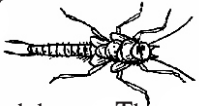


# Guide to Common Aquatic Insects

## Plecoptera and Ephemeroptera

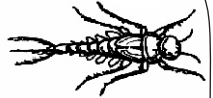
### Plecoptera: Stoneflies



Stonefly nymphs live on the bottoms of streams and lakes. They often have gills, and have two long cerci on the tip of the abdomen. They are usually herbivores. The adults have wings with numerous veins, which wrap around their body.

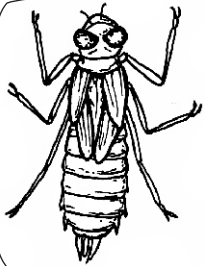
### Ephemeroptera: Mayflies

Young mayflies, called naiads, live in lakes and streams where they usually feed on algae. You can tell them apart from other immature insects because they have 7 pairs of gills along the side of their abdomen. They also have three long cerci at the tip of the abdomen. When the adults emerge, they live for just one day, long enough to mate.

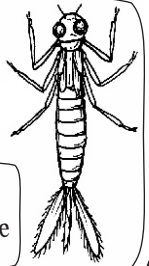


## Odonata: Flying Predators

### Odonata: Damselflies and Dragonflies



Dragonflies and damselflies are common around aquatic habitats, and their nymphs are important predators. Damselfly nymphs (right) are thinner than dragonfly nymphs, and they have long, feathery gills at the tip of their abdomen. Dragonfly nymphs (left) respire through their anus, sucking water inside for oxygen transfer. Adults have simple chewing mouths, but the nymphs have an elongated, jointed labrum that can shoot out and grab prey. Adult dragonflies and damselflies have large eyes and are extremely agile fliers.



## Megaloptera: Net-Winged Insects

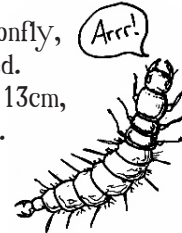
### Sialidae: Alderflies

Smaller than the fishflies and dobsonflies, alderflies are often dark brown or black. The larvae are predators that lurk under stones and wait for small insects. Unlike fishfly and dobsonfly larvae, they have one filament at the end of their abdomen.



### Corydalidae: Dobsonflies and Fishflies

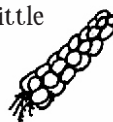
If you find an adult male dobsonfly, you can't help but be impressed. They can have a wingspan of 13cm, with gigantic, sharp mandibles. The female, however, is the one you should be wary of. The mandibles on the male are actually too long for him to effectively bite anything. The female, with her short plier-like mandibles can deliver a sharp nip. Dobsonfly larvae are ferocious predators that hunt along the bottom of streams. The larvae are often called hellgrammites. Fishflies are similar to dobsonflies, but the males have smaller mandibles. Instead, they might have long, feathery antennae.



## Trichoptera: Hairy Wings

### Trichoptera: Caddisflies

When you first spot a caddisfly larva, you may think that it is a stick or a bit of debris. Young caddisflies build homes that they carry on their back, using silk to attach stones, sticks, or other objects. They can be herbivores, omnivores, predators, or detritivores. They pupate in a cocoon made from silk. Adult caddisflies look a lot like moths, and they are closely related. One main difference is that instead of scales, caddisfly adults have little hairs on their wings.



Made by Michele Lanan, 2009. This is not a comprehensive guide, just a list of some of the more common aquatics that you might find. The drawings are just sketches, and may not be entirely accurate. Feel free to copy, remix, update, distribute, etc. Lastly, if you want to try to pick up a belostomatid, the best way is to hold it firmly by the sides of the pronotum. Try this at your own risk. You may want to consult the Schmidt Pain Index beforehand.

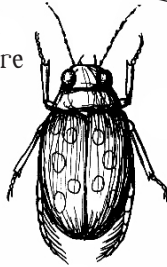
# Coleoptera: Water Beetles

## Dytiscidae: Predaceous Diving Beetles

These attractive beetles are often dark in color, and sometimes have yellowish or orangish spots. They are typically 2-3cm long, and are very good swimmers.



