

Dedicated to the Memory of Commissioner Enoch S. "Inky" Moore Jr.

# PLAY

Spring  
2006

Pennsylvania • League • of • Angling • Youth



## Six Legs Underwater *by Walt Dietz*

Anglers sometimes wonder which bait to use when fishing. Most of us are familiar with baits like corn, cheese and dough balls. We might also use live baits like minnows or worms. But there is another bait. It's easy to collect. You can even wait until you get to your fishing spot to obtain it. Do you have any idea what it might be? Here is a clue: Lift a rock the next time you go fishing. Then take a close look.

You guessed right if you were thinking "aquatic insects." Bass, panfish, trout, carp, suckers and catfish eat aquatic insects. There are plenty of these tasty treats in our ponds, streams and rivers. There are lots of different kinds and sizes.

Aquatic insects are more than food for fish. They are also important in the aquatic ecosystem. Some are predators. They eat other insects and small fish. Other aquatic insects eat plants. Still others are the garbage collectors of the stream because they eat dead animals and litter (dead plants, leaves and debris). Some scientists even use aquatic insects to tell them about the quality of the water—just like a canary in a coal mine. They measure how many kinds of insects live in certain waterways and how many of each kind of insect live there.

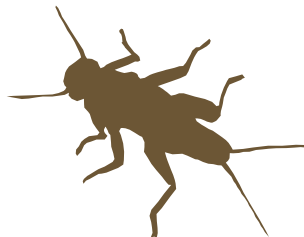
Let's take a closer look at aquatic insects—where they live, their life cycle and how we can use them for bait.



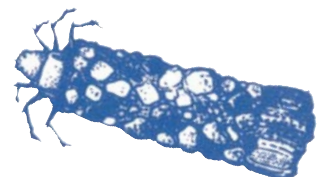
Which one should I eat?



Mayfly



Stonefly nymph



Caddisfly larva

# Family Affair

## Aquatic Insect Family Tree

Aquatic insects are like other insects. They have six legs, three body segments, antennae, and sometimes wings. They also have an exoskeleton (a skeleton on the outside of the body). That helps them move food and objects much heavier than their own weight. A caddisfly larvae can make and

carry its own house of pebbles and sticks everywhere it goes!

Aquatic insects are different in one way from the insects we see on land. They are adapted to live part of their lives underwater. This family tree shows some of the aquatic insect groups.

Kingdom:  
Animalia  
(animals)

Phylum:  
Arthropoda  
(jointed-foot invertebrates)

Class:  
Insecta  
(insects)

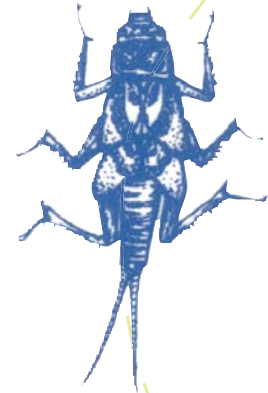
### Mayflies (Ephemeroptera)



Left to right: Burrowing mayfly nymph; minnow mayfly nymph; flat-headed mayfly nymph

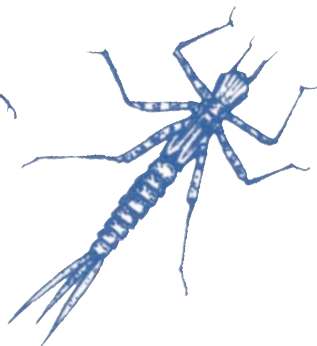
### Stoneflies (Plecoptera)

