

# MACROINVERTEBRATE IDENTIFICATION GUIDE

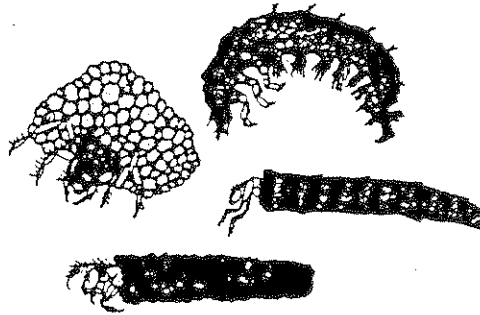
## GROUP ONE TAXA - pollution sensitive organisms

### Caddisfly larvae

Order Trichoptera

Key features:

- "worm-like" appearance
- 6 legs near head
- small tail hooks
- size range: 1/4" - 3/4"
- may be found in case



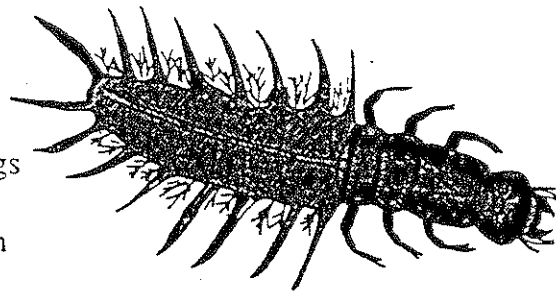
Caddisfly larvae can often be found on the undersides of stones, protected by a collection of small pieces of stone, shells, or other materials which are held together by an adhesive substance that caddisfly larvae secrete. They may also be found in cylindrical cases which they make and wear for protection. They will retract into this case when threatened or startled. Body color of these larvae varies from yellow and green to brown. Note: These larvae tend to curl up slightly (as pictured) when placed on a flat surface.

### Dobsonfly larvae

Family Corydalidae

Key features:

- set of "pincers"
- tail hooks
- stout body with 6 legs
- lateral appendages
- with gills underneath
- size range: 3/4" - 4"



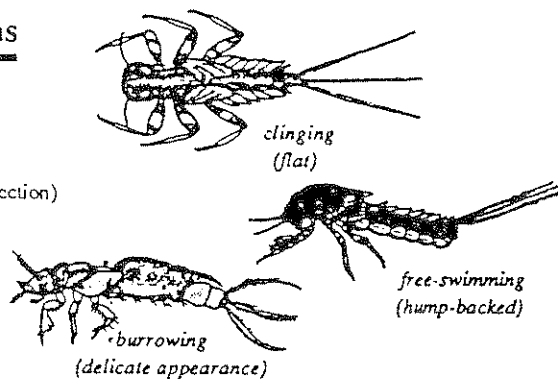
Dobsonfly larvae are often found clinging to rocks in the more swift areas of the riffle. These larvae are predacious and spend much of their time hunting for prey. They have stout bodies with tough skin. The appendages on the rear section of this organism are called "lateral appendages" and should not be mistaken for legs. If you find a dobsonfly larva in your seine, grasp it directly behind the head to pick it up. This makes it impossible for the larva to pinch you. Note: These larvae are also known as "hellgrammites."

### Mayfly nymphs

Order Ephemeroptera

Key features:

- 3 hair-like tails  
(these may break off during collection)
- 6 legs
- 3 basic types  
(pictured at right)
- size range: 1/4" - 1"



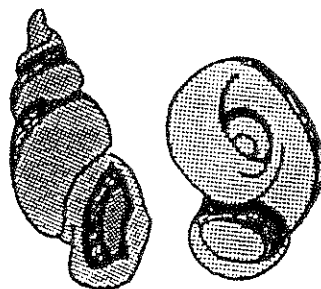
The three basic types of mayfly nymphs are classified by their life style. Burrowing nymphs burrow in the stream bottom sediments and are typically longer and lighter in color than the other types of mayfly nymphs. Clinging nymphs have very long, fragile tails, and are typically brown like the rocks they "cling" onto. Free-swimming nymphs are fast swimmers and are usually dark colored. Colors among these three groups vary, but tan, brown and black are common. All three types share the characteristic of three tails, though tail length may vary. Note: Tails are most easily seen on a submerged organism.