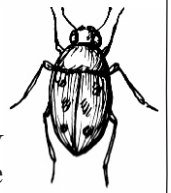
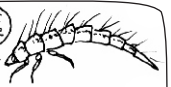
Their hind legs have many fine hairs, and are used as paddles. Like the adults, the larvae are predators, and use their long, sharp pincers to grab prey. Their face is an odd, square shape and they have many fine hairs on their body.



## Haliplidae: Crawling Water Beetles

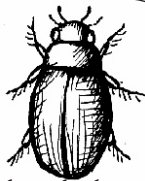
These beetles aren't very good at swimming- they do a sort of doggie paddle. They prefer to crawl on the bottom or around the shore. You can recognize them by looking for the huge coxal plates on their underside that they use for additional air storage. They can be a variety of sizes and colors. The adults eat insect eggs, algae, and small invertebrates, while the larvae eat only algae.

Sometimes I don't have hairs!



## Hydrophilidae: Water Scavengers

These beetles have short clubbed antennae. The long thin things you see on the head are actually the palps, and you can use this to help recognize them. They look similar to Dytiscids, and vary in size and color. They carry air on the underside of their body (not under the elytra), and are scavengers. The larvae are predators.



## Gyrinidae: Whirligig Beetles

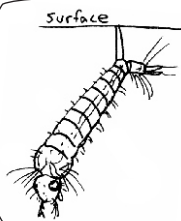


When you look into a pool and find a dozen shiny black beetles spinning around the surface at about 100 MPH, you've found whirligig beetles. The middle and hind pair of legs are highly modified paddles with hairs that fold on the up-stroke and fan out on the down-stroke. But best of all, their eyes are divided, so that they have two looking up and two looking down into the water! The adults are scavengers, eating insects that drown and other debris. The larvae are predators, eating other insects.



# Diptera: Flies

## Culicidae: Mosquitoes



Everyone's favorite insect, mosquitoes breed where there is standing water. Females lay rafts of eggs on the surface, and the larvae hang upside-down with a siphon for air. Adults are blood-suckers, of course, but the larvae use brushes on their mouths to scoop up bacteria and algae.



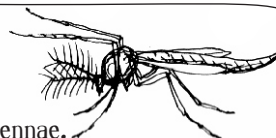
## Simuliidae: Black Flies

Adult black flies can be a nuisance, biting mammals to feed on their blood. The larvae, however, are filter-feeders that sift algae and bacteria out of the water. They attach to rocks in the fastest parts of streams.



## Chironomidae: Midges

These flies resemble mosquitoes, but they don't have scaly wings, and the males have very fluffy antennae. In some species, the larvae (called bloodworms) have hemoglobin, making them look red. This helps them survive in low-oxygen environments and polluted habitats. They are detritivores.



## Help! I found a larva!



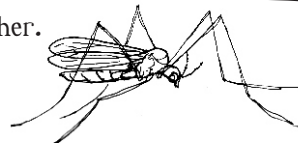
Except for a few distinctive creatures, many aquatic insect larvae are difficult to identify on sight. If you want to find out what a particular larva is, you will need some insect books with keys, and a dissecting microscope.

However, it is easy to tell the difference between beetle larvae and fly larvae. Just look at the body- if it has no legs, it's a fly!



## Tipulidae: Crane Flies

No, it's not a giant mosquito, and it doesn't eat mosquitoes either. This large fly with slender legs might feed on nectar, or not at all. In some species, the larvae are aquatic and feed on detritus.



There are many other aquatic flies and beetles out there, so if you don't find what you are looking for on my list check out some insect books!

# Hemiptera: the true bugs

## Hydrometridae: Water Measurers

About 1 cm long, brown or gray, with skinny legs and an amusingly long head. They hang around the edges of marshes and ponds and will walk on water. They are predators of small insects and will also scavenge.



## Corixidae: Water Boatmen

These insects look a lot like backswimmers, but they swim right-side up. Their hind legs are covered with hairs and work like oars. Unlike many of these bugs, they are herbivores and like to dine on water plants and algae. They always have fine little stripes on their body.

