



## A new lacewing (Insecta: Neuroptera: Grammolingiidae) from the Middle Jurassic of Inner Mongolia, China

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### Abstract

A new species of the family Grammolingiidae (Neuroptera) (*Leptolingia imminuta* **sp. nov.**) is described from Daohugou village (Middle Jurassic), Inner Mongolia, China. In this new species, MA forks at the same level as the separation of Rs2 from Rs, close to the middle of forewing, this structure of MA is peculiar in Grammolingiidae and is different from that of all other known species. Moreover, this new species is the smallest species known in the family Grammolingiidae (30 mm wing span).

**Key words:** *Leptolingia*, Jiulongshan Formation, new species, Daohugou

### Introduction

Grammolingiidae Ren, 2002 is a small family of Jurassic Neuroptera found in Central and East Asia. Three genera and nine species were described previously in this family. Among them, eight species were found in the Middle Jurassic deposits of Daohugou Village, Inner Mongolia, China (Ren 2002, Shi *et al.* 2011); only one species (*Leptolingia shartegica* Khramov, 2010) has been found in the Late Jurassic deposits of Sharteg, Mongolia (Khramov 2010). *Leptolingia* was erected by Ren (2002) who described two species; Shi *et al.* (2011) revised this genus, identifying definitive generic characters and added a new species, *L. calonervis*. Until now, four species were assigned in *Leptolingia*. According the revised generic characters, the new species described in this paper, from the Middle Jurassic Jiulongshan Formation of the Daohugou Village, belongs to the genus *Leptolingia* due to Rs arising close to the base of the wing, MP dichotomously branched basally, CuA forked after the fork of CuP, 1A terminated at the posterior margin before the separation of Rs1 from Rs.

In recent years, many Neuroptera fossils (six families, twenty-one genera and thirty-one species) have been found in the deposits of Daohugou Village, Inner Mongolia, China, such as Kalligrammatidae (Makarkin *et al.* 2009), Nymphidae (Ren & Engel 2007), Osmylidae (Wang *et al.* 2009), Psychopsidae (Peng *et al.* 2010) and Polystoechotidae (Ren *et al.* 2002). Notable examples are *Bellinympha filicifolia* Wang, Ren, Liu & Engel, 2010 and *B. dancei* Wang, Ren, Shih, & Engel, 2010, which exhibit pinnate leaf mimesis, and represent a 165 million year old specialization between insects and contemporaneous gymnosperms of the Cycadales or Bennettitales (Wang *et al.* 2010).

Daohugou Village is situated in southeastern Inner Mongolia, which is close to Lingyuan of the western Liaoning Province, northeastern China. The rocks here represent a lacustrine deposit which yields a diverse insect fauna composed of at least seventeen orders. The age of the Daohugou beds is still being debated, ranging from the early Middle Jurassic to the Lower Cretaceous (Ren *et al.* 2002; Liu *et al.* 2004; Ji *et al.* 2005; He *et al.* 2005; Wang *et al.* 2005). Recently, accurate Ar-Ar and SHRIMP U-Pb dating shows that the age of intermediate-acid volcanic rocks overlying the Daohugou fossil-bearing beds (N41° 18.979'E119° 14.318') is about 164-165Ma, and the age of Daohugou beds is older than or equal to 165Ma (Chen *et al.* 2004). Liu *et al.* (2006) also examined by SHRIMP U-Pb dating the Daohugou section (N41° 23.10'E119° 09.61') and drew a similar conclusion giving an average age