

Sorting, Identifying and Counting Freshwater Macroinvertebrate Protocol

Lab Guide

Task

Sort macroinvertebrates into taxonomic groups.

Count or estimate the number of individuals in each taxon.

Preserve three voucher specimens of macroinvertebrates for each taxon (optional).

What You Need

- Several basting syringes (20 ml with end approximately 5 mm diameter)
- Large plastic forceps
- Small forceps
- Several magnifying glasses or loupes or boxes
- Several eyedroppers (3 ml with end approximately 2 mm diameter)
- Many clear plastic jars (0.5 to 3 L) labeled (as you go) with the name of a taxon
- One to four spray bottles (1 to 2-L)
- At least 2 white trays
- Two sieves (0.5 mm (or smaller), and one between 2 and 5 mm) (optional)
- Two – six buckets
- Many small plastic vials
- Small specimen bottles with labels filled with 70% ethanol with lids that are sealing or covered with paraffin
- Permanent markers
- Pencils
- Latex gloves
- Macroinvertebrates identification keys
- Freshwater Macroinvertebrate Identification Data Sheet*

In the Lab

1. Fill out the top portion of the *Freshwater Macroinvertebrates Identification Data Sheet*.
2. Put on gloves.
3. Use a basting syringe or forceps to pick out large organisms from your buckets. Put these organisms in a tray.

Note: You have the option to combine all samples together to sort, identify or keep the samples separated by habitat type.

4. If you have rocks in your sample, take them out of the bucket and use the spray bottle to rinse the rocks over the sample bucket before discarding the rocks.

5. If the water in your buckets is clear, free of debris, and rather a small amount, pour sample on tray to sort. Go to step 13.
6. If you have a lot of water, sediments or debris, pour the samples through the sieves. Place the sieve with the finer mesh size below the other sieve. Hold the sieves inside the top of a clean bucket.
7. Gently and slowly pour the water from the bucket containing the organisms into the sieves. If a sieve is clogged, gently tap the bottom of the clogged sieve to allow water to escape.
8. Every so often, transfer and rinse the contents of the sieves into trays using a squirt bottle. Other students can start sorting organisms in the trays.
9. Rinse twigs over the sieves.
10. Put twigs in a tray with water. Examine twigs for macroinvertebrates.
11. Rinse the bucket several times with your spray bottles and pour the water down the sieves.
12. Invert each sieve over a tray and squirt water on the back of the sieve to remove contents.
13. Work in teams. Use identification keys to identify individuals to the most detailed level possible (Phylum, Class, or Order required and Family, Genus, or Species if possible). Keep in mind that appendages like legs and antennae may be missing because they may have broken in the net or the sieves.
14. Use the vials to sort organisms into different taxa. If you do not know the taxon of an organism, place in a separate vial to examine later under a dissecting scope or with the help of an expert.
15. If organisms are large and clinging to debris, use forceps to gently pull them free. If they are floating or swimming, use a basting syringe or an eyedropper to catch them.
16. If different teams are sorting and identifying organisms, combine the vials of the same taxon. Do this for all the taxa.
17. To count the number of individuals in each taxon, isolate organisms a few at a time using forceps, an eye dropper, or a basting syringe and transfer them into another jar as you go. Keep a tally on paper.
18. Count macroinvertebrates in each taxon up to 100 individuals. If you have more than 100 individuals in a taxon, you can do three things:
 1. report >100,
 2. continue counting,
 3. use the *Freshwater Macroinvertebrate Sub-sampling Field Guide* to estimate the total number of organisms of this taxon.

Note: If possible, count all individuals since it is more accurate than sub-sampling, but sub-sampling is more informative than reporting >100.

19. As you count, look closely at the individuals to make sure that there are no mistakes in identification. If you find an individual that belongs to a different taxon, notify the student who is doing the count for that taxon and transfer the organism.
20. Report the total number of organisms found for each taxon on the *Macroinvertebrates Identification Data Sheet*. Include organisms that were counted at the site but could not be collected because they escaped.
21. Optional: For each taxon you identify, preserve three individuals as voucher specimens for future reference. Place the three organisms in a specimen bottle containing 70% ethanol solution.
22. Label the bottle with:

Name of Sample Site

Date

Phylum, Class, Order (family, genus and species, if known)

70% ethanol

23. Return remaining live macroinvertebrates to the water.