



***Orthomnion javense* (Mniaceae), a formerly Malesian species newly confirmed for China and new to Laos, with *O. loheri* as a new synonym**

YAN-JUN YI¹ & SI HE^{2*}

¹College of Life Science, Qingdao Agricultural University and the Key Laboratory of Plant Biotechnology in Universities of Shandong Province, Qingdao 266109, Shandong, China

²Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299, U.S.A.

*Corresponding author: si.he@mobot.org

Abstract

We evaluated the taxonomic status of *Orthomnion javense* and *O. loheri* based on morphological characteristics. The primary distinction between the two species on the basis of the leaf border differentiation does not uphold with a prudent examination of Chinese and other Asian specimens. *Orthomnion loheri* is a new synonym of *O. javense*, a formerly Malesian species which is newly confirmed for China and is here reported new to Laos. The previously reports of *Plagiomnium elimbatum* in China were based on some misidentifications of *O. javense*, and the former is excluded from the Chinese moss flora.

Key words: Moss, Plagiomniaceae, Southeast Asia, taxonomy

Introduction

Orthomnion Wilson (1857: 368) is a genus primarily of Southeast Asia and Australasia, currently consisting of 11 species worldwide (Crosby *et al.* 2000). Since the genus was revised by Koponen (1980a), two species had been added (Koponen *et al.* 1982, Koponen 2007). Eight species were reported from China (Li 2006, Li *et al.* 2007). *Orthomnion javense* (Fleischer 1904: 585) Koponen (1980a: 53) is a species with very restricted distribution in Indonesia and the Philippines and has never been reported from China (Koponen 1980a, Redfearn *et al.* 1996, Li *et al.* 2007). Probably by overlooking the fact that *O. javense* had been reported from the Philippines (Tan & Iwatsuki 1983), Eddy (1996) still considered the species to be rare and endemic to Java, Indonesia. A closely related species, *Orthomnion loheri* Brotherus (1905: 6) with a much wider distribution range has been known from China, Japan, the Philippines, and Papua New Guinea (Li & Zang 1979, Koponen 1980a, 1980b, Koponen & Norris 1983). Both *O. javense* and *O. loheri* are morphologically similar to sterile *Plagiomnium elimbatum* (Fleischer 1904: 583) Koponen (1974: 94) except for the difference in the internal costal structure that lacks stereid cells in the former two species.

During a study of the Chinese specimens of *Plagiomnium* Koponen (1968: 145), the authors had a chance to examine five authentic collections of *P. elimbatum* from Yunnan province (Wang 4192, 4409 & Wu 21940, 21980, 21994, all in MO). Based on these specimens, Wu (1992) first reported the species new to China in a checklist without providing any description. Subsequently, Li (2006) and Li *et al.* (2007) recorded *P. elimbatum* in the Chinese moss flora based solely on the report published by Wu (1992), citing no specimens were examined. The aim of this study is to verify the Chinese records of *Plagiomnium elimbatum* and to re-evaluate the morphological distinction between *Orthomnion javense* and *O. loheri*.

Materials and Methods

All the voucher specimens cited in this paper were thoroughly examined, and they are deposited at the Missouri Botanical Garden herbarium (MO). The detailed microscopic characters of leaf morphology, including marginal borders, leaf cell walls, and costal cross sections, were carefully observed. The diagnostic features were photographed and presented for comparison.

Habitat: on tree trunks and rotten logs; between 950 and 1550 m elevation.

Distribution: China, Indonesia, Japan, Laos, Papua New Guinea, and the Philippines.

Specimens examined: CHINA. **Yunnan:** Gongshan Co., *Long 33858* (MO); Xishuangbanna, Jinghong Co., *Crosby 15019*, *Wu 21940* (both in MO); Menghai Co., *Crosby 15113*, *Wang 4409*, *Wu 21980*, *21994* (all in MO); Mengla Co., *Crosby 14904*, *Redfearn 33874*, *33885*, *Wang 4192* (all in MO). LAOS. **Luang Namtha:** Muang Sing Dist., *He 44254* (MO). PHILIPPINES. **Luzon:** Benguet Prov., *Clemens 51908a*, *Crosby 17646*, *17684*, *Merrill 7837*, *Williams 20639* (all in MO, as *Orthomnion loheri*); Mountain Prov., *Lugod 45* (MO, as *O. loheri*).