Giant stonefly nymph; roach stonefly nymph; common stonefly nymph



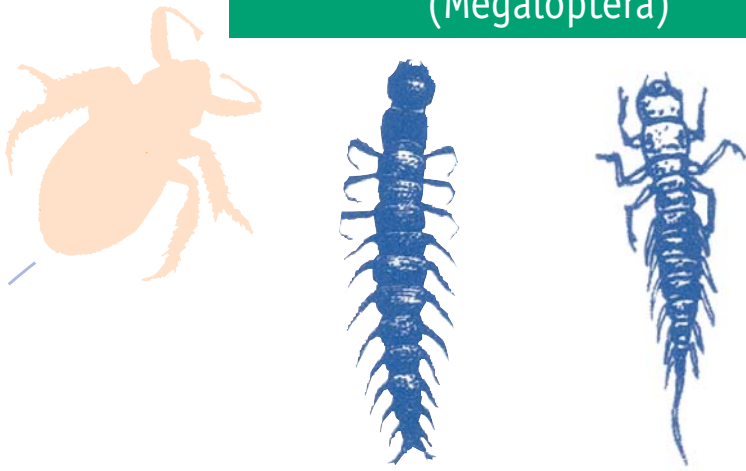
Above: Common stonefly nymph

### Dragonflies and damselflies (Odonata)



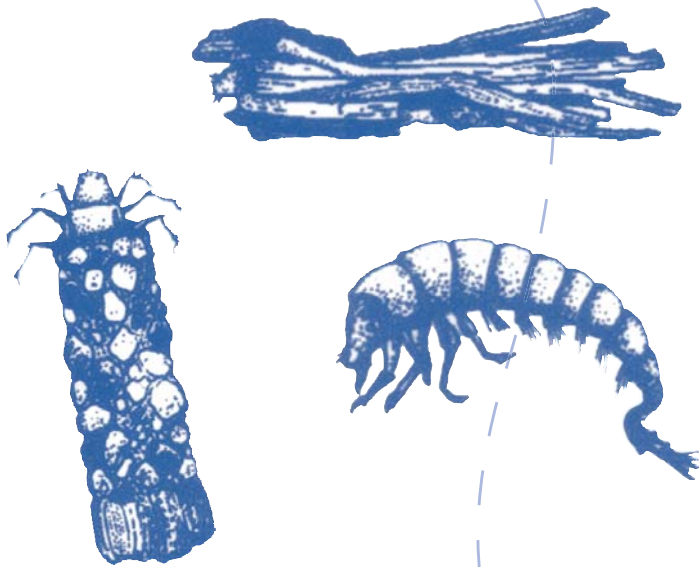
Left to right: Dragonfly nymph; damselfly nymph

## Alderflies, dobsons and fishflies (Megaloptera)



Left to right: Dobsonfly larva (hellgrammite); alderfly larva

## Caddisflies (Trichoptera)



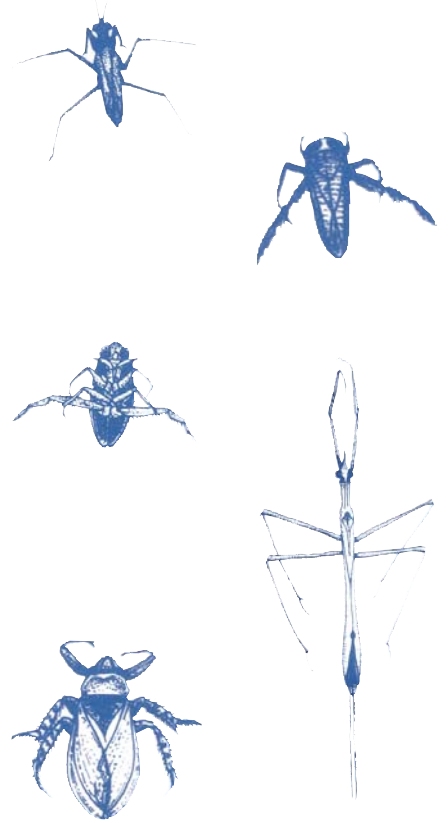
Top: Stick case-maker caddisfly larva  
Bottom left to right: Stone case-maker caddisfly larva; net-spinning caddisfly larva

## Beetles (Coleoptera)



Left to right: Water penny (larva); whirligig beetle; predaceous diving beetle

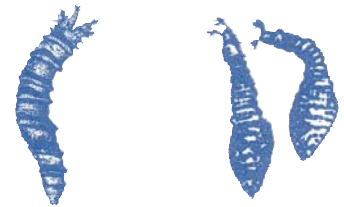
## True bugs (Hemiptera)



Top to bottom (left to right): Water strider; water boatman; backswimmer; water scorpion; giant water bug

