

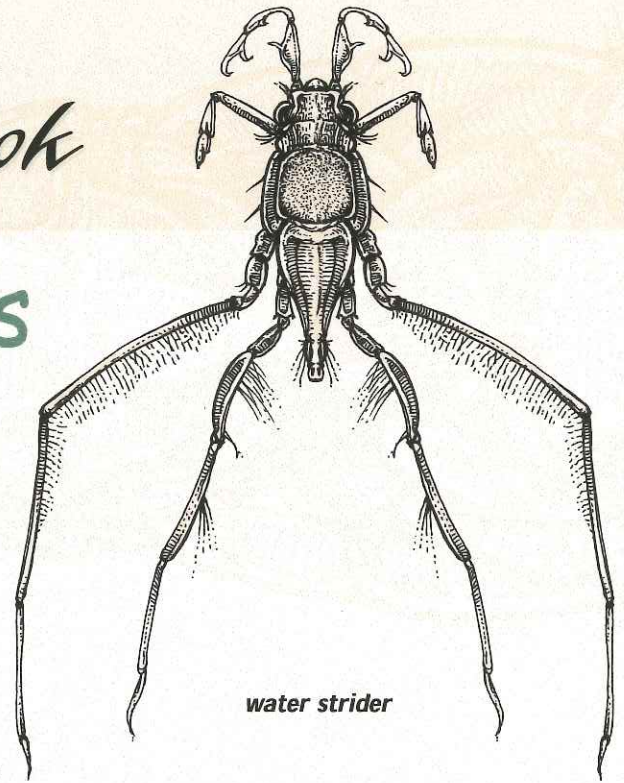
# SMART

## Angler's Notebook

by Walt Dietz

### Water Walkers

Have you ever noticed a pond or stream's tiny animals skipping, skating, jumping, swimming or hanging from the water's surface? These critters use the surface film as a home and are called neuston. Neuston include hydra, small snails, springtails, spiders and a variety of aquatic insects. Sometimes it seems as if these animals are "walking on water." In a sense, they are. Neuston are able to stay on the water's surface because of special adaptations and surface tension.



water strider

### Surface tension

Surface tension is one of the most important properties of water. Many forms of life would not exist without it.

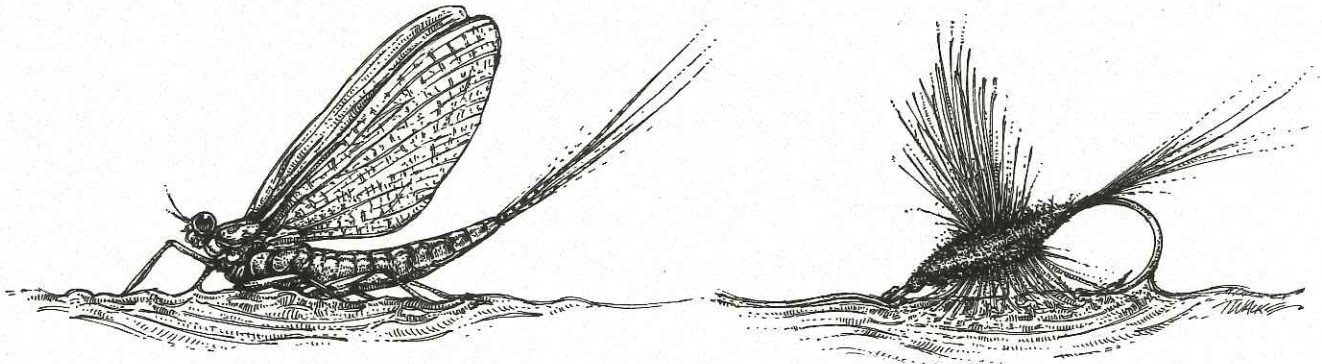
Surface tension occurs because water has an attraction to itself. This attraction to itself is much greater than it is to other things, like the air above. Surface water is drawn down into the liquid, forming an elasticlike film that is taut like a rubber band. This film supports small objects and animals.

