RECOMMENDED READING:

eterson Field Guide to Insects
ublished by xxxxxx
uthor: Donald J. Borror and Richard E. White
ppropriate for beginners and for devotees.

n Introduction to Aquatic Insects of North America
ublished by xxxxxxxxxx
ditors: R.W. Merritt and K. W. Cummins
ontains a key, illustrations, and detailed information.

heck your local library for other resources on insects that prefer other abitats you can find in Forest Park.

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Forest Park Forever
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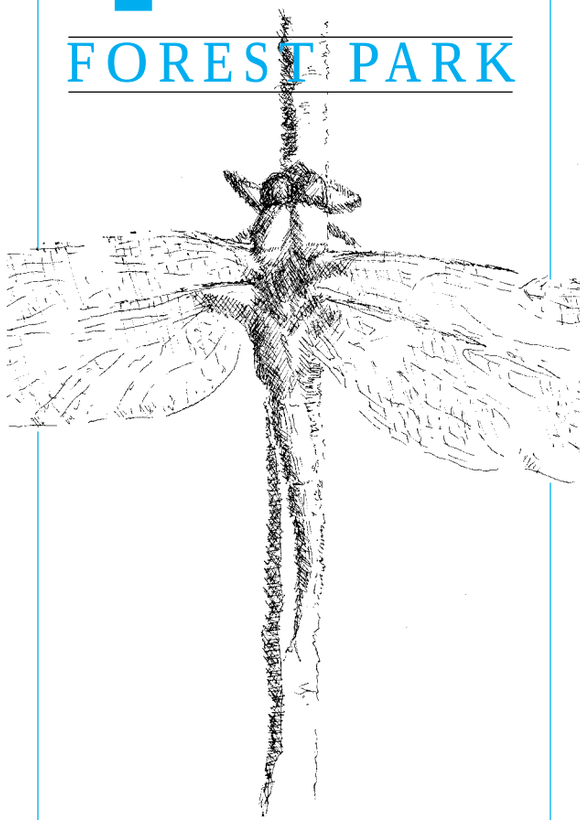
INSECTS

FOREST PARK



AQUATIC INSECTS

Scattered among the trees, landmark buildings, statues, and ponds of Forest Park are millions of creatures. Some are so small we couldn't see them even if we knew where to look. Forest Park's insect inhabitants find shelter, food, and water among the smallest blades of grass and in the largest buildings that decorate our park.

Insects, as well as being the largest group of animals, perform important functions in the natural world. Among their jobs, they pollinate our trees and flowers, recycle our waste, and add beauty to our lives.

This brochure will help you identify only a small portion of the vast number of insects in the park. As you dip and skim the waters of Forest Park looking for aquatic insects, you will find other insects not mentioned here.

Once you've scratched the surface, refer to the Recommended Reading list for more information about the insects that live in Forest Park.

HABITAT CHANGES

Many of the lakes and waterways in Forest Park are being renovated. The changes will create new aquatic habitats and old ones may disappear. Insects, the most adaptable of all animals, will find new places to survive. The addition of new habitats may encourage additional species of insects to live in Forest Park.

INDICATOR SPECIES

Scientists use insects as indicator species in environmental research. The presence or absence of certain types of insects can help determine the health of a habitat. When air or water pollution spoils a habitat, insects are among the first animals to show the effects of poor environmental care.

For instance, water samples determine water quality in aquatic environments, like the ponds and streams of Forest Park. The presence of some species of aquatic insects indicates water quality is good. Other species of aquatic insects are found only when the quality is poor.

Certain species of caddisflies, mayflies and stoneflies are examples of indicator species. Adult insects flying overhead sometimes drop their eggs into the water, and nymphs of these animals will live in flowing water.

HABITATS

Despite their dependence on land, there are many insects that live in, on, and around water. For some insects, water is necessary as simple nourishment. For other species, which require one life-stage on land and another in water, it essential for survival.

Even the most simple aquatic habitat has many sections to it. The bottom may be muddy, rocky, or thick with roots. The water surface may be covered with blooming plants, or connected to land by tree roots. The water may be standing or running.