Acknowledgments

This research is supported by the Nature Science Foundation of Shandong Province (No. ZR2011CM010), the National Nature Science Foundation of China (No. 31170191), and the U.S. National Science Foundation grant (DEB 0455568). We are grateful to two anonymous reviewers for their invaluable comments.

References

- Brotherus, V. F. (1905) Contributions to the bryological flora of the Philippines I. *Öfversigt af Förhandlingar, Finska Vetenskaps-Societeten* 47(15): 1–12.
- Brotherus, V. F. (1907) *Orthomniopsis* und *Okamuraea*, zwei neue Laubmoosgattungen aus Japan. *Öfversigt af Förhandlingar, Finska Vetenskaps-Societeten* 49(10): 1–4, Tab. I–II.
- Crosby, M.R., Magill, R.E., Allen, B.H. & He, S. (2000) *Checklist Mosses* [vi] + 320 pages. Missouri Botanical Garden, St. Louis.
- Eddy, A. (1996) *Splachnobryaceae to Leptostomataceae*. 3. [iv] + 277 pp. In *Handbook Malesian Mosses*. Natural History Museum Publications, London.
- Fleischer, M. (1904) *Die Musci der Flora von Buitenzorg* 2. Pp. I–XVIII + 381–643. Brill, Leiden.
- Koponen, T. (1968) Generic revision of Mniaceae Mitt. (Bryophyta). *Annales Botanici Fennici* 5: 117–151.
- Koponen, T. (1972) The East Asiatic species of *Plagiomnium* sect. *Rostrata* (Bryophyta). *Acta Botanica Fennica* 97: 1–29.
- Koponen, T. (1974) On *Plagiomnium* (Mniaceae) in east Asia: *P. rhynchophorum*, *P. elimbatum* and *Mnium burmense*. *Annales Botanici Fennici* 11: 94.
- Koponen, T. (1980a) A synopsis of Mniaceae (Bryophyta). II. *Orthomnion*. *Annales Botanici Fennici* 17: 35–55.
- Koponen, T. (1980b) Miscellaneous notes on Mniaceae (Bryophyta) VII. *Orthomnion loheri* in Japan. *Miscellanea Bryologica et Lichenologica* 8: 180–182.
- Koponen, T. (2007) *Orthomnion wui* (Mniaceae, Musci), a new species from Hubei Province, China. *Annales Botanici Fennici* 44: 376–378.
- Koponen, T. & Norris, D. H. (1983) Bryophyte flora of the Huon Peninsula, Papua New Guinea. II. Mniaceae (Musci). *Annales Botanici Fennici* 20: 31–40.
- Koponen, T., Li, X. J. & Zang, M. (1982) Miscellaneous notes on Mniaceae (Bryophyta). XIII. *Orthomnion yunnanense*, species nova. *Annales Botanici Fennici* 19: 73–74.
- Li, X.J. & Zang, M. (1979) Studies on the Chinese Mniaceae. *Acta Botanica Yunnanica* 1: 32–80.
- Li, X.J. (2006) *Eubryales*. In Li, X.J. (ed.), *Flora Bryophytorum Sinicorum*, vol. 4, xviii+263 pp. Science Press, Beijing.
- Li, X.J., He, S. & Zang, M. (2007) *Bryaceae–Timmiaaceae*. In Li, X.J., Crosby, M.R. & He, S. (ed.), *Moss Flora of China, English Version*, Vol. 4, viii + 211 pages. Science Press & Missouri Botanical Garden, Beijing, New York & St. Louis.
- Redfearn, P.L., Jr., Tan, B.C. & He, S. (1996) A newly updated and annotated checklist of Chinese mosses. *Journal of Hattori Botanical Laboratory* 79: 163–357.
- Tan, B.C. & Iwatsuki, Z. (1983) Nineteen new records of Philippine mosses. *Kalikasan* 12: 328–350.
- Wilson, W. (1857) Enumeration of the mosses collected in India by Dr. J. D. Hooker, F.R.S., and Dr. Thomas Thomson, F.R.S., with their habitats, elevations, and the numbers under which they have been distributed; arranged by W. Mitten, Esq. *Hooker's Journal of Botany Kew Garden Miscellany* 9: 363–370.
- Wu, P.C. (1992) The Mossflora of Xishuangbanna, southern Yunnan, China. *Tropical Bryology* 5: 27–33.