### Other snails

Class Gastropoda

Key features:

- shell opens to the right  
(see text)
- on most, a covering, called the operculum, indicates the snail is alive. If no operculum is present look for a fleshy "foot."



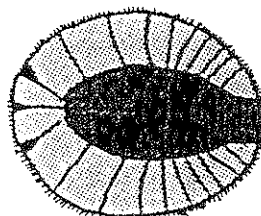
Snails in this category can be distinguished from pouch snails by the opening of the shell. To identify a snail, hold it with the tip of the shell pointed up and the opening facing you (as pictured). If the opening is to the right side, you have a snail that falls in the "other snails" category, also referred to as the "gill-breathing" snails. Note: The flat, coiled snails also fall in this group. Do not count empty shells.

### Water penny beetle larvae

Family Psephenidae

Key features:

- very flat
- oval or round in shape



Water penny beetle larvae look like fossils as they cling to the undersides of rocks. These larvae are tan, brown, or black and round like a penny (though smaller). They are flat and have six small legs on their undersides. They are best found by direct inspection of rocks at the river's edge.

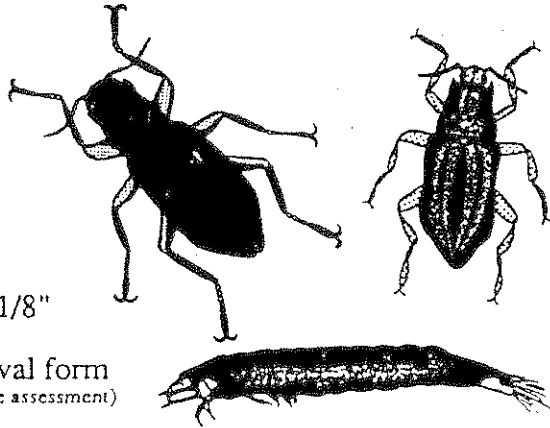
## GROUP ONE TAXA (continued)

### Riffle beetles

Family Elmidae

#### Key features:

- very small
- 6 legs
- size range: 1/16" - 1/8"
- may be found in larval form  
(this form is not counted in the assessment)



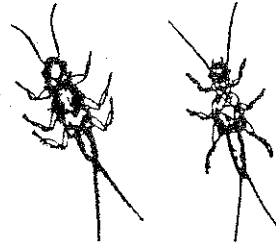
Riffle beetle adults are very small and hard to spot because they are dark colored (usually black) and blend in well with chips of slate and dead leaves in the seine. To find these beetles, watch the seine closely for movement. Be careful not to mistake small terrestrial beetles for riffle beetles. If you are uncertain if you have a riffle beetle or a terrestrial beetle, put it in water. If it seems well adapted to water and fits the rest of this description, it is probably a riffle beetle. Please be aware of the appearance of the larval form so you do not confuse it with other organisms. Note: the larval form's hard exterior, cylindrical shape and the small tuft of white filaments which are present at the rear of the organism.

### Stonefly nymphs

Order Plecoptera

#### Key features:

- two tails
- 6 legs
- size range: 3/16" - 1"



Stonefly nymphs are structurally similar to mayfly nymphs, except that stonefly nymphs have two tails instead of three. They also appear somewhat less fragile than mayflies, because they possess a more rigid-looking exterior. They are often yellowish and brown or black in color and may be brilliantly patterned.

