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Discovery of the twisted-wing parasite family Myrmecolacidae (Insecta: Strepsiptera) from China, with description of two new species of the genus *Myrmecolax* Westwood, 1861

XIUMEI LU¹ & XINGYUE LIU^{1,2}

¹Department of Entomology, China Agricultural University, Beijing 100193, China. E-mail: xingyue_liu@yahoo.com

²Corresponding author

Abstract

The twisted-wing parasite family Myrmecolacidae is recorded from China for the first time based on the discovery of the genus *Myrmecolax* Saunders. Two species of *Myrmecolax* are described as new to science, *Myrmecolax pachygnathus* sp. nov. and *Myrmecolax arcuatus* sp. nov..

Key words: Myrmecolacidae, *Myrmecolax*, new species, China

Introduction

The family Myrmecolacidae is a unique group of twisted-wing parasites as the hosts belonging to not only different families but of different orders: The males parasitize ants and the females parasitize grasshoppers, crickets and mantids (Kathirithamby & Hamilton 1992). The male adults of Myrmecolacidae are characterized by having a seven-segmented antenna, which has the third antennomere bearing a long flabellum and has a rather short fourth but long fifth antennomere, and by the four-segmented tarsus without tarsal claws.

Currently, Myrmecolacidae comprises three valid extant genera, *Caenocholax* Pierce, 1909, *Myrmecolax* Westwood, 1861, and *Stichotrema* Hofeneder, 1910, with 76 described extant species. The genus *Lychnocolax* Bohart, 1951, which belonged to Myrmecolacidae was excluded from this family by McMahon *et al.* (2011) and represents the family Lychnocolacidae, with one species, *Lychnocolax chinensis* Kifune & Hirashima, 1989, recorded from Hongkong, China. Myrmecolacidae are globally distributed except for the Palaearctic and Antarctic, but with major fauna restricted to the subtropical and tropical areas, e.g. Southeast Asia, Central and Southern Africa, and Southern America. In East Asia, only one species, i.e. *Stichotrema asahinai* Hirashima & Kifune, 1974, is recorded from Okinawa of Japan. However, as a region with diverse insect fauna, so far there have been no records of Myrmecolacidae from China.

The genus *Myrmecolax*, with 29 described species, which includes 28 extant species and 1 extinct species, can be distinguished from the other two genera from the present CuA₁ and CuA₂ in hindwing and two detached veins between R₁ and R₄. Hosts of only five species of *Myrmecolax* are known and these hosts belong to the ant families Ecitoninae, Formicinae, Myrmecinae and Pseudomyrmecinae (Nakase *et al.* 2014). In only one species of *Myrmecolax*, the males have been matched to their conspecific females by molecular data (Kathirithamby *et al.* 2009).

Currently, there are 12 described species of *Myrmecolax* from Asia, and they are distributed in some countries of South Asia (Westwood 1861; Chaudhuri *et al.* 1978; Chattopadhyay & Chaudhuri 1980) and Southeast Asia (de Meijere 1908; Bohart 1941, 1951; Kifune & Hirashima 1979; Kathirithamby 1993, 1994). However, no species of *Myrmecolax* have been recorded from East Asia. In the present paper, we report the family Myrmecolacidae from China for the first time based on two male specimens collected from Guizhou Province in southwestern China. These specimens were identified to be two new species belonging to the genus *Myrmecolax*. Here we provide the

Remarks. This new species and *M. pachynathus* sp. nov. are distributed in the same province, i.e. Guizhou Prov. of southwestern China, and both species share some similar characters, e.g. the long 3rd flabellum, which almost reaches tip of 7th antennomere, and the distinctly bifurcated R₂. However, *M. arcuatus* sp. nov. differs from *M. pachynathus* sp. nov. by the thin and incurved maxillary palp and the strongly curved apex of aedeagus.

This new species also resembles *Myrmecolax malayensis* Kathirithamby, 1993 from Southeast Asia by having similar distally bifurcated detached vein with anterior branch directed toward wing base, but it differs from *M. malayensis* by the conspicuously longer body length and the long and curved apex of aedeagus.

A key to the species of *Myrmecolax* from Asia, based on the males, is given below, including 13 extant species. However, in the present key, *Myrmecolax genitalis* Kifune & Hirashima, 1989 from Laos is excluded because the description lacks the character of antenna, which is important for specific identification, due to damage of the holotype.

Key to males of *Myrmecolax* from Asia

1. Distal end of detached vein to radius clearly bifurcated, with anterior branch often directed to wing base environing distal end of radius. 2
 - Distal end of detached vein to radius simple or rather slightly bifurcated, with short anterior branch 10
2. Flabellum of 3rd antennomere reaching about basal 1/3 of 7th antennomere 3
 - Flabellum of 3rd antennomere reaching at least middle of 7th antennomere 4
3. Length ratio of 6th and 7th segments 1:2; body length 1.75 mm. **Indonesia** *M. flagellatus* (de Meijere, 1908)
 - Length ratio of 6th and 7th segments 1:1.51; body length 1.85 mm. **Malaysia (N. Borneo)** *M. danielssoni* Kathirithamby, 1994
4. Flabellum of 3rd antennomere reaching middle of 7th antennomere 5
 - Flabellum of 3rd antennomere extending beyond middle of 7th antennomere 6
5. Detached vein R₃ distally forked. **India** *M. pierci* (Chattopadhyay & Chaudhuri, 1980)
 - Detached vein R₃ not forked. **Thailand** *M. chantaneeae* Kifune & Hirashima, 1979
6. Dorsal process of aedeagus short, inconspicuous. **Philippines**. *M. furcatus* Bohart, 1951
 - Dorsal process of aedeagus long, almost as long as ventral projection 7
7. Body of aedeagus straight. **China**. *M. pachynathus* sp. nov.
 - Body of aedeagus curved 8
8. Body of aedeagus arcuately curved; body length 1.86 mm. **China** *M. arcuatus* sp. nov.
 - Body of aedeagus curved at basal 1/3; body length 1.00–1.28 mm 9
9. Basal 1/3 of aedeagus broad; length of 5th segment shorter than 6th segment; body length 1.005 mm. **India** *M. plantipes* (Chaudhuri, 1978)
 - Basal 1/3 of aedeagus thin; length of 5th segment longer than 6th segment; body length 1.17–1.28 mm. **Malaysia (N. Borneo)**. *M. malayensis* Kathirithamby, 1993
10. Flabellum of 3rd antennomere reaching at most base of 7th antennomere 11
 - Flabellum of 3rd antennomere reaching at least middle of 7th antennomere 12
11. Postscutellum short, slightly longer than wide. **Philippines** *M. philippinensis* Bohart, 1941
 - Postscutellum long, about 1.5 times as long as wide. **Philippines**. *M. culionensis* Bohart, 1951
12. Aedeagus without dorsal process. **Sri Lanka**. *M. nietneri* Westwood, 1861
 - Aedeagus with prominent dorsal process. **Philippines** *M. rossi* Bohart, 1951

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