



# Article

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## New fossil Mesochrysopidae (Neuroptera) from the Mesozoic of China

QIANG YANG<sup>1</sup>, VLADIMIR N. MAKARKIN<sup>1,2,3</sup> & DONG REN<sup>1</sup>

<sup>1</sup>College of Life Sciences, Capital Normal University, Beijing, 100048, China; e-mail: rendong@mail.cnu.edu.cn

<sup>2</sup>Institute of Biology and Soil Sciences, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, 690022, Russia; e-mail: vnmakarkin@mail.ru

<sup>3</sup>Corresponding author. E-mail: vnmakarkin@mail.ru

### Abstract

A new genus and two new species of extinct Mesochrysopidae (Neuroptera) are described from the Mesozoic of China: *Protoaristenymphes daohugouensis* sp. nov., from the Middle Jurassic of Daohugou, Inner Mongolia; and *Kareninoidea lii* gen. et sp. nov., from the Early Cretaceous (Yixian Formation) of Dakangpu, Liaoning Province. The presence of CuP in one hind wing of *K. lii* gen. et sp. nov. is interpreted as an atavism. *Armando-chrysopa* Nel *et al.* is regarded as a new junior synonym of *Karenina* Martins-Neto. *Armando-chrysopa inexpecta* Nel *et al.* is tentatively transferred to *Kareninoidea* gen. nov.

**Key words:** Neuroptera, Mesochrysopidae, Daohugou, Yixian Formation, Mesozoic, China

### Introduction

The Mesozoic family Mesochrysopidae Handlirsch, 1906 was hitherto considered to consist of 14 genera and 24 species occurring from the Early Jurassic to the Early Cretaceous of Eurasia and South America (Makarkin & Menon 2005; Nel *et al.* 2005; Menon & Makarkin 2008; Ren *et al.* 2010; Makarkin *et al.* 2012). *Chimerochrysopa incerta* Nel *et al.*, 2005 from the Spanish Las Hoyas locality was preliminary assigned to this family by Makarkin *et al.* (2012). Here, we remove it from Mesochrysopidae, as we consider that its characters do not allow confident placement to family. We also describe one new genus and two new species from the Mesozoic of China, and synonymize the genus *Armando-chrysopa* Nel *et al.* 2005. Therefore, we treat the family as comprising of 13 genera and 25 species (Table 1).

The occurrence of specialized mesochrysopids is the most characteristic feature of Early Cretaceous neuropteran assemblages, distinguishing them from those that are both older and younger (Makarkin *et al.* 2012). Herein, one new genus and species of such a derived taxon are described from the Aptian/Barremian Yixian Formation of Liaoning Province, China. This family occurs very rarely in the Jurassic; hitherto, only four specimens were known. Recently, one poorly preserved specimen was found among approximately 2000 neuropteran specimens examined from the Middle Jurassic locality at Daohugou, Inner Mongolia in China. This is described here as representing a new species of the genus *Protoaristenymphes* Nel et Henrotay, 1994, hitherto only known by the type species from the Early Jurassic of Europe.

### Material and Methods

This work is based on two specimens, collected from the Daohugou and Dakangpu localities, and housed in the Key Laboratory of Insect Evolution and Environmental Changes, College of Life Sciences, Capital Normal University, Beijing, China (CNUB; Dong Ren, curator).

Daohugou Village is situated in Shantou Township, Ningcheng County, Inner Mongolia, China. The insect-bearing beds of the Daohugou locality are considered as belonging to the Jiulongshan Formation, and dated as