

Aquatic Invertebrates Investigation

Introduction

Not only is investigating aquatic habitats super fun, macroinvertebrates help determine the health of the water and help lead participants to becoming more mindful about the importance of water quality.

Background

Aquatic insects are foundational in the aquatic food chain. Scientists often use macroinvertebrate populations to learn more about a system. Macroinvertebrates are used as indicators of water conditions for several reasons. 1) They are easy to collect. 2) Many, called sensitive, cannot survive changes in stream conditions such as the introduction of pollution, high levels of sediments, high water temperatures, or low levels of dissolved oxygen (environmental stressors). Other species of macro-invertebrates, called tolerant, can survive in waters with changes in stream conditions and environmental stressors. 3) Many stay in a small area most of their lives. The sensitivity and feeding groups of macroinvertebrate samples offer clues to how the aquatic system is functioning.

Objectives

Participants will:

- Understand aquatic insect structure and become familiar with key identification features
- Explore areas of local creek or river channels
- Identify unique characteristics of insects in an aquatic ecosystem
- Use field guides to conduct research

Materials

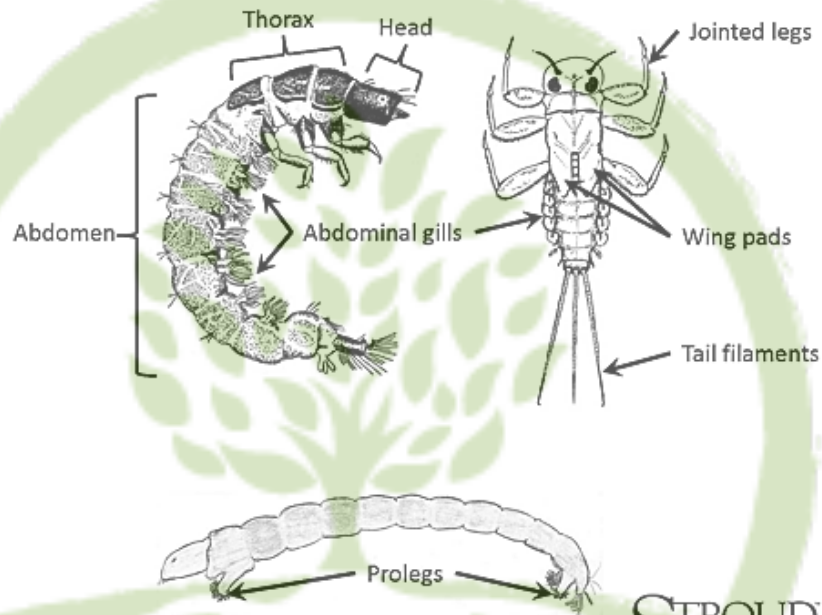
Insect cards, or laminated identification sheets, hand held magnifiers, including Discovery Scopes (optional), containers to hold water and organisms (a white dishpan works great), small catch nets, small basic craft paint brushes, Petri dish or small plexiglass viewing container with lid

Procedures

1. Water safety is paramount, and the site should be safe from swift currents and steep river channels. For safety reasons, macroinvertebrates may be collected by an adult and viewed by participants in large clear tubs or containers that can temporarily keep macroinvertebrates out of their natural aquatic home. **Remember, the aquatic creatures depend on natural water conditions for their survival, so keep them in the water they were found in.**
2. Before venturing out into the wilds, the instructor should preview the outing to locate an area or areas where macroinvertebrates may be found.
3. If the riverbank and current is safe, participants may just turn rocks over on the water's edge without wading into the river/creek/water body. Extreme caution should always be exercised when working with participants near water. If you are comfortable with participants getting in the water (up to their calves), they should wear gumboots or water shoes and approved life vests at all times!
4. However specimens are collected, use macroinvertebrate cards made by LaMotte, or other printable resources for identification. A basic chart can be found and downloaded from the internet, or laminated guides can be purchased from Acorn Naturalist. Or use a life cycle and habitat manual (Stroud Water Research Center manual is highly recommended).
5. Handle the living creatures with care and honor.
6. One of the best methods of collection is to fill the tub with water and to place large rocks taken from a moving stream or river's edge in it. Carefully place the rocks into the tub. By lifting and holding the rock out of the water, one may begin to see signs of movement and some will be seen swimming around. Use the paint brush to transfer the critters into a water-filled Petri dish or clear container, or use the dish to scoop them out of the tub. Then use a hand-held magnifier to see the details of the critter, and match it with the ones shown on the chart.
7. Carefully return specimens to their home before the collected water becomes too warm. Set, do not toss or drop, the rocks back into the water from which they came. Some critters may stick to the equipment, so be sure all critters make it home safely.

Major Characteristics of Aquatic Larvae

GLOSSARY
Abdomen: posterior body segment of insect
Filaments: hair-like structures
Jointed leg: true legs, legs capable of bending
Lateral: at the side
Portable case: structure made of leaves, twigs, or sand that some caddisfly larvae carry with them
Posterior: tail end of the body
Prolegs: short, stumpy leg-like structures (not jointed)
Protrusion: part of the body that sticks out
Segment: a section of body
Ventral: underside
Wing pads: developing wings, often W in shape



Additional Resources and References

Macroinvertebrates, Bay Area Restoration Council

<http://hamiltonharbour.ca/resources/documents/Macroinvertebrates.pdf>

Aquatic Macroinvertebrates-Environmental Education Products, La Motte

<http://www.lamotte.com/en/education/macroinvertebrates>

Nelson, Dennis, et al. ProjectWet, Water Education For Teachers. Bozeman, MT: The Watercourse/ ProjectWet International Foundation and the Council for Environmental Education, 2008.

Stroud Water Research Center. "Identification Guide to Freshwater Macroinvertebrates".

http://www.stroudcenter.org/education/MacroKey_Complete.pdf

Utah State University. Bugs Don't Bug Me. Logan, UT: Water Quality Extension

<http://extention.usu.edu/waterquality>