

## Microscope Lab Mounting and Observing Chironomid Mouthparts

To supplement use of the letter "e" described in your lab manual on page 9 (sections B1 and B2) you will mount the head and observe the mouthparts of a chironomid. Chironomids or midges are the immature stage of a common aquatic fly. Chironomids are present and abundant in most aquatic environments. Appearance of mouth parts vary between species (Figure 1), but the dentation or teeth of most are arranged as a row of triangles and give the head a "jack-o-lantern" appearance. Mouthparts are used to obtain food. As such, they are intimately associated with the environment. Contaminants in the sediments where the chironomids live and eat can cause mouth part deformities (e.g., missing teeth, fused teeth, abnormal shape; view final page of this lab guide). In an unimpacted habitat, deformities are relatively rare (<5%). As organic and inorganic contaminants increase (e.g., discharge from a sewage treatment plant, leachings from a landfill, industrial effluent), the incidence and severity of mouth part deformities increases.

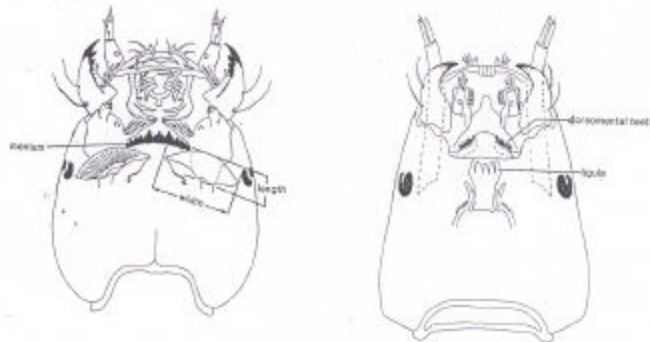


Figure 1. Head and mouth parts of common, healthy chironomids.

### Summary:

1. You will mount and observe a chironomid head from either above (sample A) or below (sample B) a discharge as detailed below.
2. To become familiar with operation of your microscope, follow instructions on page 9 (sections B1 and B2) of your lab manual, substituting chironomid head or teeth for the letter "e." (If needed, prepared slides of the letter "e" are available for practice).
3. Mouthparts will be observed and their condition (normal vs. abnormal) will be determined.
4. Your findings will be tabulated on the board and analysed with information from the entire class.

### Methodology:

1. Normal and deformed mouth parts of chironomid larvae will be demonstrated.
2. Previously collected and preserved chironomids from above and below a discharge will be provided. Students will work in pairs; one using a specimen from above the discharge and the other using a specimen from below the discharge. The head of each specimen will be excised and properly mounted as demonstrated by the lab instructor.
3. Obtain a petri dish, add water to the dish and position under your dissecting scope.
4. Using forceps, select one chironomid and place it in the petri dish.
5. With jewelers forceps firmly, but gently hold the chironomid, preferably just behind the head. Use an insect pin to tease off the head. Be careful not to lose either the head or the body. The head will be mounted directly in CMC media. The CMC media serves as both a mounting media and clearing agent.
6. To mount the head, position a slide on the diagram provided (Figure 2). Place a small droplet of CMC media in the center of the positioned slide. Use insect pins or jewelers forceps to transfer the head to the droplet of mounting media. View under the dissecting scope to ensure that mouthparts are facing up and the head is correctly positioned. Reposition as necessary.

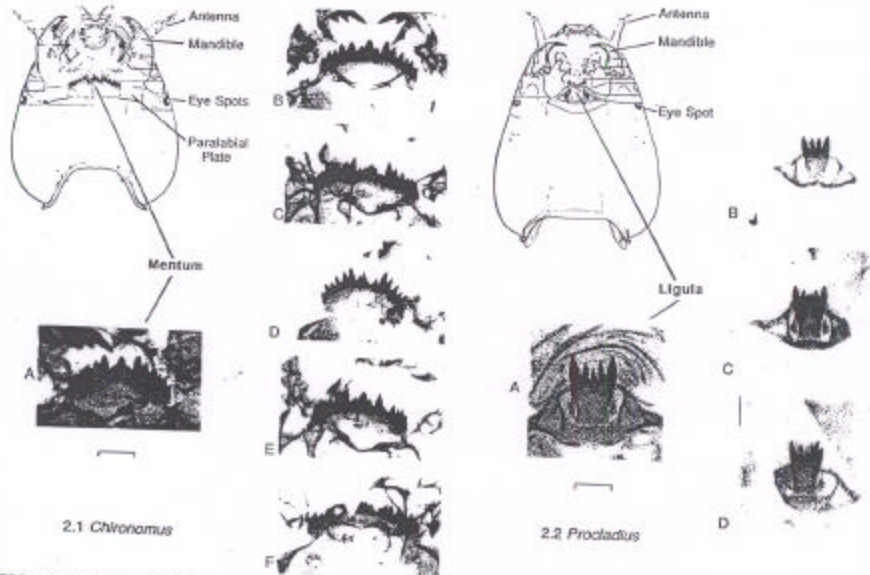


Figure 2. Slide template used to position specimens in the center.

7. Allow the media to glaze over and then add 3-5 drops of additional media with a probe. View under the dissecting scope to ensure that mouthparts are facing up and the head is still correctly positioned. Reposition as necessary. Place a cleaned coverslip on top of the mounted head capsules. View under the dissecting scope to ensure that mouthparts are facing up and the head is correctly positioned. Reposition as necessary. If media does not flow to the edge of the coverslip, additional media may be added at the edge. It will flow under the coverslip by capillary action. Excessive media can be removed with alcohol when the slide has dried.
8. Label the slide with stickers provided. Include your name, date, and title "chironomid head." View the slide, pay close attention to the mouth parts. If properly (luckily) done, the mouth parts will be readily visible and you can assess tooth condition. As the media dries, the head will "clear" and mouth parts will become more apparent. When done, store slides on the back table to dry and view next week. Indicate on board the origin of your chironomid (above or below

discharge), whether the teeth of your specimen were normal or abnormal, and, if abnormal, indicate deformity type and quantity.

*Deformed Chironomids in the Buffalo River*



**FIG. 2.1** Diagram of *Chironomus* spp. head capsule (modified from Oliver and Roussel 1983), and normal (A) and abnormal (B - F) menta (mentum = hypostoma, labial plate). Scale bars (photographs) = 100  $\mu$ . A. Normal. Six lateral teeth each side, trifid medial teeth, symmetrical throughout. B. One missing lateral tooth. C. Notably asymmetrical medials with small accessory teeth. D. Gap within medials. E. Gap within laterals, with one missing lateral tooth. F. Extensive deformities of medials, and missing laterals on both sides (multiple mentum abnormalities).

**FIG. 2.2** Diagram of *Procladius* spp. head capsule (modified from Oliver and Roussel 1983), and normal (A) and abnormal (B - D) ligulae. Scale bars = 100  $\mu$ . A. Normal. Five teeth, symmetrical. B. Four symmetrical teeth. C. Six symmetrical teeth. D. Asymmetrical forked and extra teeth.

Created by:  
Joseph Butner  
Scouty Brokeport