



New genus and species of Hexagenitidae (Insecta: Ephemeroptera) from Yixian Formation, China

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Abstract

A new genus and two new species of the extinct family Hexagenitidae, *Epicharmeropsis hexavenulosus* gen. et sp. nov. and *Epicharmeropsis quadrivenulosus* sp. nov., are described from the Late Jurassic-Early Cretaceous Yixian Formation, Hebei and Liaoning Provinces in China. Detailed description and illustration of the specimens along with a brief review of Hexagenitidae are given. By comparing with the imago specimens of so-called *Ephemeropsis* which were previously reported from China, we believe these *Ephemeropsis*-like specimens should be placed into *Epicharmeropsis* gen. nov. and *Ephemeropsis* Eichwald could be absent in China.

Key words: Ephemeroptera, Hexagenitidae, *Epicharmeropsis* gen. nov., *Ephemeropsis*, fossil, Yixian Formation, China

Introduction

The family Hexagenitidae Lameere, 1917 which was proposed for the genus *Hexagenites* Scudder, 1880 from the remains of imago in the Late Jurassic of Solnhofen, Germany, is an extinct group. As the number of dentisetae and other important infraordinal characters are unknown, Hexagenitidae is temporarily classified to *Anteritorna incertae sedis* (Kluge, 2004). Toward the Early-Middle Jurassic boundary Hexagenitidae had appeared in Transbaikalia and Mongolia (*Siberiogenites* Sinitshenkova, 1985), to become common in Solnhofen (*Hexagenites* Scudder). In the Early Cretaceous, where it was widespread and often forming mass burial, Hexagenitidae was usually the only dominant family in mayfly assemblages (Kluge and Sinitshenkova, 2002). They have been recorded in Ukraine and Algeria (*Hexameropsis* Tshernova and Sinitshenkova, 1974), Transbaikalia (*Ephemeropsis* Eichwald, 1884), Mongolia (*Ephemeropsis* and *Mongologenites* Sinitshenkova, 1986), China (*Caenoephemera* Lin and Huang, 2001) and Brazil (*Protoligoneuria* Demoulin, 1955; *Palaeobaetodes* Brito, 1987; *Cratogenites* and *Cratogenitoides* Martins-Neto, 1996). Kluge (2004) believes that *Siberiogenites* cannot be placed to any family (including Hexagenitidae), but undoubtedly should be regarded as Euplectoptera incertae sedis.

Recently we discovered 14 well-preserved adult fossil mayfly specimens from the Yixian Formation, in Jianshangou and Huangbanjigou, Chaomidian Village, Shangyuan Township, Beipiao City, Liaoning Province; Dakangpu Village, Liulongtai Township, Yixian County, Liaoning Province; and Shimen Village, Yangshuling Township, Pingquan County, Hebei Province, China. Two new species of a new genus are established and described in this paper.

The geological age of the Yixian Formation is still contentious, considered to be the Late Jurassic (Ren *et al.* 1997, Zheng *et al.* 2003), the transition from the Late Jurassic to the Early Cretaceous (Chen *et al.* 2004,