
Ji-Shen Wang • Bao-Zhen Hua

A Color Atlas of the Chinese Mecoptera



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Foreword (First Edition)

Speaking of insects, some common groups immediately appear in our minds: butterflies, dragonflies, bees, mosquitos, flies, and cockroaches. These insects are closely related to the daily life of humans and frequently occur in the screen and other cultural works. Few people know, however, that among over a million species of extant insects, there are a group of peculiar members with elongated rostrum in their heads; some of them have enlarged and recurved male genitalia resembling the tail of scorpions, hence the common name “scorpionflies”; their external morphology and biological characteristics are highly varied; and they play a significant role in the study of the evolution and phylogeny of the order Insecta. This group of insects has been assigned in the order Mecoptera by entomologists. Because of the lack of specific literatures, the identification of Mecoptera is relatively difficult in a long period for the general entomological researchers and hobbyists.

The extant Mecoptera, a small relic order in the class Insecta, consists of over 700 species in nine families and ca. 40 genera. By contrast, the fossil Mecoptera includes ca. 620 species in more than 40 families and 210 genera; a great number of new taxa (families, genera, and species) have unceasingly been found. Among them, more than three-fourths of families were extinct. Mecopterans have a long history of origin and evolution, with the earliest fossil records in the Early Permian (ca. 270 mya). The Mesozoic era (252–65 mya) was an important period which links the past with the present days for the evolving Mecoptera. The mecopterans reached their peak of diversity in this era and held a large proportion in the Mesozoic fossil records of Holometabola. Nine extant families in Mecoptera have been found in the Jurassic-Cretaceous period. Many extinct families (e.g., Cimbrophlebiidae, Orthophlebiidae, and Choristopsychidae) not only enrich our knowledge of the diversity of Mecoptera, but also provide precious and solid evidence for the study of the origin and evolution of this order.

The mecopterans have their mouthparts, wings, and genitalia highly varied among different groups, corresponding to their diverse biological characteristics. Frequently, by comparing ancient, extinct mecopterans with extant ones, we are so amazed at their highly varied biological characteristics. For instance, members of the families Aneuretopsychidae, Mesopsychidae, and Pseudopolycentropodidae were ancient pollinators sharing a complex co-evolution with plants, and their special, slender siphoning mouthparts were able to feed the pollination drops of the gymnosperms; *Juracimbrophlebia ginkgofolia*, belonging to the family Cimbrophlebiidae, has a complex mimicry and symbiotic relationship with the plant *Ginkgo*, the relationship between them lasted over a hundred million years; some male insects in the family Holcorpidae have exaggeratedly elongated abdomen and genitalia, special structures not only utilized to forcedly fight with other males, but also an sexual display to the females. There are enormous number of unknown structures, biological characteristics, and evolutionary laws await our further discovery and research.

For the past many years, the research team of Mecoptera, Northwest A&F University, leading by Professor Bao-Zhen Hua, dedicated to the study of morphology, behaviors, taxonomy, and phylogeny of Mecoptera and made a lot of remarkable achievements. They published some excellent works in many Chinese and abroad journals, making Northwest A&F University one of the global centers of the study on Mecoptera. Meanwhile, professor Bao-Zhen Hua also dedicated to teaching works and trained a group of young entomologists. His college courses

such as scientific writing, general entomology, insect morphology, and insect taxonomy are popular among students. A title of “Prominent Educator of Shaanxi” was granted for his unique teaching idea and rigorous working attitude.

A Color Atlas of the Chinese Mecoptera is a valuable and unmatched work, in which all the aspects of knowledge of Mecoptera are shown by distinct elegant pictures and accurate scientific texts. It is a great original work that gathered scientific, artistic, and enjoyable qualities, suitable for the general entomological researchers and hobbyists, and a practical reference for the forefront workers in agriculture and forestry. I am honored to recommend this atlas to the readers. Meanwhile, I also expect more excellent discoveries from the research team of Mecoptera leading by professor Bao-Zhen Hua.

Capital Normal University, Beijing, China
September 2018

Dong Ren

Preface (Second Edition)

Mecoptera is a small order of holometabolous insects and consists of over 700 known species worldwide, including scorpionflies and hangingflies, etc. They are important indicators of ecological environments and are often ideal materials for behavioral studies due to their interesting courtship and mating behaviors. They are ancient members in Holometabola and play a significant role in the evolutionary research of Insecta.

China is rich in Mecoptera all over the world. More than 300 species in 11 genera of three families have been recorded in China hitherto. However, literature regarding the identification of the Chinese Mecoptera is very scarce. Hence, we spent three years to compile the first edition of this color atlas based on the abundant collections from the Entomological Museum, Northwest A&F University, and our intensive field investigations in recent years, to introduce the common species of the Chinese Mecoptera. In the second edition, we list and illustrate 242 species (updated from 170 species in the previous edition) of the Chinese Mecoptera. It is often difficult to identify to the species-level based exclusively on live photographs without careful examinations under a microscope. Therefore, we also provide many pictures of pinned or alcohol-preserved specimens. For most species, we present pictures of the adults, and the male and female genitalia. A geographical distribution map is also provided for each species.

This work cannot be finished without the generous helps from numerous friends and colleagues during our writing and editing courses. For the identifications of species, we mostly benefit from the late Professor Io Chou, who had collected specimens and literature and initiated the studies of the Chinese fauna of Mecoptera decades ago. We also profited from the postgraduate students of the research team of Mecoptera, Northwest A&F University, including Peng-Ying Huang, Jiang-Li Tan, Jing Chen, Li-Jun Cai, Na Ma, Wen Zhong, Lu Jiang, Qiong-Hua Gao, Meng Wang, Gui-Lin Hu, Ying Miao, Sha Xie, Tao Peng, Xiao-Yan Hou, Shu-Yu Liu, Gang Yan, Hao Xu, Xue Li, Qiang Fu, Jun-Xia Zhang, Chao Gao, Wei Du, and Kai Gao.

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Due to our limited knowledge, there might be some mistakes and flaws in this atlas. We expect criticism and correction from experts and readers.

Dali, China
October 2021

Ji-Shen Wang

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