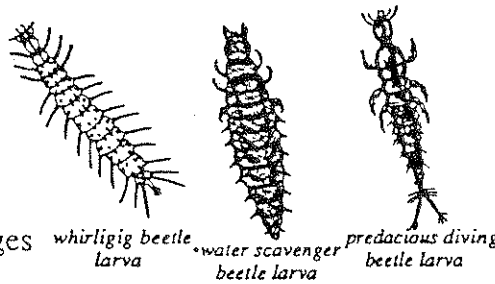
## GROUP TWO TAXA - pollution intermediate organisms

### Beetle larvae

Order Coleoptera

#### Key features:

- head more slender than that of the dobsonfly
- 6 legs
- some with lateral appendages
- size range: 1/2" - 1"



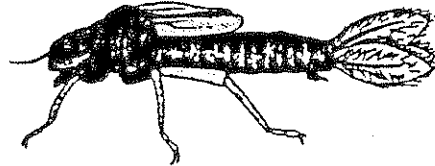
Beetle larvae look somewhat similar to dobsonfly larvae, but are generally smaller, lighter in color and more slender and tapered than the dobsonfly larvae. Often the head is darker in color than the rest of the body. Beetle larvae will not have the pronounced pincers that the dobsonfly larvae possess. The appendages on the back section (abdomen) of this organism, if present, are called "lateral appendages" and should not be mistaken for legs.

### Damselfly nymphs

Order Odonata

#### Key features:

- 6 legs
- 3 feathery tails
- size range: 1/4" - 3/4"



Damselfly nymphs are somewhat slender, with six legs and three feathery tail appendages which are flat or fan-like and usually oval in shape. These tails are readily visible if the organism is placed in water. Damselfly nymphs are most easily found around stream vegetation and calmer areas along the stream's edge.

### Dragonfly nymphs

Order Odonata

#### Key features:

- large eyes (like adult dragonfly)
- 6 legs
- often flat on underside
- no tails
- size range: 1/2" - 1 1/2"

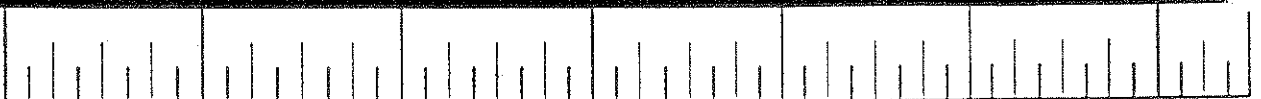


Dragonfly nymphs have the large eyes typical of the adult form and are often quite flat on their undersides. The abdomen may be stout and somewhat diamond-shaped. These nymphs do not have tails like those seen on the damselfly, mayfly, or stonefly nymphs. The body length may be up to 1", and the legs may be quite long. Some may look "spider-like". Like damselfly nymphs, they are most easily found near aquatic vegetation or in the calmer areas of the stream.

1" 2" 3" 4" 5" 6" 7"

Ruler

Inches



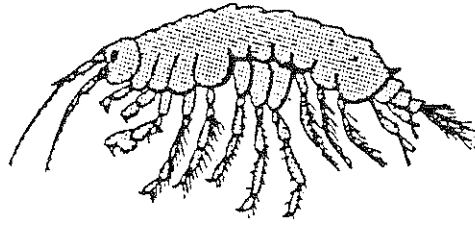
## GROUP TWO TAXA - (continued)

### Scuds

Order Amphipoda

Key features:

- "shrimp-like"
- usually quite small
- size range: 1/8" - 1/4"



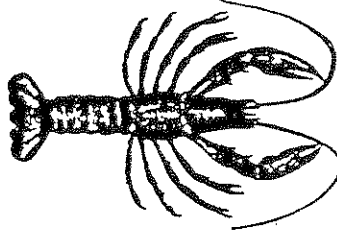
Scuds look basically like little shrimp and they actually belong to the same subphylum, Crustacea. They have a swimming motion similar to that of crayfish, propelling themselves backwards through the water with quick strokes of their tails. They may be slightly orange or green and are somewhat translucent and shiny with some silvery-gray coloration.

