Identification to subfamily and tribe of Chironomidae larvae in California

By
Joseph Slusark and Brady Richards
California Department of Fish and Game - Aquatic Bioassessment Laboratory
College of Natural Sciences - Center for Water and the Environment
California State University, Chico

Why do this?

- The new California Stream Condition Index requires your Chironomidae are determined to subfamily.
- In order to determine Chironomidae to SAFIT level 2 it is a good practice to determine them to subfamily and tribe first.

Procedure

Woodard, M.E., J. Slusark, and P.R. Ode. 2012. Standard Operating Procedures for Laboratory Processing and Identification of Benthic Macroinvertebrates in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 003

PDF available at URL:
http://swamp.mpsl.mlml.calstate.edu/resources-and-downloads/standard-operating-procedures#Taxonomy

Section 4.3 Identification and enumeration of Chironomidae

Caveat

- For this training we assume you have a good working knowledge of the external morphology of Chironomidae larvae.

Basic references for Chironomidae Taxonomy

Ferrington, L. C. Jr. , Coffman, W. P. and Berg, M. B. 2008. Chironomidae. An introduction to the aquatic insects of North America, 4th edition, 1158 pp. R. W. Merritt, K. W. Cummins and M. B. Berg. Dubuque, Iowa, Kendall/Hunt Publishing Company**:** 847-1003.

Epler, J. H. 2001. Identification manual for the larval Chironomidae (Diptera) of North and South Carolina, North Carolina Department of Environment and Natural Resources, Division of Water Quality. PDF available at URL: http://home.comcast.net/~johnepler3/howto.html. Accessed 23 April 2013.

Wiederholm, T. 1983. Chironomidae of the Holarctic Region. Keys and diagnoses. Part 1. Larvae. Entomologica Scandinavica Supplement **19**: 1-457.

North American Subfamilies and Tribes of Chironomidae

- Chironomidae
  - Chironominae
    - Chironomini
    - Pseudochironomini
    - Tanytarsini
  - Diamesinae
    - Boreoheptygini
    - Diamesini
  - Orthocladiinae
  - Podonominae (high elevation in California)
    - Boreochini
    - Podonomini
  - Prodiamesinae (high elevation in California)
  - Tanypodinae
    - Coelotanypodini
    - Macropelopini
    - Natarsini
    - Pentaneurini
    - Procladini
    - Tanypodini
  - Telmatogetoninae (marine in California)

Taxa collected in Stream BMI samples

- Chironomidae
  - Chironominae
    - Tribe Chironomini
    - Tribe Pseudochironomini
    - Tribe Tanytarsini
  - Diamesinae
  - Orthocladiinae
  - Podonominae
  - Prodiamesinae
  - Tanypodinae

Chironominae

- Mentum present and well defined
- Antennae non-retractile
- No toothed ligula
- Ventromental plates well developed with conspicuous striations throughout more than half their width
- Found in nearly all BMI samples in California

Chironominae
Tanytarsini

- Antennae arising from distinct tubercles
- Ventromental plates usually narrow and elongate in most genera
- Lauterborn organs very large and conspicuous or occurring at the apex of elongated stalks

Chironominae
Chiromonini

- Antennae not arising from distinct tubercles
- Ventromental plates larger variously shaped and well striated, not narrow and elongate like Tanytarsini (Exception; *Stenochironomus* which lacks ventromental plates but possesses a very distinct mentum. Uncommon.)
- Lauterborn organs inconspicuous

Chironomini
Pseudochironomini

- Only one genus *Pseudochironomus* in North America
- Narrow elongate ventromental plates (Tanytarsini-like) in combination with an antennae lacking a tubercle (Chironomini-like)
- Posterior parapods bearing dense crochets-like claws almost forming a single band of claws
- Often found in loosely constructed tubes of silk and very fine detritus

Orthocladiinae

- Antennae non-retractile
- Toothed ligula absent
- Mentum present and well defined
- Ventral mental plates vestigial to well developed. When well developed never possessing striations
- Common, found in most BMI samples in California

Tanypodinae

- Antennae retractile
- 4-8 toothed ligula present
- Mentum membranous or with dorsal mental teeth arranged in conspicuous plates or longitudinal rows
- Common but rarely the dominant taxon in a sample

Diamesinae

- Looks similar to Orthocladiinae but more robust in appearance. Typically larger specimens.
- Antennal segment 3 annulated
- More common in cold water, high elevation streams.

Prodiamesinae

- Only 3 genera
- Two genera *Prodiamesa* and *Odontomesa*, are the “Cheshire Cat” midges, possess very distinctive mentums bearing large numbers of distinctive setae. “Cat whiskers”
- Found in cold high elevation streams in California. Not commonly found.
- The unwhiskered genus *Monodiamesa* occurs mostly in the profundal zones of oligotrophic lakes. Very rarely in streams.

Podonominae

- Possessing long distinctive procerci easily seen under the dissecting microscope.
- Antennal segment 3 appearing annulated.
- Found in cold high altitude streams in California. Larvae associated with mosses.
- Very rarely collected in BMI samples.

Points to Remember

- Nearly all samples contain Chironominae, Orthocladiinae, and Tanypodinae
- Diamesinae can occur in samples from anywhere in the state but rarely in large numbers
- In California samples from cold water and high altitude may contain Prodiamesinae and Podonominae

And now for something completely different.

A live microscope feed of Chironomidae.

Bear Cake! Obviously!

This is what discriminating Chironomidae eat.