## True flies (Diptera)

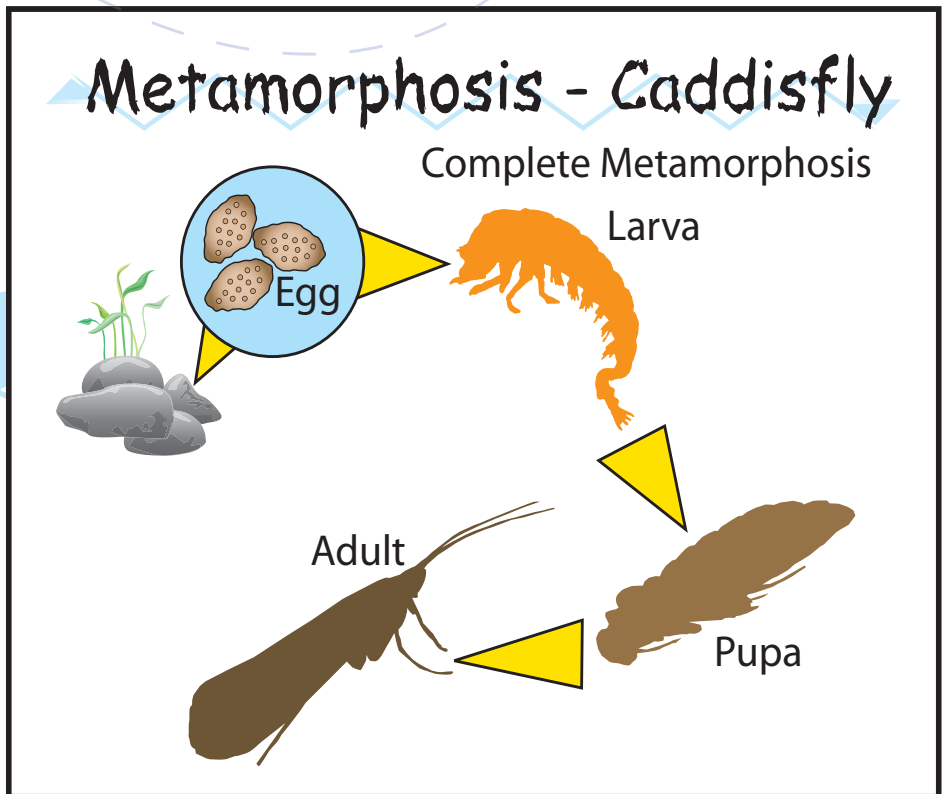
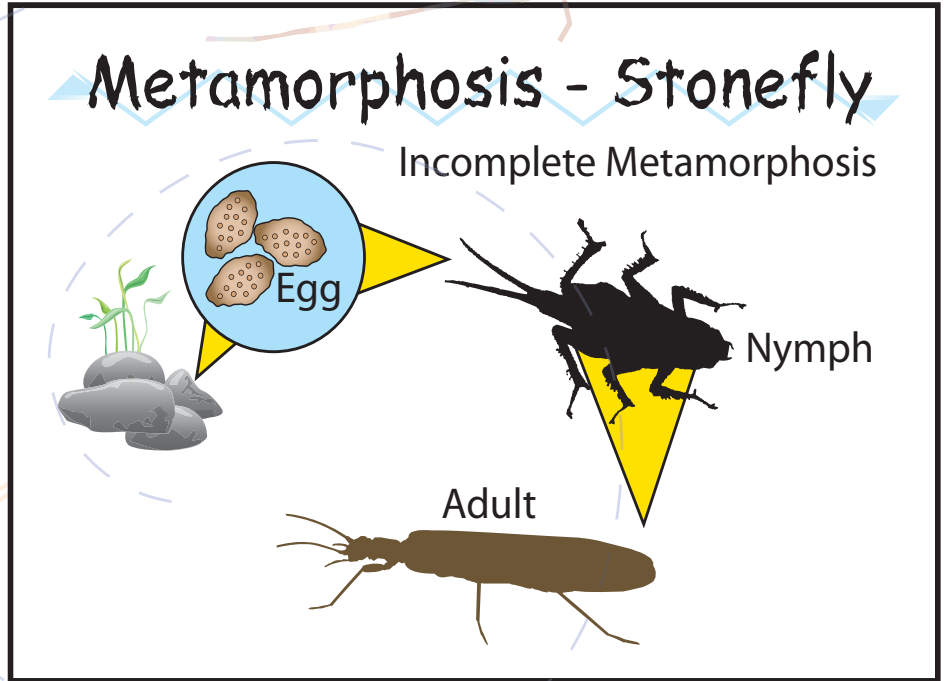
Cranefly larva; mosquito larvae; blackfly larva