Insects find a variety of ways to survive in the many adaptations of the aquatic environment, but they are also are strongly connected to the land. That fact may explain why more insect species live near or in shallow streams and ponds, and why only a few species live in large lakes or on open sea.

METAMORPHOSIS

Metamorphosis comes from the Greek word metamorphe, which means change form. Insects undergo either complete metamorphosis or gradual metamorphosis to reach adulthood.

In complete metamorphosis, an insect goes through several life stages, and displays a completely different appearance in each stage. The butterfly, a well-known example of complete metamorphosis, is first egg, then caterpillar, then chrysalis, and then adult.

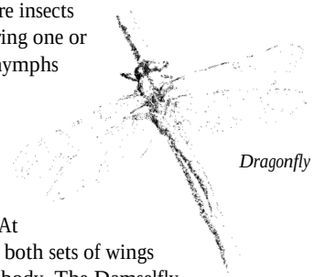
In gradual metamorphosis, young insects hatched from eggs appear very similar to the adult but are smaller. They maintain their appearance as they grow larger. They transform into mature insects with the formation of wings (if part of the anatomy) and reproductive organs.

As adults, the insects live on, in, or near the water. During one or more stages of life some insects are completely aquatic, and in other stages they may live on land. Insects may also lay eggs in water or on aquatic plants.

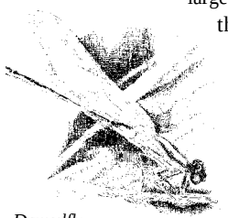
DRAGONFILES & DAMSELFLIES

(order *Odonata*)

Dragonflies and damselflies are insects that survive only in water during one or more life-stages. The young nymphs (larval stages) sometimes feed heavily on mosquito larvae. Look for adult insects flying above the waters where they will lay their eggs in or in aquatic plant stems. At rest the adult dragonfly holds both sets of wings straight out to the sides of its body. The Damselfly holds its wings up over its body. Adults of this order also eat mosquitoes and many other insects they catch on the wing. The large eyes of these animals demonstrate the importance of the sense of sight in these animals and most species fly during warm sunny parts of summer days perching to rest on water plants and branches.



Dragonfly



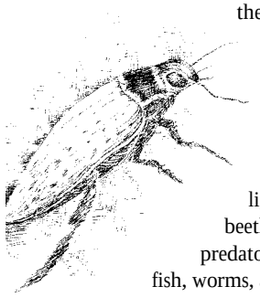
Damselfly

Dragonfly nymph

DIVING BEETLES

(order *Coleoptera*)

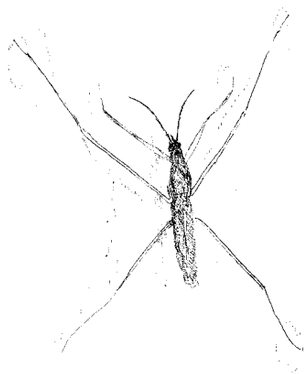
Streams yield several different kinds of diving beetles. They lay their eggs in the water and, within ten days, more than 100 young will emerge from the silk egg case. The young are long and larval-like. These voracious feeders will eat anything they can catch. The larva uses an inverted position in the water because it breathes through an air tube at the tip of the abdomen. When it is time to change into an adult, the larva crawls into the soil at the water's edge. The adult insect is generally sleek in design, perfect for skimming through its watery environment, and it is well camouflaged by its colors of greens, browns, and blacks. The adults have wings and will fly to lights at night. Some adults diving beetles are scavengers and some are predators as well, eating insects, small fish, worms, and an occasional small frog.



WATERSTRIDERS

(order *Hemiptera*)

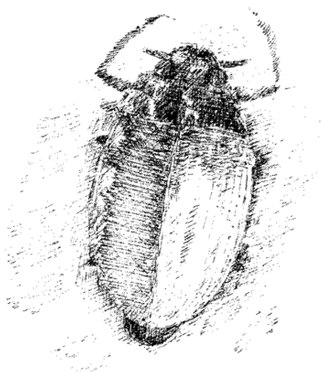
The waterstrider is a slender-bodied insect that perches on the water surface with long stilt-like legs. Its ability to maintain this remarkable position is dependent on the hairs on its feet, which allow it to glide along without breaking the surface tension. If the insect gets its hairy feet too wet, it looses the ability to skate across the water and it can drown. If the hairs get wet, it must reach a dry surface to groom and dry them, before it returns to the water to forage for food, such as insects that fall onto the water's surface.



