



## *Sialis primitivus* sp. nov. (Megaloptera: Sialidae), a remarkable new alderfly species from China

XINGYUE LIU<sup>1,3</sup>, FUMIO HAYASHI<sup>2</sup> & DING YANG<sup>1</sup>

<sup>1</sup>Department of Entomology, China Agricultural University, Beijing 100193, China

<sup>2</sup>Department of Biology, Tokyo Metropolitan University, Minamiosawa 1–1, Hachioji, Tokyo 192–0397, Japan

<sup>3</sup>Corresponding author. E-mail: xingyue\_liu@yahoo.com

### Abstract

A new species of the alderfly, *Sialis primitivus* sp. nov. from China is described. Remarkably, the general habitus of the new species resembles the New World genera *Protosialis* van der Weele, 1909 and *Ilyobius* Enderlein, 1910 as well as the Madagascan endemic genus *Haplosialis* Navás, 1927 by having similar wing venation. However, the characteristics of mouthparts and genitalia indicate the new species belongs to *Sialis* and probably represents the basalmost species among all known extant *Sialis* species.

**Key words:** Neuropterida, taxonomy, new species, East Asia

### Introduction

Sialidae (alderflies) is one of the extant families of the holometabolous order Megaloptera with eight genera and 82 world species (Liu *et al.* 2015a). The divergence between Sialidae and its sister group the Corydalidae, was estimated to take place during the late Permian or Triassic (Wang *et al.* 2012, Misof *et al.* 2014) although there is no definite alderfly fossil available for this period. The oldest alderfly fossil, *Dobbertinia reticulata* Handlirsch, 1920 from the Early Jurassic of Germany shows considerably similar wing venations with the extant alderflies, suggesting evolutionary stasis over at least 180 million years (Ansorge 2001). Among the modern alderfly genera, most of them are rare and relict insects, while the genus *Sialis* Latreille, 1802 is the most species-rich group of Sialidae, currently comprising 59 species (Liu *et al.* 2015a, b), some of which are common and can be easily collected in the field. *Sialis* are distributed in Eurasia and North America, with major species diversity found from East Asia and North America. In recent years, a few new *Sialis* species were described from East Asia by Liu and Yang (2006a, b), Liu *et al.* (2009, 2011, 2015b), and Jung and Bae (2012). The fauna appears to be well explored in other parts of the world with no new taxa since 1991 when a species outside Asia was described from southern California, U.S.A. (Whiting 1991). By far, the taxonomy, phylogeny and biogeography of *Sialis* have been extensively studied by modern approaches (Whiting 1994; Liu *et al.* 2015a) but there are still a number of open questions on the evolutionary history of *Sialis*, such as the timing of speciation and its biogeographic relevance (Liu *et al.* 2015b).

A visit by the first author to the entomological collection of the California Academy of Sciences, a series of alderflies collected from China in 1948 were found. These specimens were unidentified and unique in having a distinctive orange head and pronotum and the bifurcated Rs vein. It was determined that these specimens represented an undescribed species of *Sialis*. This new species may be the earliest diverged taxon among all known extant *Sialis* species, which invoke new interpretations of the phylogeny and evolution of this genus.

### Material and methods

Specimens are deposited in the California Academy of Sciences (CASC), San Francisco, California, U.S.A.