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The earliest fossil record of the wasp subfamily Pelecininae (Hymenoptera: Proctotrupoidea: Pelecinidae) from the Yixian Formation of China

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Abstract

A new genus with a new species (*Shoushida regilla* **gen. et sp. nov.**) of pelecinid wasps is described and illustrated. The fossil has been collected from the Upper Jurassic to Lower Cretaceous of Yixian Formation at Huangbanjigou Village, Liaoning Province, China. The new species has vein Rs forking to two branches: Rs_1 straight and reaching wing margin much before apex and Rs_2 long, forming an "X" pattern together with 2r-rs. This finding represents the earliest fossil record of subfamily Pelecininae in the world up to date. Sexual dimorphism in Pelecinidae is briefly discussed.

Key words: Pelecinidae, Proctotrupoidea, Hymenoptera, new taxa, Yixian Formation, China

Introduction

Pelecinidae, a relict family, only contains one extant genus with three species (Muesebeck, 1979; Masner, 1993; Johnson & Musetti, 1999). Based on the extant and extinct specimens, this family is currently divided into two subfamilies: Pelecininae and the extinct, probably paraphyletic, Iscopininae. Pelecininae includes only three species within one extant genus and six species within three extinct genera; Iscopininae has seven genera and 33 species (Brues, 1933; Kozlov, 1974; Rasnitsyn, 1980; Johnson, 1998; Engel, 2002; Zhang *et al.*, 2002; Zhang & Rasnitsyn, 2004; Zhang, 2005; Zhang & Rasnitsyn, 2006; Engel & Grimaldi, 2006; Duan & Cheng, 2006; Shih, Liu & Ren, 2009). Johnson (1998) accorded Iscopininae a familial status as Iscopinidae which was supported by Engel and Grimaldi (2006).

Recently, we collected a well–preserved female pelecinid fossil from the Yixian Formation, Huangbanjigou Village, Beipiao City, Liaoning Province, China. Based on its different and unique morphological characters, we erect a new genus and species herein. The new genus represents a transition type between subfamilies Pelecininae and Iscopininae. The forewing venation shows Rs_1 straight and reaching wing margin much before apex, Rs_2 long, but not reaching the wing margin. Rs_2 is a nebulous vein (Mason, 1986), darkest basal and fade gradually toward the apical. Rs, Rs_1, Rs_2 and 2r–rs form an "X" pattern to support the anterior and apical part of the forewing. This finding represents the earliest fossil record of subfamily Pelecininae in the world up to date. It also indicates that there were very diverse pelecinids in the Pelecinidae family during the Late Jurassic–Early Cretaceous in China.

The exact age of the Yixian Formation is still contentious. There are mainly three opinions: the Late Jurassic (Ren *et al.*, 1997; Zheng *et al.*, 2003); the Late Jurassic–Early Cretaceous. (Wang *et al.*, 2004; Chen *et al.*, 2004; Wang *et al.*, 2005) and the Early Cretaceous (Swisher *et al*, 1999; Zhou *et al.*, 2003). By comparing the Yixian biota with the Solnhofen biota of Germany, the Purbeck biota in England and Late Jurassic Terori–type and Ryoseki–type floras in Japan, Wang *et al.* (2004, 2005) considered the synthetic age of the Yixian Formation as Late Tithonian to the Berriasian.

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