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New and little known species of *Zorotypus* Silvestri (Zoraptera: Zorotypidae) from China

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Abstract

A new species of the insect order Zoraptera, *Zorotypus hainanensis* sp. n., is described from southern China based on apterous adults, which represents a fourth species of the genus in China. Additional collection data for *Z. medoensis* Hwang in Xizang (= Tibet) is provided. Illustrations of the major diagnostic features of both the new species and *Z. medoensis* are provided, and their taxonomic placements are briefly discussed.

Key words: Zoraptera, Zorotypidae, new species, China

Introduction

The small, cryptic insect order Zoraptera (also known as ‘zorapterans’ or ‘angel insects’) currently contains a monogeneric family Zorotypidae, with 39 extant and 9 fossil species (Mashimo et al. 2013). The majority of species are pantropical in distribution, with only four species found north of 23.5°N (i.e. north of the Tropic of Cancer): the widespread *Z. hubbardi* Caudell in the United States, *Z. snyderi* Caudell in Florida, and *Z. sinensis* Hwang and *Z. medoensis* Hwang in Tibet (Hwang 1974, 1976, 1982; Engel 2004, 2009). At present members have not been found in Australia, but recently a new species *Zorotypus novobritannicus* Terry & Whiting was described from New Britain (Terry & Whiting 2012, Mashimo et al. 2014). Seven generic names have been proposed for extant zorapterans either based on wing morphology (Kukalová-Peck & Peck 1993), or mainly based on the forms of the tarsomeres and cercus (Chao & Chen 2000). However, Engel & Grimaldi (2000) discussed the flaw of this multiple-generic classification, felt a more conservative approach was warranted, and placed all these names in synonymy with *Zorotypus* Silvestri.

In China, the diversity of Zoraptera certainly remains underexplored, with merely two species known to occur in Tibet and one in Taiwan. Hwang (1974) described the first Chinese species *Z. sinensis* from Chayu. Two years later, the same author added a second species, *Z. medoensis*, from Hanmi (Hwang 1976). The distance between the type localities of *Z. sinensis* and *Z. medoensis* measures only about 200 kilometers. The external morphologies of these two species are extremely similar; they can be separated only by the setation of male sternite VIII, and form of the male genitalia (Hwang 1976). Both species were originally described based on apterous forms found under barks of fallen logs at an elevation of about 2100 m. Later Hwang (1980) recorded the alate morph of *Z. medoensis*. Twenty years later, Chao & Chen (2000) described *Z. newi* (Chao & Chen) from low elevation (300 m) at Hualien Hsien, Taiwan, based on five apterous females collected in leaf and humus samples. This species exceptionally has the first tarsomeres slightly longer than the second tarsomeres, and has a pair of elongate cerci; these two unique character states readily separate *Z. newi* from all other known zorapterans.

Recently, staff of our lab surveyed the insect fauna in several natural reserves in the Hainan Island. During the investigation, we collected a small series of apteron zorapterans from the inside of several fallen, decomposing logs at the Jianfengling Nature Reserve and Limu Mountain. Examination of this material revealed a new species of *Zorotypus*, which represents a fourth Chinese species. Moreover, additional collecting data of *Z. medoensis* from Tibet are provided, and important diagnostic characters of this species are figured to facilitate sound species identification.