Left to right: Cranefly larva; blackfly larva

# A Bug's Life

All insects go through a life cycle as they grow. Their bodies change through each stage. We call these changes metamorphosis (met-a-'morph-o-sis). Some insects go through three changes, called incomplete metamorphosis. They have an egg, nymph and adult stage. Other insects go through four changes, called complete metamorphosis. They have an egg, larva, pupa and adult stage. Sometimes we use the term "hatch" to describe a nymph or larva that is changing into an adult. The insect appears to be "hatching" right out of the water to become an adult.



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....metamorphosis.

(met-a-'morph-o-sis)

# A Wet World

Aquatic insects are different from land insects in some ways. They are adapted to underwater life during the larval or pupal stage. Some also live on or under the water during the adult stage. These critters, like the mayfly nymph, have gills. They may take in oxygen through the skin like the

chironomid, a type of fly larva. Some aquatic insects, like the mosquito larva, draw air through a tube. Others, like the adult backswimmer, carry a gas bubble.

Aquatic insects also have some unique feeding adaptations. Check out some of the ways these insects get their dinner.

## PREDATORS

Pursue or wait for prey



*Predaceous diving beetle*

## GRAZERS

Scrape algae, food and bacteria off rocks



*Water penny*

## SHREDDERS

Eat pieces of leaves and dead plant parts



*Giant stonefly nymph*

## COLLECTORS

Gather or filter food from the water



*Net-spinning caddisfly larva*

**PLAY**

Edited by: Art Michaels  
Layout, design, and illustration:  
Spring Gearhart  
PLAY subscriptions:  
Linda Covage  
Marty Miller

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# Match the Hatch

Knowledge of aquatic insects can make you a better angler. It helps to know which insect and life stage a fish is eating. Then you will know which bait or lure to use. Ever try a stone fly for trout? Or how about a hellgrammite for bass? They work great!

What do you do if you see trout feeding on caddisflies, or a bluegill feeding on whirligig beetles? Catch one of these

insects. Take a close look. Compare it to the lures in your tackle box. Then fish with the lure that looks most similar. You might choose a tiny brown caddisfly lure. Or maybe a small black popper. We call this process "matching the hatch."

Here is a quiz to test your aquatic insect knowledge. Match the larva or nymph to the adult stage.

## It's the Law

Did you know that fishing regulations also apply to aquatic insects?

They are considered "fishbait." A fishing license is required if you are 16 or older. Anglers are allowed to possess up to 50 combined species of aquatic invertebrates at a time, including mudbugs (damselfly and dragonfly nymphs) from rivers or streams. An unlimited number of mudbugs can be possessed if taken from ponds or lakes.

To learn more about aquatic invertebrates, check the following fact sheets on the Commission's web site, [www.fish.state.pa.us](http://www.fish.state.pa.us). Visit our Education Resources Catalog on the education page.

### Types of Aquatic Insects:

- Caddis Flies
- Dobsonfly
- Dragons & Damsels
- Mayflies
- Stoneflies
- Pond and Stream Study Guide

### Aquatic Insect Life Cycles & Adaptations:

- ENA or ELPA
- Macroinvertebrate Feeding Frenzy
- PLAY - Why Fish Need Trees (Aquatic Leaf Eaters)
- Water Walkers

1. Caddisfly larva



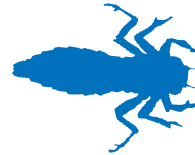
2. Stonefly nymph



3. Mayfly nymph



4. Dragonfly nymph



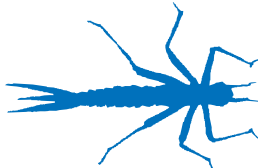
5. Hellgrammite



6. Crane fly larvae



7. Damselfly nymph



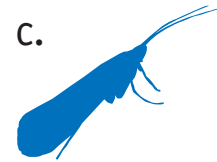
a.