### Help or Hindrance?

Surface film can be a help or a hindrance to many creatures. It provides a safe habitat for neuston. But it also traps and holds other animals long enough for predators

to catch them and swallow them up. Egg-laying mayflies often fall into this trap. There is even an entire group of small fish that take advantage of mayflies laying eggs on the water's surface. They are called "top feeders" and have specialized mouths that point upward.

The surface film can also be a barrier, making it difficult for animals to escape from below or penetrate from above. Transforming damselfly nymphs must push their way through this barrier to reach the air above. The effort might distract them long enough to make them a meal for a hungry bass. Either way, many animals have evolved special adaptations to survive on or near the water's surface. Here's a closer look at the more common neuston and their unique adaptations.



*Egg-laying mayflies can become convenient food for top feeders. The same surface tension that enables the mayfly to walk on water helps fly fishermen imitate the properties of nature to lure fish to feed on the water's surface.*

## Bugs (Hemiptera)

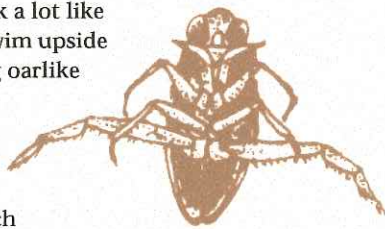
**Water striders** are sometimes called “pond skaters” because of their ability to “skate” across the water’s surface. They have two pairs of long rear legs and one shorter pair in front. The hind legs steer, the middle legs propel them like oars and the front legs grab prey. You might say that water striders go through life on their feet. They have specially arranged claws that keep them from piercing the surface film. Their feet are covered with hairs and a water-repellent wax, which keeps their body above water. They even have sense organs on their feet that feel vibrations and locate prey or mates. Water striders can sense light reflections caused by uneven surface film around a moving object. They are quick to zip over to a meal and suck its body fluids with a piercing proboscis (specialized mouth parts).

The **water boatman** has adapted to many aquatic habitats. Some species even survive in inter-tidal ocean waters. Water boatmen swim right-side up. Each pair of legs has a specialized function. Short forelegs sift through mud for food. The other legs are covered with long hairs, which increase surface area and make them more like paddles. The middle legs act like rudders and are clawed to help anchor onto substrate. The long hind legs serve as oars, which propel it through the water.

Water boatmen are strong fliers and migrate from pond to pond.

**Backswimmers** look a lot like water boatmen, but swim upside down. They have long oarlike hind legs and are very buoyant. Their movement is fun to watch as they swim in a looping path. Each stroke drives the backswimmer forward and downward. They must stop and rise to the surface before a recovery stroke.

Backswimmers dive, but they don’t have gills to breathe underwater. They take an air supply with them in the form of a bubble. They can remain underwater for six



hours because gases are exchanged between the bubble and water through diffusion.

Backswimmers prey on insects and small fish. They can give a stinging bite if not carefully handled.

## Beetles (Coleoptera)

**Whirligig beetles** are found on ponds and still areas of streams. The shiny black beetles congregate in groups and spin around one another like bumper cars. If disturbed, they scatter and then gather together again.

Whirligigs have four compound eyes. One pair is on top to watch for aerial predators. The other pair is below water to hunt for small prey.

A **stenus** is a land-dwelling beetle. If it falls into the water, it secretes a fluid that lowers the surface tension in front of its head (like a detergent). It is then propelled forward rapidly across the surface by the physical forces of water.

## Flies (Diptera)

**Mosquito larvae** are found in still water. They do not have gills. Instead, they get their oxygen from the air. For this reason, mosquito larvae can survive in polluted water or in water with low oxygen levels. The larvae, or “wrigglers,” hang just below the film and poke a small tube, or snorkel, from the rear of the abdomen to the air above. The tip of this tube is equipped with tiny hairs that repel water and keep the tube open to the air. The tube also has a valve, which can be closed to prevent water from entering.

## Spiders (Arachnida)

The **fishing spider** lives along pond edges. It’s covered with thousands of water-repellent hairs. The hairs increase the spider’s surface area, spreading its weight over the surface film. The hairs also provide camouflage and have a sensory function.

A fishing spider can easily skate across a pond to search for food or escape predators. □