WHIRLIGIGS

(order *Coleoptera*)

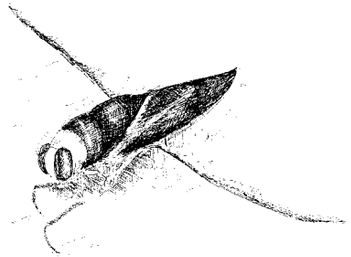
Whirligigs are the clowns of the water surface habitat. These oval black beetles whirl and spin at dizzying speeds. Though they often swim in groups they use their wonderful agility to avoid hitting each other. Their eyes are very helpful in avoiding collisions too. They have divided compound eyes with one pair of eyes able to see above the surface of the water and another pair to see beneath the water. The larvae feed on several tiny water creatures, and the adults (like waterstriders) are scavengers preying on insects that accidentally fall into the water. Whirligig beetles lay their eggs under aquatic plant leaves. The larvae go to shore to transform into an adult.



BACKSWIMMERS

(order *Hemiptera*)

Backswimmers swim below the surface on their backs using their hind legs like oars. The backswimmer preys on water animals, sometimes much larger than themselves. They wait in hiding for an insect, tadpole, or fish to move overhead. Then they float up and suck out the victim's body juices using their piercing mouth parts. The males of some species make sounds during courtship by rubbing their front legs against their beaks. These insects can bite and the pain is similar to a bee sting.



WATERSCORPION

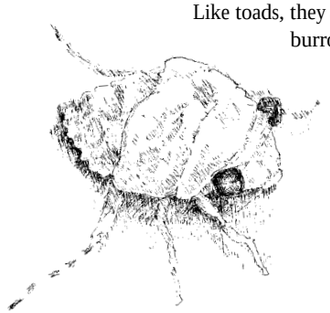
(order *Hemiptera*)

Another insect that can inflict a painful bite is the waterscorpion. With a sharp, piercing mouthpart, characteristic of the true bug, these insects stab their prey and suck out dissolved organs. They eat many kinds of arthropods including small crustacea, mosquito larvae and mayfly nymphs. These animals look like terrestrial walking sticks. Look for waterscorpians clinging to aquatic plant stems in ponds and slow-moving streams.

TOAD BUGS

(order *Hemiptera*)

Toad bugs, as the name implies, look very much like tiny toads. Like toads, they also hop. They usually burrow in the muddy edge of the water, where they feed on smaller creatures. Like the other members of the Hemiptera order these little bugs can bite.



WATER BUGS

(order *Hemiptera*)

Water Bugs are also known as toe biters and fish killers. They are one of the largest insects. Water bugs inject venom into their prey and suck the victim's body fluids. They eat other aquatic insects, tadpoles, and fish. The female lays eggs on the male's back. The male remains relatively docile until the eggs hatch, and then he may eat the babies. Light attracts these insects, and they are strong fliers.

MOSQUITOES

(order *Diptera*)

The most annoying insect, the mosquito, can be found flying around all types of water. Its eggs and larvae are found in ponds, puddles, or small containers of still water. Mosquitoes are sometimes deadly because of their ability to transmit diseases to humans.

Adult female mosquitoes look for blood meals from mammals, birds, reptiles, and even amphibians. They need protein from blood to make their eggs. Adult males cannot bite and drink only nectar.

Mosquito larvae, although they live in water, actually breathe air. Some people call the larvae "wrigglers," because they twitch a lot. Mosquitoes lay their eggs in water, no matter how small the pool. Try to keep your yard free of small pools of water by looking inside old tires, buckets, or plant stands. Dump these puddles and there will be fewer mosquito bites to scratch.