



# Macroinvertebrates

## What is a macroinvertebrate?

The tiny animals that live in streams are called aquatic **macroinvertebrates**. These macroinvertebrates include many types of insects as well as other animals such as worms, mollusks, and tiny crustaceans.

## Where do we find them?

Most of the macroinvertebrates you will sample make their home in the rocks, leaves and sediment of stream beds. These organisms have many special adaptations that allow them to live in demanding environments. When you sample from riffles and fast-moving areas, look closely for features that help the animals hold on in the current, such as hooked feet, suction cups, and flat bodies. Animals that live deep in the mud may have adaptations for a low oxygen environment.

## Do they spend their whole life in water?

Some macroinvertebrates complete their lives in a few weeks; others may live for several years. Usually, just the immature phases of insects' lives (larvae and nymphs) are spent in the water. Some mayflies live as nymphs for 2-3 years in water. But, when they hatch into adults, they have just 24 hours left. In that time they must find a partner, mate and lay their eggs before they die. They don't even have time to eat.

Other insects, such as water boatmen and backswimmers, spend their whole lives in the water. Most non-insect macroinvertebrates, such as amphipods (scuds), gastropods (snails) and bivalves (clams and mussels) spend their entire life in the water. Some mussels have been found to live for 100 years!

## Why do we care about macroinvertebrates?

The types and abundance of macroinvertebrates in your stream are important to know for two reasons:

- (1) They are indicators of water quality. Different macroinvertebrates tolerate different types of stream conditions. Depending on what we find, we can make predictions about water quality.
- (2) They are an important part of aquatic and terrestrial food chains. Each macroinvertebrate plays a role, or function, in a stream.

## How do we interpret our results?

Pollution tolerance indexes (PTI) provide a relatively quick means for assessing stream quality and help us to understand pollution tolerance ranges for organisms. However, they need to be considered along with physical and chemical data in order to provide a comprehensive picture of water quality.

To evaluate the health and productivity of a stream, biologists (like us!) look at the species that live there. Different species have different tolerances to pollution. If many pollution-intolerant species, such as **stonefly** and **caddisfly nymphs**, are present then the water quality is probably quite good. Although the presence of certain species indicates good water quality, the absence of these species does not necessarily indicate bad water quality. Other factors besides pollution may account for their absence. For example, they may have metamorphosed (changed) into adults and flown away.



The name says it all. "Macro" means large (or large enough to be seen with the naked eye). "Invertebrate" means lacking an inside skeleton, like we have. Instead, they have an exoskeleton - a protective, supportive case on the outside of the body.



Chemical samples provide a "snapshot" of the water quality at a particular moment. Macroinvertebrates provide a "video." Because they remain in the same area over a long period of time they enable biologists to assess both recent and more historic water quality.