



New species and revisions of Pediciidae (Diptera) from the Middle Jurassic of northeastern China and Russia

JIAQI GAO¹, CHUNGKUN SHIH¹, KATARZYNA KOPEĆ², WIESŁAW KRZEMIŃSKI³ & DONG REN^{1,4}

¹Key Lab of Insect Evolution and Environmental Changes, Capital Normal University, Beijing 100048, China

²Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Krakow, Poland

³Institute of Biology, Pedagogical University of Kraków, podbrzezie 3, 31-054 Kraków, Poland

⁴Corresponding author. E-mail: rendong@mail.cnu.edu.cn

Abstract

Two new species of *Praearchitipula* Kalugina, 1985, *P. apprima* sp. nov. and *P. mirabilis* sp. nov., are described and illustrated from the late Middle Jurassic Jiulongshan Formation of Daohugou in eastern Inner Mongolia, China. In addition, we propose to transfer *Architipula abnormis* Hao & Ren, 2009 (which is from the same locality of Daohugou) from *Architipula* of Limoniidae to *Praearchitipula* of Pediciidae: *Praearchitipula abnormis* (Hao & Ren, 2009) comb. nov. In addition, we propose to transfer *Praearchitipula spasskia* Kalugina, 1985 to the genus *Mesotipula* (Limoniidae, Architipulinae). We also suggest treating *Praearchitipula lata* Kalugina, 1985 as a junior synonym of *Praearchitipula notabilis* Kalugina, 1985. An emended generic diagnosis of *Praearchitipula* is provided.

Key words: Daohugou, Jiulongshan Formation, new species, *Praearchitipula*, Tipuloidea

Introduction

Pediciidae are a relatively species-poor family of the Tipuloidea comprising about 490 extant species. The family is widespread in the world except for the Afrotropical and Antarctic Regions (Oosterbroek 2015). The phylogenetic relationships among Pediciidae genera and subgenera have not yet been investigated. Recent phylogenetic studies based on morphological and molecular evidence (Ribeiro 2008; Petersen *et al.* 2010) placed the family Pediciidae as the sister group of the other families of Tipuloidea.

The Pediciidae currently are divided into two subfamilies: Pediciinae and Ulinae (Oosterbroek 2015). Up to date, 11 fossil species belonging to 3 genera have been reported, ranging from the Middle Jurassic to the Upper Oligocene (Alexander 1931; Kalugina & Kovalev 1985; Krzemiński 2000; Krzemiński and Evenhuis 2000; Podenas 2001). Only one extant genus, *Tricyphona* Zetterstedt, 1837, is represented in the fossil record with 6 species known from Baltic amber (Alexander 1931; Podenas 2001). The extinct genus *Fragisternella* Krzemiński, 2000, contains a single species from the Upper Oligocene of Asia (Krzemiński 2000). Kalugina (in Kalugina and Kovalev 1985) described the genus *Praearchitipula* from Kubekovo locality, Itatskaya Formation, Middle Jurassic of Siberia (Russia), and Novospasskoye locality, Ichetuy Formation, Lower or Middle Jurassic of Transbaikalia (Russia) (Kalugina & Kovalev 1985), and classified it in the subfamily Architipulinae (Limoniidae). She described five species in *Praearchitipula*: *P. lata*, *P. notabilis*, *P. parvula*, *P. spasskia* and *P. trinervis*. Krzemiński and Evenhuis (2000) transferred *P. notabilis* to the family Pediciidae for discovering presectoral position of sc-r in one specimen. Lukashevich (2009) transferred *Praearchitipula parvula* Kalugina, 1985 to *Mesotipula* Handlirsch, 1939 within the Limoniidae, based on the terminal position of sc-r.

In this paper, we describe two new species, *Praearchitipula apprima* sp. nov. and *Praearchitipula mirabilis* sp. nov., and assign them to Pediciidae based on the characters present in three well-preserved fossil specimens with almost complete bodies and wings. In our opinion, *P. spasskia* Kalugina, 1985 also belongs to the genus *Mesotipula*. We suggest treating *Praearchitipula lata* Kalugina, 1985 as a junior synonym of *Praearchitipula*