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urn:lsid:zoobank.org:pub:5EA14648-EF42-4CE2-9C68-CA0892C24E3E

The new fossil lacewings of Grammolingiidae (Neuroptera) from the Jurassic of Central Asia and Mongolia, with notes on biogeography of the family

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Abstract

A new genus and three new species of the family Grammolingiidae are described: *Protolingia mira* gen. et sp. nov. and *Litholingia longa* sp. nov. from the Sai-Sagul locality (Kyrgyzstan, upper Lower Jurassic–lower Middle Jurassic) and *Lep-
tolingia oblonga* sp. nov. from the Houtiyn-Hotgor locality (Mongolia, Upper Jurassic). Grammolingiidae are recorded from the Karatau locality (Kazakhstan, Upper Jurassic). This fossil lacewing family occurred in the South of Central Asia and in East Asia during the Middle and Upper Jurassic; its distribution was limited by Mongol-Okhotsk and Turgai seas. Grammolingiidae from Sai-Sagul is the oldest record of this family. They demonstrate unusual characteristics for the family, such as the pectinate CuP and the distal fusion of Sc and R1.

Key words: Neuroptera, Grammolingiidae, Jurassic, Mongol-Okhotsk sea

Introduction

Grammolingiidae is an extinct Jurassic family of Neuroptera, which currently includes four genera and fourteen species. Thirteen species came from the Middle Jurassic Daohugou locality, China, Inner Mongolia (Ren 2002; Shi *et al.* 2011; Liu *et al.* 2011; Shi *et al.* 2012), and only one was found outside Daohugou, in the Upper Jurassic Shar-Teg locality, Mongolia (Khramov 2010). The new findings reported here indicate that Grammolingiidae is probably typical for the Jurassic of all East Asia and the southern Central Asia (Fig. 1a). In this paper new Grammolingiidae are described from three lacustrine Jurassic localities: Sai-Sagul (Kyrgyzstan, upper Lower Jurassic–lower Middle Jurassic), Houtiyn-Hotgor (Mongolia, Upper Jurassic) and Karatau (Kazakhstan, Upper Jurassic).

Material and methods

This study is based on specimens that were collected in the localities Sai Sagul (Kyrgyzstan, upper Lower Jurassic–lower Middle Jurassic), Houtiyn-Hotgor (Mongolia, Upper Jurassic) and Karatau (Kazakhstan, Upper Jurassic). These specimens are housed in the fossil insect collection of the Paleontological Institute (PIN) of the Russian Academy of Science in Moscow, Russia. The specimens were examined under Leica MZ 9.5 and MPS-2 dissecting microscope. Line drawings were processed by use of Adobe Photoshop CS3 and photographs were taken by Leica M165C stereomicroscopes. In this study the following wing vein abbreviations are used: C, costa; Sc, subcosta; R, radius; R1, first branch of R; Rs, radial sector; Rs1, first branch of Rs; M, media; MA, anterior media; b, basal part of MA; MP, posterior media; Cu, cubitus; CuA, anterior cubitus; CuP, posterior cubitus; A1–A3, first to third anal veins.

Localities

Sai-Sagul. The fossil insect locality Sai-Sagul is situated in South Fergana, in Batken Province of Kyrgyzstan, close to the border of Sughd Province of Tajikistan. More than 3300 fossil insects belonging to 15 orders were