



<http://dx.doi.org/10.11646/zootaxa.4021.1.4>

<http://zoobank.org/urn:lsid:zoobank.org:pub:1242BD05-F287-4F0B-9320-C452E0391EC5>

Review of the last instar larvae and pupae of *Hexatoma* (*Eriocera*) and *Hexatoma* (*Hexatoma*) (Diptera, Limoniidae, Limnophilinae)

VIRGINIJA PODENIENE¹ & JON K. GELHAUS²

¹Department of Zoology, Vilnius University, Ciurlionio 21/27, 03101 Vilnius, Lithuania. E-mail virginija.podeniene@gf.vu.lt

²Department of Entomology, Academy of Natural Sciences of Drexel University, Philadelphia, PA, USA, 19103-1195.

E-mail gelhaus@ansp.org

Abstract

Description, illustrations and habitat characteristics are given for the previously unknown larvae and pupae of Nearctic species *Hexatoma* (*Eriocera*) *californica*, *H. (E.) fuliginosa* and East Palaearctic species *H. (E.) sachalinensis*, *H. (E.) stackelbergi*, *H. (E.) ussuriensis* and *H. (s.str.) nubeculosa*. *Hexatoma (E.) sachalinensis*, *H. (E.) stackelbergi*, and *H. (s.str.) nubeculosa* are reported new for Mongolia based on larval and reared adult collections. There are no distinguishing morphological characters to separate last instar larvae of the subgenera *H. (Eriocera)* and *H. (Hexatoma)*, while pupae of these subgenera can be separated by the size and shape of the spines on the terminal segments. This study indicates that microscopic setae on the last abdominal segment, length of maxillary palpi, sclerotization of the spiracular field, length of spiracular lobes, length of setae on the apical part of the ventral lobes, the shape of the labrum and the arrangement of sensory structures on the labrum are the main larval characters to distinguish among species in this genus. The shape and length of the respiratory horns, size and number of the horns of the cephalic crest, length of the antennal sheaths, the lengths of the sheaths of the legs, size and shape of tubercles on the antennal scape are the main distinguishing pupal characters for the species of this genus. Nearly all known species of *Hexatoma* develop in sand or gravel in bottom of large and medium size rivers, smaller streams and creeks while last instar larvae and pupae can be found in the riparian zone, usually in gravel, sand or under stones.

Key words: *Hexatoma*, larvae, pupae, Mongolia, USA

Introduction

The genus *Hexatoma* Latreille, 1809 in the subfamily Limnophilinae is one of the largest in the Tipuloidea with six subgenera and over 600 species (Oosterbroek 2015). The most distinct feature of adult *Hexatoma* is that the antennae have a reduced number of flagellomeres, but each flagellomere is strongly elongate, much longer than the usual flagellomeres of most crane flies, and in many species the overall antennal length exceeds the body length. The most distinct feature of larvae belonging to this genus is the labrum, which has longer or shorter lateral lobes. The best feature for distinguishing pupae of the genus *Hexatoma* is the cephalic crest, which is situated between the breathing horns and consists of one or two pairs of horns or tubercles. Subgenera are distinguished only on adult wing venation characters. According to the phylogenetic analysis of Limnophilinae relationships (Ribeiro 2008) using adult characters, *Hexatoma* was not supported as monophyletic, based on seven species representing five subgenera of *Hexatoma* in the analysis. This grouping did form a clade in some analyses with *Ulomorpha*, *Pilaria* and *Pseudolimnophila*. An earlier, non-quantitative analysis of phylogenetic relationship based on larval and pupal characters also did not support *Hexatoma* as monophyletic, and grouped it with several genera including *Limnophila* based on respiratory horn characteristics in the pupa (Oosterbroek and Theowald, 1991).

The subgenus *Hexatoma* (*Eriocera*) Macquart, 1838 is the largest (560 species) and distributed worldwide with most species in the Oriental (290 species) and Neotropical regions (143 species), and lesser numbers of species in the Palaearctic (66 species), Nearctic (34 species), Afrotropical (29 species) and Australian regions (6 species). The subgenus *Hexatoma* (*s.str.*) Latreille, 1809 contains 24 species which are distributed in Oriental (11