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Two new genera and species of fossil true bugs (Hemiptera: Heteroptera: Pachymeridiidae) from northeastern China

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Abstract

Two new genera and new species, *Peregrinpachymeridium comitcola* **gen. et sp. nov.** and *Corollpachymeridium heteroneurus* **gen. et sp. nov.**, of fossil Pachymeridiidae are described and illustrated from the Middle Jurassic Jiulongshan Formation in Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia Autonomous Region, China. We summarized all fossil genera of pachymeridiids found in China and set up a key to these 7 genera and 7 species. In addition, we hypothesize the significance of a rare, well-preserved, unusual bug fossil showing a male and a female together with their abdomen terminalia facing each other and their heads in the opposite direction.

Key words: Pachymeridiidae, fossil, Middle Jurassic, Jiulongshan Formation, China

Introduction

The Pachymeridiidae is an extinct fossil true bug family, which was established by Handlirsch (1906). It is a big family of approximately 26 genera and 41 species (Giebel 1856; Geinitz 1880; Handlirsch 1925, 1939; Popov 1961, 1986, 1990; Popov *et al.* 1994; Hong 1983, 1987; Lin 1986; Yao *et al*. 2006b, 2008). Among them, 5 genera and 5 species have been reported in China (Yao *et al*. 2006b, 2008). This family has been described from the Early Jurassic of northwestern Europe (Becker-Migdisova 1962), the Middle Jurassic of China (Yao *et al.* 2006b, 2008), the Early Jurassic of England, the Late Jurassic of Kazakstan, the Early Cretaceous of Siberia and Mongolia (Popov 1986, 1990).

Recently we collected several well-preserved fossil pachymeridiids from the Jiulongshan Formation in Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia Autonomous Region, China. The complete preservation of these specimens enabled us to explore their taxonomic status. We have already reported 3 genera and 3 species in this locality (Yao *et al.* 2006b, 2008). Based on new and different fossils of Pachymeridiid, we erected 2 new genera and 2 new species in this paper. These fossils are important supplement to pachymeridiid records and provide new evidences for studying their origin and evolution.

This locality is depicted with mountain streams, lakes, and a humid and warm-temperate climate (Tan & Ren 2002; Ren *et al.* 2002). It is rich in well-preserved fossils, such as insects, bivalves, plants, conchostracans, gastropods, proto-feathered dinosaurs and Eutherian mammals (Dong 2002; Ji & Yuan 2002; Gao & Shubin 2003; Zheng *et al*. 2003; Zhou *et al*. 2003; Ji *et al*. 2006; Ren *et al*. 2010). Ren *et al*. (2010) reported a high level of disversity in collected insects, such as Ephemeroptera, Odonata, Plecoptera, Blattaria, Grylloblattodea, Dermaptera, Orthoptera, Chresmodidae, Phasmatodea, Homoptera, Heteroptera, Raphidioptera, Neuroptera, Coleoptera, Mecoptera, Diptera, Trichoptera, Hymenoptera. Mantophasmatodea (Huang *et al.* 2008) and Embioptera were found in this locality (Huang *& Nel.*2009).

The accurate Ar-Ar and SHRIMP U-Pb dating shows that the age of intermediate-acid volcanic rocks overlying the Daohugou fossil-bearing beds is 164–165 Mya, and that the age of this fossil-bearing beds is older than or equal to 165 Mya (Chen *et al*. 2004). Combined with the above-mentioned composition of insect fauna and conchostracans, the age of Daohugou biota is considered as the Middle Jurassic (Bathonian - Callovian boundary) (Zhang *et al.* 1987; Ren *et al*. 1995, 2002; Wang *et al.* 2000; Shen *et al*. 2003; Gao & Ren 2006; Yao *et al.* 2006a).

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