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A review of the genus *Magadha* Distant, 1906 (Hemiptera: Fulgoromorpha: Achilidae)

JIAN-KUN LONG^{1,2}, LIN YANG^{1,2} & XIANG-SHENG CHEN^{1,2,3,4}

¹Institute of Entomology, Guizhou University, Guiyang, Guizhou Province 550025, P.R. China

²Special Key Laboratory for Development and Utilization of Insect Resources of Guizhou, Guizhou University, Guiyang, Guizhou Province 550025, P.R. China

³College of Animal Sciences, Guizhou University, Guiyang, Guizhou Province 550025, P.R. China

⁴Corresponding author. E-mail: chenxs3218@163.com

Abstract

Three new species of the planthopper genus *Magadha*, *M. basimaculata* **sp. nov.**, *M. densimaculosa* **sp. nov.** and *M. intumescens* **sp. nov.**, are described and illustrated from China. The male of *M. taibaishanensis* Wang, 1989 is described for the first time. Illustrations of *M. pinnata* Chen, Yang & Wilson, 1989 and *M. redunca* Chen, Yang & Wilson, 1989 and a key to all species of the genus are given.

Key words: Achilid, Fulgoroidea, distribution, planthopper, taxonomy

Introduction

The achilid genus *Magadha*, which is placed in Plectoderini, was established by Distant (1906) with *Cixius flavisigna* Walker, 1851 from India as its type species. Distant further described a new species *M. nebulosa* from Sri Lanka. Later on, 17 species were added by the following authors: Matsumura, 1914; Fennah, 1956; Chou & Wang, 1985; Wang & Wang, 1988; Wang, 1989; Chen *et al.*, 1989; Wang & Huang, 1995; Liang, 2007 and Xu & Liang, 2012.

In this paper, three new species are described and illustrated from China. The male of *M. taibaishanensis* Wang, 1989 is reported and described for the first time. Illustrations of *M. pinnata* Chen, Yang & Wilson, 1989 and *M. redunca* Chen, Yang & Wilson, 1989 and a key to all species of the genus are provided.

Material and methods

The morphological terminology and measurements used in this study follow Chen *et al.* (1989) and Yang & Chang (2000). The color photographs were taken with a Keyence VHX-1000C camera. External morphology was observed under an Olympus SZX7 stereoscopic microscope and characters measured with an ocular micrometer. The genital segments of the examined specimens were macerated in 10% KOH and drawn from preparations in glycerin jelly using an Olympus CX41 stereomicroscope. Illustrations were scanned by a Canon CanoScan LiDE100 and imported into Adobe Photoshop CS5 for labeling and plate composition. Spinal formula refers to the numbers of apical spines of the hind tibiae and 1st and 2nd hind tarsomeres.

Specimens examined are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

each lateral margin dorsad rising from 1 valviform process (Figs 96, 98); ventral lobe (Fig. 97) with apical margin deeply cleft in the middle, ventral surface ventrad rising from 3 processes, directed basad, the middle one long, spine-like, 2 others symmetrical beside the midline, each with many sharp teeth apically (Figs 97–98)

Material Examined. CHINA, **Shaanxi:** 2 ♂♂, Taibaishan National Natural Reserve, light trap, 11 July 2012, Z.-M. Chang; 3 ♂♂, 3 ♀♀, Foping National Natural Reserve, 15–17 July 2010, H. Li and Z.-H. Fan; 1 ♀, Foping National Natural Reserve, 4–7 Aug. 2010, P. Zhang; 2 ♂♂, 1 ♀, Heihe Forest Park, Zhouzhi, 9–12 Aug. 2010, Y.-L. Zheng and Z.-M. Chang. **Henan:** 6 ♂♂, 2 ♀♀, Niufushan National Natural Reserve, 2 July 2010, H. Li and Z.-H. Fan; 1 ♂, 2 ♀♀, Taiping, Xixia, 30 July–1 Aug. 2010, H. Li and Z.-H. Fan. **Sichuan:** 1 ♂, Qianfoshan, Mianyang, light trap, 13 Aug. 2007, Z.-H. Meng; 2 ♂♂, 2 ♀♀, Shuimogou, Guangyuan, light trap, 16 Aug. 2008, Z.-H. Meng; 1 ♂, Labahe, Quantian, 25 July 2012, H. Li. **Yunnan:** 1 ♂, Tengchong, 13 Aug. 2006, Z.-G. Zhang. **Guizhou:** 1 ♂, Dashahe, Daozhen, X.-S. Chen; 1 ♂, Mayanghe National Natural Reserve, 6 Oct. 2009, Y.-J. Li; 2 ♂♂, 1 ♀, Leigongshan National Natural Reserve, 13–14 Sep. 2005, Z.-Z. Li and B. Zhang; 8 ♂♂, 6 ♀♀, Leigongshan National Natural Reserve, light trap, 2–4 July 2011, J.-K. Long; 3 ♂♂, 5 ♀♀, Leigongshan National Natural Reserve, 4–6 July 2011, J.-K. Long; 2 ♂♂, 2 ♀♀, Leigongshan National Natural Reserve, light trap, 3–6 July 2011, W.-B. Zheng; 1 ♂, 2 ♀♀, Leigongshan National Natural Reserve, 5 July 2011, W.-B. Zheng.

Distribution. China (Guizhou, Henan, Shaanxi, Sichuan and Yunnan) (new records for Oriental region).

Remarks. Wang (1990) described *M. taibaishanensis* based on 1 female specimen from Taibaishan National Natural Reserve, Shaanxi Province, China. Two of the male specimens examined and described here were collected in the same locality as holotype and show similar markings on head and thorax.

Discussion

The genus *Magadha* now consists of 22 species. The majority of species (18 species) are distributed in the Oriental region, especially in southern China (16 species). The remaining four species (*M. gyirongensis*, *M. shaanxiensis*, *M. taibaishanensis* and *M. yadongensis*) are found in the Palaearctic region but near the boundary of the Oriental and Palaearctic regions (Fig. 99). This strongly suggests that *Magadha* is an Oriental genus.

In all recorded species of *Magadha* where both sexes are known, the external morphological characteristics (especially coloration) vary little between the male and female (Figs 1–4, 17–20, 33–36, 51–54, 67–70, 83–86; Chen *et al.*, 1989; Wang & Wang, 1988). The only exception appears to be that the overall body length of the female is larger than the male.

Metasequoia glyptostroboides is currently the only known host record for the genus (Fennah, 1956). However, the ecology of the majority of described species (including the species described in this paper) is largely undocumented, and further research is required.

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