



The larvae of Chinese Hydropsychidae (Insecta: Trichoptera), Part I: *Arctopsyche shimianensis*, *Parapsyche* sp. A, and *Diplectronea obscura*

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Abstract

DNA sequence libraries (mitochondrial COI barcode and nuclear 28S D2) are built for Chinese caddisflies, a fauna largely under-studied. These independent DNA sequences are used to associate larvae and adults of Chinese Hydropsychidae. As the first part of the result of this work, *Arctopsyche shimianensis* Gui and Yang, 2000 and *Parapsyche* sp. A are associated with their adults across both gene markers. Probable association is also made for *Diplectronea obscura* Ulmer, 1930. Larval descriptions and illustrations are provided for all three species for the first time.

Key words: Trichoptera, Hydropsychidae, *Arctopsyche*, *Parapsyche*, *Diplectronea*, larva, China, DNA barcoding

Introduction

The fauna of Chinese hydropsychid larvae has been poorly studied. Only 13 larvae out of 136 known hydropsychid species distributed in China have been associated with adults, among which only a few were fully described or illustrated (Zhou 2007). Conventional approaches to associating larvae with adult caddisflies include larval rearing and examination of metamorphotypes (Wiggins 1996). Recently, a complementary larval association approach that integrates morphology and independent DNA sequences (mitochondrial COI gene and nuclear 28S D2 fragment) was proposed to facilitate and accelerate larval association in caddisflies when rearing is not possible and metamorphotypes are not available (Zhou *et al.* 2007). This method is followed in this paper.

This series larval association and description work is part of the U.S. National Sciences Foundation grant “Phylogeny and Classification of World Hydropsychidae, with a Revision of Chinese Species and Description of Their Larvae”. During the course of this investigation, many new species have been discovered from China and will be described in independent papers by correspondence researchers. As a result, many Chinese hydropsychid materials used in this larval association study remain unidentified. Potentially new species, such as the associated *Parapsyche* species in this paper, are given provisional identities. Along with this association work, DNA reference libraries of the mitochondrial COI DNA barcode and nuclear 28S D2 have been built for Chinese caddisflies. These libraries will continuously grow as part of the on-going ‘Trichoptera Barcode of Life’ project (www.trichopterabol.org) coordinated at the University of Guelph, Canada.

In this work, the larval descriptions and illustrations of three Chinese hydropsychid taxa, *Arctopsyche shimianensis* Gui and Yang, 2000, *Parapsyche* sp. A, and *Diplectronea obscura* Ulmer, 1930, are provided. Additional larval descriptions will be published as series manuscripts, consisting of a total of 23 species. For each associated species, a general introduction to each genus is provided first, followed by generic characteristics. A list of specimens used in the larval association is given, with GenBank accession numbers for both genes (where available) linked to each individual (Table 1). Association trees constructed from both genes are provided. Finally, larval descriptions and illustrations are given for each species.