



A revision of the genus *Anthoceros* (Anthocerotaceae, Anthocerotophyta) in China

TAO PENG^{1,2} & RUI-LIANG ZHU^{1*}

¹ Department of Biology, School of Life Science, East China Normal University, 3663 Zhong Shan North Road, Shanghai 200062, China; *Corresponding author: lejeunea@163.com

² School of Life Science, Guizhou Normal University, 116 Bao Shan North Road, Guiyang 550001, China; taopeng7791@163.com

Abstract

The genus *Anthoceros* (Anthocerotaceae, Anthocerotopsida) in China is reviewed. Five species and one variety are recognized. *Anthoceros alpinus*, *A. bharadwajii*, and *A. subtilis*, are reported new to China. *Aspiromitus areolatus* and *Anthoceros esquirolii* are proposed as new synonyms of *Folioceros fuciformis* and *Phaeoceros carolinianus*, respectively. A key to the species of *Anthoceros* in China is provided.

Key words: *Anthoceros alpinus*, *A. bharadwajii*, *A. subtilis*, hornworts, new synonym

Introduction

Hornworts (Anthocerotophyta) represent a key group in the understanding of evolution of plant form because they are hypothesized to be sister to the tracheophytes (Qiu *et al.* 2006). An estimate of 200–250 species of hornworts exist worldwide (Villarreal *et al.* 2010; Garcia *et al.* 2012; Villarreal *et al.* 2012). *Anthoceros* Linnaeus (1753: 1139) is the largest genus of hornworts, with ca. 83 species (Villarreal *et al.* 2010). With a global distribution, the centres of diversity in the genus are in the Neotropics and tropical Africa and Asia.

Anthoceros formosae Stephani (1916: 1002) was the first species of the genus described from China, based on U.J. Faurie's collection from Taiwan. Seven years later Stephani (1923) described two new species from China: *Anthoceros esquirolii* Stephani (1923: 427) [= *Phaeoceros carolinianus* (Michaux 1803: 280) Proskauer (1951: 347) (present study)] and *A. subalpinus* Stephani (1923: 429) [= *Phaeoceros subalpinus* (Steph.) Udar & Singh (1981: 257)]. Khanna (1938) added two *Anthoceros* species to the Chinese flora: *A. fulvisporus* Stephani (1912: 306) [= *Phaeoceros fulvisporus* (Steph.) Hasegawa (1993a: 52)] and *A. chungii* Khanna (1938: 316) (a new species). Lai and Wang-Yang (1976) reported four species from Taiwan: *A. formosae* [= *A. angustus* Stephani (1916: 1001)], *A. miyabenus* Stephani (1897: 85) [= *Folioceros fuciformis* (Mont.) Bharadwaj (1975: 227) (Piippo 1990)], *A. nagasakiensis* Stephani (1916: 1005) [= *A. agrestis* Paton (1979: 257)] (Stotler & Crandall-Stotler 2003) and *A. vesiculosus* Austin (1874: 17) [= *Folioceros vesiculosus* (Austin) Bharadwaj (1975: 227)]. Hsu (1979) listed nine *Anthoceros* species, including several invalid names, in his checklist of bryophytes in China (see section below under "Synonyms, doubtful and excluded records"). Hasegawa (1993b) made a taxonomic revision of Taiwanese Anthocerotae, and confirmed six species of *Anthoceros* in Taiwan, including a new species [*A. verruculosus* Hasegawa (1993b: 103)] and a new variety [*A. fusiformis* Aust. var. *taiwanensis* Hasegawa (1993b: 100)]. Since 1995, numerous publications have contributed to the knowledge of the *Anthoceros* flora in China (So 1996; Zhu & So 1996; Gao & Cao 2000; Guo & Zhang 2001; Gao & Lai 2003; Wu *et al.* 2006; Zhang & Chen 2006; Zhang & Wu 2006; Wu & But 2009; Wang *et al.* 2011).