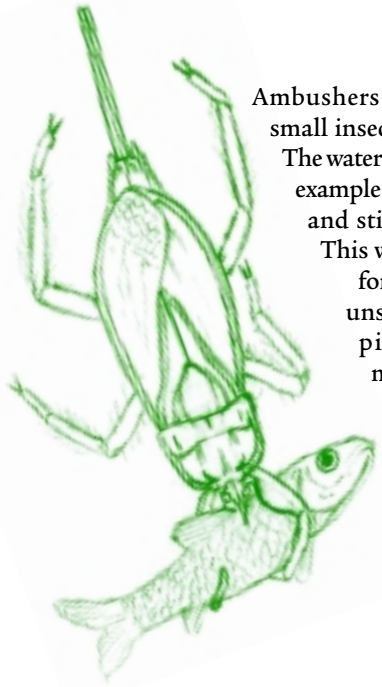
SMART

*Angler's Notebook*

by Walt Dietz

# Macroinvertebrate Feeding Frenzy

We usually don't give much thought to how aquatic macroinvertebrates (animals without backbones) get their food. They often go unnoticed because of their small size. But they still have to eat to survive. And just like any other animal group, they have different forms of feeding. Many are passive herbivores. They feed on plant material as a deer would munch on grass. Some are voracious predators that hunt prey as a lion hunts. There are even scavengers that feed on detritus. Let's take a closer look at how these aquatic critters feed.



Ambushers lie in wait until a small insect or fish swims by. The water scorpion is a perfect example with its camouflage and sticklike appearance. This water bug uses long forelegs to strike out at unsuspecting prey. Its piercing proboscis makes the perfect straw for sucking out body fluids.

## Predators

Predators are mobile animals that kill and eat their prey. Pursuit hunters like the predaceous diving beetle chase their prey. They are good swimmers, and they pursue a variety of aquatic animals and small fishes. The larvae are sometimes called "water tigers" because of their voracious nature. They even eat their own kind if they get the chance.

Some dragonfly nymphs are searchers. They move along the bottom in search of less mobile prey. These dragonflies have great eyesight and long legs that let them navigate the muddy bottom. They also have a long spoonlike lower lip called a labium. They extend it with lightning speed to capture prey. Crushing mouthparts then make quick work of the meal.

## Parasites

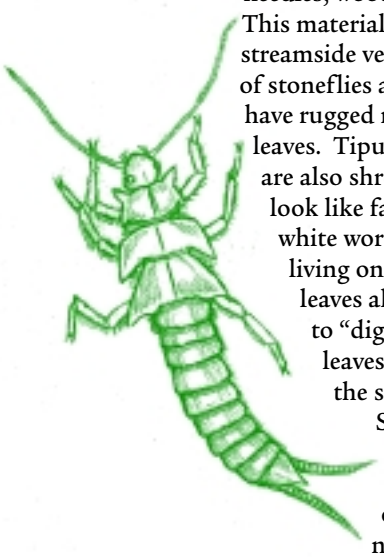
Parasites get their food by taking advantage of other animals. There are many types and almost every aquatic animal has one. The spongillafly larva feeds on freshwater sponges. It uses needlelike mouthparts to suck cells from sponge tissue. Water mites cling to the feet or hide under the wings of water bugs. They suck body fluids through a special mouthpart, called a capitulum. Parasitic flatworms burrow and live in the body of dragonflies. Even the smallest critters have parasites. Even the tiny rotifer has tinier flagellates living inside its bladder. Other aquatic parasites include leeches, fish lice and larval clams called glochidia.

## Grazers

Grazers feed on algae, fungi or bacteria attached to rocks and other surfaces. Grazers have specialized stomachs to help digest plant material. Snails scrape algae from rocks and plants with a rasplike tongue called a radula. The water penny is another type of scraper. It has a flattened body and suction cups on its feet. These adaptations help it cling to rocks in the riffles. Many mayfly nymphs are also scrapers.

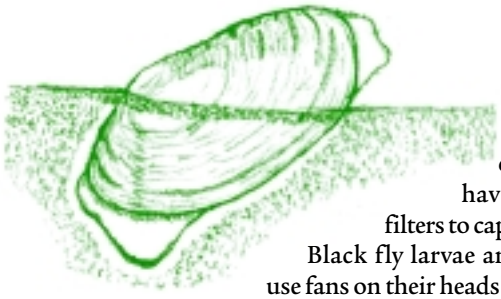
## Shredders

Shredders eat large (greater than 1 mm) pieces of organic materials, like leaves, evergreen needles, wood and other plant parts. This material comes primarily from streamside vegetation. Some species of stoneflies are shredders. They have rugged mouthparts to chew up leaves. Tipulid, or crane fly, larvae are also shredders. Cranefly larvae look like fat, olive-green to pale-white worms. Bacteria and fungi living on the surface of the leaves also get eaten. They help to "digest" and soften the leaves and other materials in the shredder's stomach. Shredders are very dependent on streamside vegetation. The wastes of shredders provide nutrition to another group—the collectors.



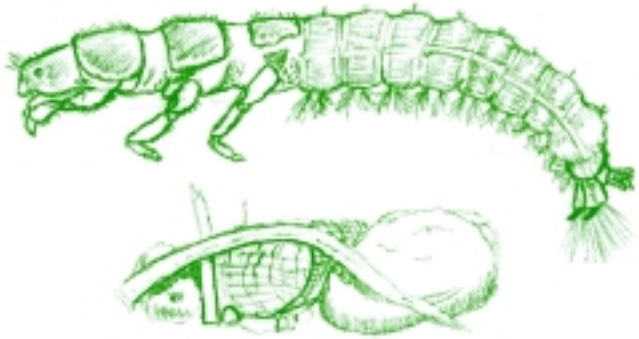
## Collectors

Collectors gather or filter food from the water. Collectors feed on smaller (less than 1 mm) pieces of organic materials, which drift in the current. These smaller pieces may have passed through a shredder upstream. Freshwater clams and mussels are an efficient example. Filter feeders strain food particles as an aquarium filter cleans water. An inhalant siphon sucks water into the cavity and over the gills. Algae, plankton and other bits of food are filtered. The water is then shot out an exhalant siphon. This system allows bivalves to eat and breathe at the same time!



Some collectors have external filters to capture food. Black fly larvae and midges use fans on their heads to capture food particles in the current. The fans are then cleaned off in their mouths. There are other types of suspension feeders that use special appendages. They include protozoa, bryozoa (moss animals), rotifers and water fleas.

Other aquatic animals have unique ways of capturing suspended food. They trap their dinner. Some caddis larvae build nets similar to a spider's web. The net faces into the current and catches detritus. The caddis larva eats the detritus and net at the same time. It then turns around and spins a new one.



## Symbionts

Neither animal is harmed in a symbiotic relationship, but one or both may benefit. The peritrich is a protozoan that enjoys this lifestyle. It attaches to crustaceans, turtle shells and insects. There's nothing like a free ride to new food and fresh oxygen! Some peritrichs live on the tentacles of hydra (related to jellyfish). Life works out great in this relationship. The peritrich eats food caught by the hydra. It, in turn, keeps the hydra's tentacles clean.

There are even symbiotic plants. One type of alga lives in the body of hydra. The alga produces food and oxygen. The hydra provides carbon dioxide and a safe place to live. What a way to go through life!

No matter how you slice it, aquatic macroinvertebrates have interesting ways to get food. Take a close look at one of these critters the next time you are near a stream or pond. Take a minute to turn it over. Look at its mouth parts and see if you can figure out how it lives. You just might impress your friends with your guess.