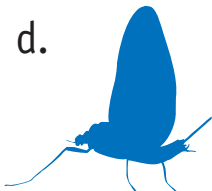
b.



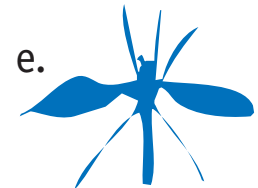
c.



d.



e.



f.



g.



Answers  
1. c; 2. g; 3. d; 4. f; 5. a; 6. e; 7. b

# Critter Collectors

Aquatic insects make some of the best baits. They are easy to capture. Head down to the stream and turn over some rocks. Then collect them by hand. You can also use a kitchen strainer, small net or homemade kick seine. Check out our "Critter Collectors" fact sheet. It shows how to make a kick seine from window screen. Set the net downstream of some rocks. Turn them over. Disturb the stream bottom. The current does all the work. It will wash the critters into your net. Be careful with those hellgrammites! Grab them on the head, directly behind their pincers.

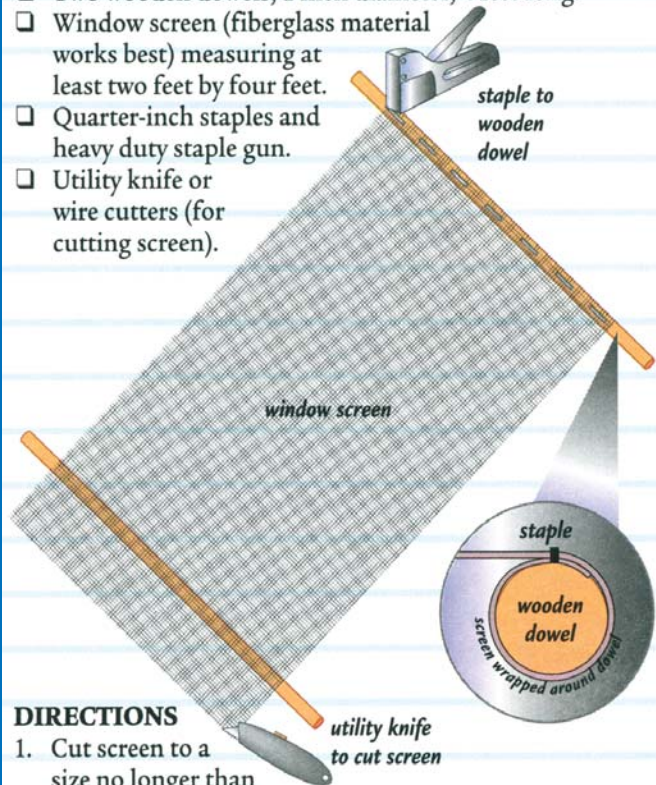
Whirligig beetles, diving beetles, water boatmen, backswimmers and other water bugs can also be used for bait. They are tricky to capture. Use a long-handled net to scoop them from the water's surface. You'll have to be quick!

Most nymphs and larvae can be kept in a container of water. They include mayflies, dragonflies and damselflies, caddisflies, crane flies and hellgrammites. They need cold water with lots of oxygen. You'll need to collect them right before you go fishing. Or replace the old water with fresh cold water once in a while. Stonefly nymphs are best kept in a container with cool wet moss.

## Kick Seine

### Materials needed:

- Two wooden dowels, 1 inch diameter, 4 feet long.
- Window screen (fiberglass material works best) measuring at least two feet by four feet.
- Quarter-inch staples and heavy duty staple gun.
- Utility knife or wire cutters (for cutting screen).



### DIRECTIONS

1. Cut screen to a size no longer than four feet. Fish and Boat Commission regulations limit the length of nets and seines to four feet. Seines larger than four feet require a special scientific collector permit.
2. Lay dowels along shorter edge of screen, lining up the bottom of screen with the bottom of dowels.
3. Wrap screen around dowel, one complete wrap. Staple screen to dowel rod, placing staples every six inches or so.
4. Repeat process on other dowel.

### To use a kick seine: one or two persons