### Crayfish

Order Decapoda

Key features:

- 10 legs, 2 with claws (unless broken off)
- size range: 1/2" - 5"



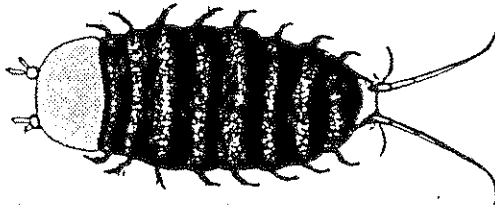
Crayfish are quite easy to identify. They closely resemble a small lobster. They can be found under loose rocks in the middle or the edge of the riffle. They will swim swiftly backwards if frightened or disturbed. Note: Crayfish are also known as crawdads.

### Sowbugs

Order Isopoda

Key features:

- segmented, flat body
- many legs
- size range: 1/4" - 1/2"



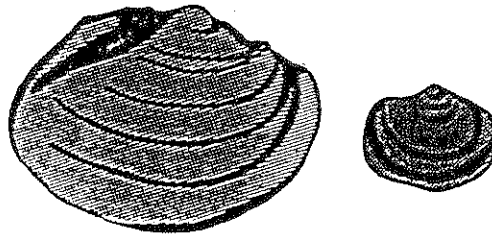
Sowbugs are gray and segmented, with an "armored" appearance. They look very similar to terrestrial sowbugs, also known as pill bugs. They have a sort of rectangular shape and many small legs. Sowbugs are most easily found along the stream's edge.

### Clams

Class Bivalvia (Pelecypoda)

Key features:

- 2 hinged shells
- fleshy "foot" (not visible if shells are closed tightly)
- size range: 1/8 - 5"



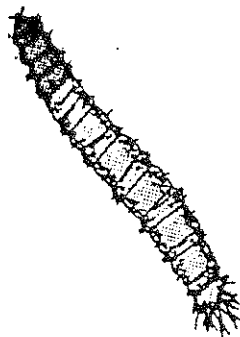
Clams are easily identified by their two shells which they will draw tightly closed when handled. Count only whole, live clams (those with both shells) in your assessment. Please do not force the shells open to see if you have a live clam. If the shell is tightly closed, you can assume the organism is alive. Note: Clams are usually buried in the stream bottom, so you should kick up the sampling area thoroughly. Also, as indicated by the size range, clams can be quite small and fragile, so look carefully and handle carefully. Do not count empty shells.

### Crane fly larvae

Family Tipulidae

Key features:

- worm-like and plump
- no legs
- small tentacles at one end (these will extend if you give the larvae a gentle squeeze)
- size range: 1/2" - 2 1/2"



Crane fly larvae are segmented and worm-like. They can be found in a large variety of colors, including white, brown, and green. Some are almost translucent, so you can see the insides of the organism move when it crawls. These larvae have a soft, fleshy appearance and very short tentacles (small "arms" or projections) at one end which can be seen more easily if the larvae is placed in water or squeezed gently. They range in length from 1/2" to 2 1/2" and may be as thick or slightly thicker than a pencil.

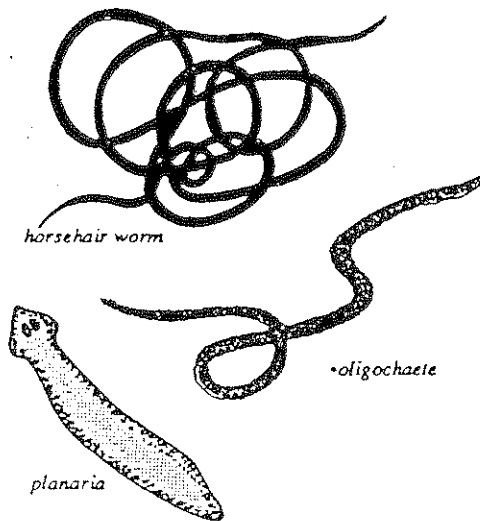
**Please note:** If you find an organism which you cannot identify with this guide, please feel free to draw a sketch of it on the back page of your assessment form (please make a note on the front to direct our attention to the back of the page). We will then attempt to identify the organism at the office and contact you to let you know of the correct identification.

