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New fossil mesoserphid wasps (Insecta, Hymenoptera, Proctotrupoidea) from the Jehol Biota, China

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Abstract

A new genus with two new species, *Codoserphus calophlebius* **gen. et sp. nov.** and *Codoserphus euneurus* **gen. et sp. nov.**, assigned to the subfamily Mesoserphinae of Mesoserphidae, are described from the Jehol Biota, Early Cretaceous Yixian Formation of Huangbanjigou Village in Liaoning, China. *Codoserphus* **gen. nov.** is characterized by its fore wing with all major veins present, not reduced, and 1cu-a distal to 1-M in fore wing. An updated key is given for the genera of Mesoserphidae from around the world.

Key words: Apocrita, *Codoserphus*, Early Cretaceous, Northeast China

Introduction

Proctotrupoidea, an old and diverse group within Apocrita comprising 11 extant families. Fossil records of the superfamily spanned from the Middle Jurassic to recent, indicating that this is a basal group of the Proctotrupomorpha (Grimaldi and Engel 2005). Among them, mesoserphids, an extinct family, comprise two subfamilies: Mesoserphinae Kozlov, 1970 and Karataoserphinae Rasnitsyn, 1994. The earliest fossil records hitherto of mesoserphids are described from the Middle Jurassic, Jiulongshan Formation of China (Shih *et al.* 2011), suggesting that the family might have originated from northeastern China.

Up to date, 16 genera and 33 species within this family have been described. Shih *et al.* (2011) summarized their locality, horizon and body measurements. Most specimens have been found in Russia, Mongolia and China, and their ages cover from the Late Jurassic to the Early Cretaceous. Zhang and Zhang (2001) suggested transferring *Otlia ectemnia* Zhang, 1992 from Heloridae to Mesoserphidae, even though *O. ectemnia* has a triangular cell 1m-cu, which is different from the typical trapezoid cell in other known mesoserphids. *Paraulacus sinicus* Ping, 1928, originally attributed to the Aulacidae (Ping 1928), was attributed to Mesoserphidae or Roproniidae by Zhang *et al.* (2013). The holotype specimen of *Paraulacus sinicus* is poorly preserved and not well-documented. We agree and accept these proposed revisions. In addition, *Cretoserphus gomezi* Rasnitsyn, 2000 had fore wing with indented Cu and distinctly distal cu-a, high cell 2cu-a, soft metasoma, and in hind wing, r-m long, cell r low and open apically, so it could not be assigned to any subfamily (Rasnitsyn, 2000).

Recently we collected 7 well-preserved fossil mesoserphids from the Early Cretaceous (Late Barremian), Yixian Formation of Huangbanjigou Village, Shangyuan Township, Beipiao City, Liaoning Province, China (Ren *et al.* 1997, 2010; Gao *et al.* 2008). Based on these specimens, we describe a new genus with two new species, *Codoserphus calophlebius* **gen. et sp. nov.** and *Codoserphus euneurus* **gen. et sp. nov.**, assigned to the subfamily Mesoserphinae of Mesoserphidae. An updated key is given for the genera of Mesoserphidae from around the world, except for *Paraulacus sinicus* Ping, 1928 (poor preservation and family un-assigned), *Otlia ectemnia* Zhang, 1992 (with a triangular cell 1m-cu and subfamily un-assigned), and *Cretoserphus gomezi* Rasnitsyn, 2000 (subfamily un-assigned).

This formation has provided abundant and diverse insect fauna (Ren *et al.* 2010, 2012) comprising complete specimens of Blattaria (Wang *et al.* 2007), Ephemeroptera (Huang *et al.* 2007), Mecoptera (Ren *et al.* 2009),