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Two new species of Ptychopteridae and Trichoceridae from the Middle Jurassic of northeastern China (Insecta: Diptera: Nematocera)

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Abstract

Two new species of Diptera, *Eoptychoptera postica* **sp. nov.** in Ptychopteridae and *Eotrichocera (Archaeotrichocera) spatiosa* **sp. nov.** in Trichoceridae are described and illustrated from the Middle Jurassic Jiulongshan Formation of Daohugou in eastern Inner Mongolia, China. These two new species are established based on fossil specimens with bodies and complete wings.

Key words: Diptera, Ptychopteridae, Trichoceridae, new species, Middle Jurassic, China

Introduction

The family Ptychopteridae, belonging to the Superfamily Ptychopteroidea, is a very small but widespread in the world except the Australasian and the Antarctic regions (Krzemiński & Prokop 2011). In addition, Lukashevich (2008) synonymized the family Eoptychopteridae with Ptychopteridae; the Ptychopteridae thus consists of two extant subfamilies: Ptychopterinae and Bittacomorphinae and three extinct subfamilies: Proptychopterinae, Eoptychopterinae and Eoptychopterinae (Lukashevich 2008). The extinct subfamilies containing 66 species, achieved widespread distribution from the Jurassic to the Early Cretaceous, but these subfamilies might have become extinct by the end of the Early Cretaceous, the extant subfamilies include 7 fossil species described from the Early Cretaceous to Oligocene (Evenhuis 1994; Lukashevich *et al.* 2001; Ren & Krzemiński 2002; Krzemiński & Krzemińska 2003; Krzemiński & Prokop 2011). To date, the extinct genus *Eoptychoptera*, established by Kalugina (1985), contains 18 species from the Early Jurassic to the Early Cretaceous of Europe and Asia (Evenhuis 1994; Lukashevich 2004, Zhang 2004, Hao *et al.* 2009).

Up to 1976, there were 110 described extant and fossil species of Trichoceridae (commonly called winter crane flies) (Dahl & Alexander 1976). The Trichoceridae consists of two subfamilies: Trichocerinae and Paracladurinae (Krzemińska 1992). To date, only 26 extinct species belonging to 9 genera have been recorded from the Early Jurassic to Miocene of Asia, Europe and North America (Krzemińska 1992; Evenhuis 1994; Podenas 2001; Zhang 2006; Krzemińska & Lukashevich 2009; Krzemińska *et al.* 2009). In 2009, Krzemińska *et al.* (2009) emended the diagnosis of *Archaeotrichocera* Zhang 2006 and put it as a subgenus of *Eotrichocera* Kalugina, 1985.

In this paper, we describe two new species, *Eoptychoptera postica* **sp. nov.** and *Eotrichocera (Archaeotrichocera) spatiosa* **sp. nov.**, and assign them to the families of Ptychopteridae and Trichoceridae of Nematocera respectively, based on well-preserved fossil specimens with almost complete bodies and wings. These two new species were collected from the Middle Jurassic Jiulongshan Formation of the Daohugou Village, Inner Mongolia, China. The locality of Daohugou is one of the richest Middle Jurassic fossil-bearing sites in China. Abundant and diverse well-preserved fossil specimens, such as insects, bivalves, plants, conchostracans, gastropods, proto-feathered dinosaurs and pterosaurs, and eutherian mammals, have been found in the Daohugou fossil-bearing beds which are considered as the late Middle Jurassic (Bathonian-Callovian boundary, 165 Mya) (Ren *et al.* 2002; Gao & Ren 2006; Ren *et al.* 2010; Shi *et al.* 2011).