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Plaubelia burmensis, a new name for *P. perinvoluta* (Pottiaceae), with special reference to the phylogenetic relationship between *Plaubelia* and *Hyophila*

LIHUI MAO[1*], QIN ZUO[1*], SI HE[2] & LI ZHANG[1,3]

[1] *Shenzhen Key Laboratory of Southern Subtropical Plant Diversity, Fairylake Botanical Garden, Shenzhen & Chinese Academy of Sciences, Shenzhen 518004, China; colourhui@163.com, greatmantisking@gmail.com*

[2] *Missouri Botanical Garden, 4344 Shaw Blvd., St. Louis, MO 63110, USA; si.he@mobot.org*

[3] *Author for Correspondence: zhangli@scib.ac.cn*

* *The first two authors contribute equally to this paper.*

Abstract

The new name *Plaubelia burmensis* (Pottiaceae) is proposed for the species currently recognized as *Desmatodon burmensis* and for replacing the illegitimate name *P. perinvoluta*. The species is reported here first time from China. A detailed description and illustrations for the species as well as a diagnostic key to the currently recognized three species of *Plaubelia* are provided. A phylogenetic analysis based on four DNA loci from three genomic compartments (cp *rps*4, mt *nad*5, *nr* ITS and *nr* 26S) shows that *Plaubelia* species are nested within the Trichostomoideae of the Pottiaceae, sister to *Hyophila involuta*.

Key words: Bryophyta, China, *Desmatodon*, *Hyophila involuta*, moss, taxonomy, Yunnan

Introduction

Plaubelia Bridel (1826: 522) is a small genus of the pantropics, currently consisting of three species and one variety (Zander 1993, Eckel 2007). Since Bridel (1826) established the genus with *P. tortuosa* Bridel (1826: 522) as its type, the status of the generic name had been unsettled until recently when Zander (1993) provided a thorough review of its taxonomic history and rectified the legitimacy of this genus. The genus is characterized by a combination of the following features, i.e., the rosulate plants, the spathulate or round-ovate leaves with erect or incurved margins, the ventrally strongly bulging laminal cells, and the ventrally bulging epidermal cells of the costa. *Plaubelia* is closely related to *Hyophila* Bridel (1827: 760) (Zander 1983, 1993, Allen 2002, Eckel 2007), but differs from the latter by the presence of peristome teeth, the round to semicircular abaxial stereid bands in the leaf transverse sections, and the thicker or darker colored walls of the axillary hair proximal cells.

The three species and one variety of *Plaubelia* are: *P. involuta* (Magill 1981: 225) R.H. Zander (1993: 176), *P. perinvoluta* R.H. Zander (1993[Dec.]: 176), *P. sprengelii* (Schwägrichen 1823: 64) R.H. Zander (1993: 176), and *P. sprengelii* var. *stomatodonta* (Cardot 1909: 76) R.H. Zander (1993: 176) (Zander 1993, Eckel 2007), among which *P. perinvoluta* is in fact an illegitimate name because its type (*Desmatodon involutus* E.B. Bartram 1943: 175) is based on the same species as an earlier name, *Desmatodon burmensis* B.C. Tan & Z. Iwatsuki (1993[Nov.]: 343). *Plaubelia sprengelii* is widely distributed in the Americas and is relatively well understood (Allen 2002). *Plaubelia involuta*, originally described as *Weisiopsis involuta* Magill (1981: 225) from Botswana, is only known from a few specimens and was recently reported from Yunnan, southwestern China (Cao *et al*. 2010).

During a field trip to Yunnan, the same province from where the recent report of *P. involuta* in China came, the first author collected a specimen of a distinctively tiny moss from roadside soil bank between Ninglang County and Lugu Lake (*Mao 101*, SZG). Our initial study of this moss showed that it has strong affinity to *Plaubelia involuta*. Further examination of the morphological features from the types and relevant specimens revealed that our collection is identical to *Desmatodon involutus* E.B. Bartram (= *Plaubelia perinvoluta*). In this paper, a new name, *Plaubelia burmensis* (B.C. Tan & Z. Iwats.) S. He & L. Zhang, *comb. nov.*, is proposed to replace *Plaubelia*

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Appendix 1

Specimens examined for morphological investigation, and GenBank accession numbers of the sequences used in this study in the order: rps4, nad5, ITS, and 26S.