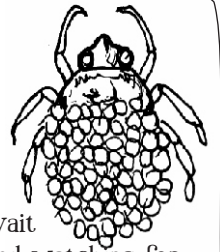


## Belostomatidae: Toe Biters, Giant Water Bugs

These critters can be huge- up to 12 cm, and the biggest ones have been reported to catch birds in



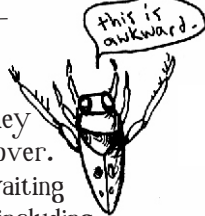
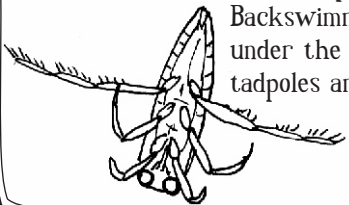
Thailand. They don't bite, they stab, using their powerful beaks to inject digestive juices. It hurts a lot. Belostomatids are sit-and-wait predators, lurking in the muck and watching for other insects or small fish. Their strong front legs are used for grasping prey. The largest genus, *Lethocerus* (left) can fly and will sometimes show up at lights. In the smaller Arizona genus, *Abedus* (right) females lay eggs on the back of the male, who takes care of them until they hatch.



## Notonectidae: backswimmers

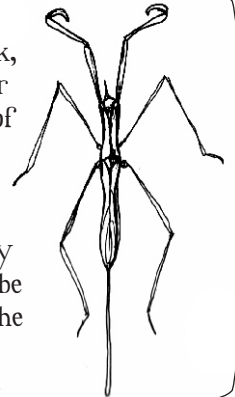
As their name implies, backswimmers swim upside-down in the water. They use their hairy hind legs as oars. Their top side (right) looks a lot like a water boatman, but without the fine stripes. They don't like to be right-side up and will quickly flip over.

Backswimmers are predatory, waiting under the surface to stab prey including tadpoles and other insects. They can occasionally bite humans, so take care when handling them.



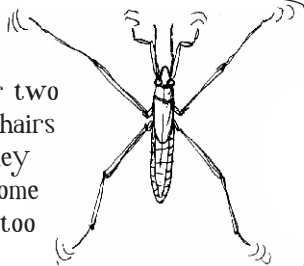
## Nepidae: Water Scorpions

Sometimes fat like a Belostomatid, sometimes thin like a walking stick, you can always recognize a water scorpion by the tube coming out of its back end! Water scorpions can hang upside-down in the water and breathe through this tube. They are predators, and grab prey with their front claws. Some can be almost 8cm long, if you measure the breathing tube.



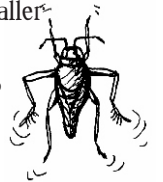
## Gerridae: Water Striders

Water striders use surface tension to skim on the surface of the water. Their first pair of legs is short, while the other two are long, and they are covered with fine hairs that make them virtually waterproof. They are predators that capture insects that come to drink, as well as anything that swims too close to the surface.



## Veliidae: Riffle Bugs

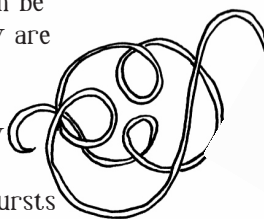
These little water striders are much smaller than most Gerrids, and they tend to be darker in color. They have shorter legs, and their body is wider below the head. Riffle bugs are also predators on small insects, and they like to eat mosquitos.



# Other aquatic creatures

## Nematomorpha: Horshair Worm, Gordian Worm

This awesome parasite shows up in puddles, streams, and ponds, and can be more than a foot long! Harmless to humans (and fun to play with), they are parasites on insects including crickets, cockroaches, and grasshoppers. The hosts ingest the eggs of the worm, which develop into the worm inside the living insect. In at least one species, when the worm is ready to emerge it somehow changes the insect's behavior, compelling it to go to water. When the insect falls into the puddle or stream, the worm bursts out and swims away.



## Hirrudinea: leeches

You may occasionally find fresh water leeches in Arizona. They may feed on insects, snails, or aquatic vertebrates like fish and frogs.