## Aquatic worms

Phylum Annelida and others

Key features:

- no legs
- may be smooth or bristly
- may be round or flat
- size range: 1/4" - 5"



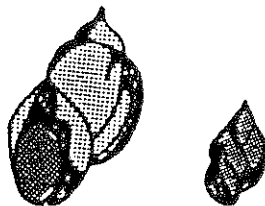
Many aquatic worms look similar to earthworms. In streams, you may also find very long, slender worms (such as horsehair worms), or flatworms, like planaria, which are small, sticky and soft-bodied (contrast with the muscular leech--see below). Many of these can slip through the seine quite easily, so watch closely. If you locate a worm and it is not a midge larva, crane fly larva, leech, or black fly larva, (see descriptions below and on previous page) it should be recorded under the category of "aquatic worms." These worms will typically "wriggle" in a snake-like fashion. Colors vary greatly in this category (red, white, and brown are common). Note: Worms do not have legs. If it looks like a worm, but has six legs (they may be small) it is not an aquatic worm -- check the other descriptions to correctly identify the organism.

## Pouch snails

Class Gastropoda

Key features:

- shell opens to the left
- presence of a fleshy "foot" indicates the snail is alive.



Snails in this category can be distinguished from "other snails" by the opening of the shell. To identify a snail, hold it with the tip of the shell pointed up and the opening facing you (as pictured). If the opening is to the left side, you have a pouch snail. Do not count empty shells.

## Black fly larvae

Family Simuliidae

Key features:

- quite small
- bulbous at one end
- constricted in middle
- size range: 1/16" - 1/4"



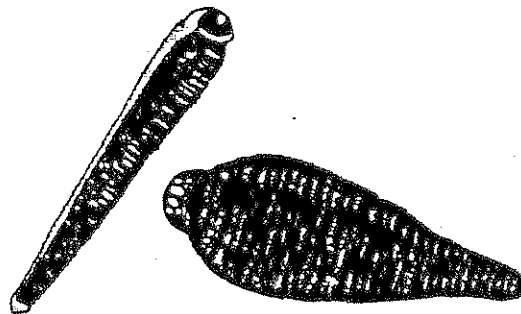
Black fly larvae are small and slightly bulbous at one end. They use this bulbous end to attach themselves to rocks and other material, usually in the faster flowing areas of the riffle. They may be found in groups, attached to stones and leaves and will often curl into a "u" shape when pulled off and held in the hand. Most larvae are gray or brownish in color.

## Leeches

Class Hirudinea

Key features:

- flat underside
- circular, sucking mouth
- size range: 1/2" - 4" when extended (see text)



Leeches are usually small, dark in color, and flat. They tend to cling to smooth stones and boulders with their circular "sucker." Leeches generally have the appearance of being segmented, with the lines running perpendicular to the length of their body. They may be long and tapered, or short and tear-drop shaped. They move by extending and contracting their tough muscular bodies, so they may appear quite long. Do not confuse these with the flat, soft-bodied planaria (see above).

## Midge larvae

Family Chironomidae

Key features:

- often very small, slender
- spastic squirming action (see text)
- size range: 1/8" - 1/2"



Midge larvae are often a distinct red color, though they can also be brown or even whitish in color. The best way to identify these larvae is by their small size and spastic squirming action. Note: These are very small, slender organisms, so watch your seine closely and make a point of inspecting leaves and other debris which may be present.

This identification sheet was designed by the staff of the Division of Natural Areas and Preserves with assistance from volunteer Anne Coburn for use with the Ohio Scenic Rivers Stream Quality Monitoring Program. Our thanks to Anne and to all our dedicated volunteers.