***Anoectangium aestivum*(Hedw.) Mitt.**: rps4-AY908049, nad5-AY908832, ITS-HM147801, 26S-HM751554. ***Barbula unguiculata* Hedw.**: rps4-AF480952, nad5-AY908844, ITS-AY437129, 26S-HM751536. ***Ceratodon purpureus* (Hedw.) Brid.**: rps4-AY908123, nad5-AY908862, ITS-AY156591, 26S-HM751561. ***Chenia leptophylla* (Müll. Hal.) R.H. Zander**: rps4-AF480960, nad5-AY908815, ITS-AY437134, 26S-HM751532. ***Crossidium crassinervium* (De Not.) Jur.**: rps4-AY908037, nad5-AY908823, ITS-JN544732, 26S-HM751711. ***Didymodon rigidulus* Hedw.**: rps4-HM147768, nad5-AY908828, ITS-HM147795, 26S-HM751543. ***Dolotortula mniifolia* (Sull.) R.H. Zander**: rps4-AY908036, nad5-AY908824, ITS-GQ339748, 26S-HM751535. ***Erythrophyllopsis andina* (Sull.) R.H. Zander**: rps4-JX679978, nad5-, ITS-JX679954, 26S-. ***Gymnostomiella vernicosa* (Hook. ex Harv.) M. Fleisch.**: rps4-AY908066, nad5-AY908837, ITS-, 26S-HM751572. ***Gymnostomum aeruginosum* Sm.**: rps4-HM147788, nad5-AY908847, ITS-HM147814, 26S-HM751550. ***Gyroweisia tenuis* (Schrad. ex Hedw.) Schimp.**: rps4-HM147772, nad5-AY908834, ITS-HM147799, 26S-HM751556. ***Hyophila involuta* (Hook.) A. Jaeger** 1, MALAYSIA: Penang, George Town, 120 m, 4 Apr. 2012, *L. Zhang 8636* (SZG): rps4-KJ195508, nad5-KJ195514, ITS-KJ195495, 26S-KJ195501. ***Hyophila involuta* (Hook.) A. Jaeger** 2, CHINA: Taiwan, Miaoli County, 735 m, 14 Sep. 2012, *L. Zhang 9650* (SZG): rps4-KJ195509, nad5-KJ195515, ITS-, 26S-KJ195502. ***Hyophila involuta* (Hook.) A. Jaeger** 3, CHINA: Yunnan, Tengchong County, 1920 m, 11 Oct. 2012, *L. Zhang*, *Y-J Zhao* & *Q. Zuo 9797* (SZG): rps4-KJ195510, nad5-KJ195516, ITS-KJ195496, 26S-KJ195503. ***Hyophiladelphus agrarius* (Hedw.) R.H. Zander**: rps4-AY908067, nad5-AY908838, ITS-, 26S-HM751568. ***Indopottia irieandoana* H. Akiyama**: rps4-AB567718, nad5-AB567719, ITS-, 26S-. ***Leptobarbula berica* (De Not.) Schimp.**: rps4-AF480964, nad5-AY908835, ITS-AY796283, 26S-HM751557. ***Molendoa sendtneriana* (Bruch & Schimp.) Limpr.**: rps4-HM147787, nad5-AY908846, ITS-HM147813, 26S-HM751552. ***Plaubelia burmensis* (B.C. Tan & Z. Iwats.) S. He & L. Zhang,** MYANMAR: Shan State, Taungyi, Dickason 8787-B (FH, syntype of *Desmatodon involutus* E.B. Bartram = *Plaubelia perinvoluta*): for morphological investigation only. ***Plaubelia burmensis* (B.C. Tan & Z. Iwats.) S. He & L. Zhang**, CHINA: Yunnan, Ninglang County, 2310 m, 24 Jun 2010, *L-H Mao 101* (SZG): rps4-KJ195511, nad5-KJ195517, ITS-KJ195497, 26S-KJ195504. ***Plaubelia burmensis* (B.C. Tan & Z. Iwats.) S. He & L. Zhang,** CHINA: Yunnan, Luoping Co., *Li 006* (GNUB, SHNU, SZG): for morphological investigation only. ***Plaubelia involuta* (Magill) R.H. Zander**, BOTSWANA : Boteti River, *Smith 2603a* (MO, isotype of *Weisiopsis involuta* = *Plaubelia involuta*): for morphological investigation only. ***Plaubelia sprengelii* (Schwägr.) R.H. Zander** 1, BOLIVIA: Tarija, Gran Chaco, 468 m, 10 Feb. 2006, *I. Linneo* & *M. Nee 203* (MO): rps4-, nad5-KJ195518, ITS-KJ195498, 26S-KJ195505. ***Plaubelia sprengelii* (Schwägr.) R.H. Zander** 2, MEXICO, Acahuales, 5 m, 4 Oct. 2000, *C. Delgadillo M. 6624* (MO): rps4-KJ195513, nad5-KJ195519, ITS-KJ195499, 26S-KJ195506; ***Plaubelia sprengelii* var. *stomatodonta* (Cardot) R.H. Zander**, NICARAGUA: Esteli, 637 m, 11 May 2010, *R. E. Magill 14210* (MO): rps4-KJ195512, nad5-KJ195520, ITS-KJ195500, 26S-KJ195507. ***Pleurochaete squarrosa* (Brid.) Lindb.**: rps4-AY950373, nad5-AY908854, ITS-AY854408, 26S-HM751714. ***Pseudosymblepharis guatemalensis* (E.B. Bartram) B.H. Allen**: rps4-AY908056, nad5-AY908850, ITS-, 26S-. ***Pterygoneurum ovatum* (Hedw.) Dixon**: rps4-AY908038, nad5-AY908818, ITS-JN544738, 26S-HM751573. ***Splachnobryum obtusum* (Brid.) Müll. Hal.**: rps4-AF223058, nad5-AY908855, ITS-AY796287, 26S-HM751565. ***Stegonia latifolia* (Schwägr.) Venturi ex Broth.**: rps4-AY908039, nad5-AY908826, ITS-JN544716, 26S-HM751529. ***Trichostomum tenuirostre* (Hook. & Taylor) Lindb.**: rps4-JX679973, nad5-AY908852, ITS-JX679948, 26S-HM751569. ***Tortella humilis* (Hedw.) Jenn.**: rps4-AY908064, nad5-AY908836, ITS-AY796260, 26S-HM751570. ***Tortula subulata* Hedw.**: rps4-AY908040, nad5-AY908814, ITS-AY934573, 26S-HM751531. ***Tuerckheimia valeriana* (E.B. Bartram) R.H. Zander**: rps4-AY908052, nad5-AY908833, ITS-, 26S-HM751553. ***Weissia controversa* Hedw.**: rps4-AY950397, nad5-AY908849, ITS-AY854432, 26S-HM751566. ***Weisiopsis anomala* (Broth. & Paris) Broth. & Paris**: rps4-AY908070, nad5-AY908864, ITS-, 26S-HM751583.