. (2011) Inclusion of *Metabriggsia* into *Hemiboea* (Gesneriaceae). *Phytotaxa* 23: 37–48.
- Wei, Y.G., Wen, F., Möller, M., Monro, A. & Cui, C. (2010) *Metabriggsia* and *Hemiboea*. In: Wei, Y.G., Wen, F., Möller, M., Monro, A., Zhang, Q., Gao, Q., Mou, H.F., Zhong, S.H. & Cui, C. (Eds) Gesneriaceae of south China. Guangxi Science and Technology Publishing House, Nanning, pp. 174–216.
- Weitzman, A.L., Skog, L.E., Wang, W.T., Pan, K.Y. & Li, Z.Y. (1997) New taxa, new combinations, and notes on Chinese Gesneriaceae. *Novon* 423–435.
<http://dx.doi.org/10.2307/3391777>
- Wen, F., Tang, W.X., & Wei, Y.G. (2011) *Hemiboea angustifolia* (Gesneriaceae), a new species endemic to a tropical limestone area of Guangxi, China. *Phytotaxa* 30: 53–59.
- Wen, F., Zhao, B., Liang, G.Y., & Wei, Y.G. (2013) *Hemiboea lutea* sp. nov. (Gesneriaceae) from Guangxi, China. *Nordic Journal of Botany* 31(6): 720–723.
<http://dx.doi.org/10.1111/j.1756-1051.2013.01697.x>
- Xu, W.B., Huang, Y.S., Peng, R.C., & Zhuang, X.Y. (2012) *Hemiboea sinovietnamica* sp. nov. (Gesneriaceae) from a limestone area along the boundary of Sino-Vietnam. *Nordic Journal of Botany* 30(6): 691–695.
- Xu, W.B., Wu, W.H., Nong, D.X. & Liu, Y. (2010) *Hemiboea purpurea* sp. nov. (Gesneriaceae) from a limestone area in Guangxi, China. *Nordic Journal of Botany* 28(3): 313–315.
<http://dx.doi.org/10.1111/j.1756-1051.2009.00722.x>
- Zhou, S.B., Hong, X., Wen, F., & Xiao, H.M. (2013) *Hemiboea roseoalba* SB Zhou, X. Hong & F. Wen (Gesneriaceae), a new species from Guangdong, China. *Bangladesh Journal of Plant Taxonomy* 20(2), 171–177.
<http://dx.doi.org/10.3329/bjpt.v20i2.17391>