



# Environmental Health

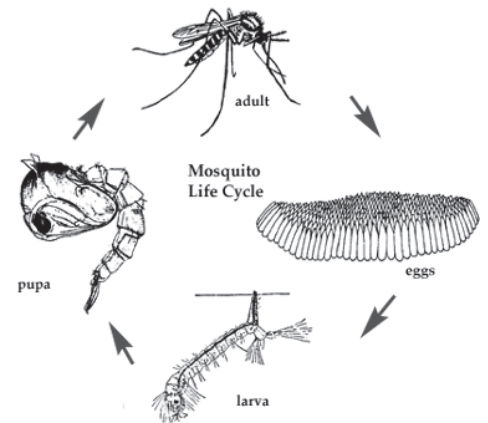
## Mosquitoes In Ohio

There are about 60 different species of mosquito in Ohio. Several of them are capable of transmitting serious, possibly even fatal diseases, such as mosquito-borne encephalitis and malaria to humans. Even without spreading disease, mosquito bites can result in allergic reactions producing significant discomfort and itching. Sometimes excessive scratching can lead to bleeding, scabbing, and possibly even secondary infection. Children are very susceptible to this because they find it difficult to stop scratching. Frequently, they are outside playing and do not realize the extent of their exposure until it is too late.

Female mosquitoes can produce a painful bite during feeding, and, in excessive numbers, can inhibit outdoor activities and lower property values. Mosquitoes can be a significant burden on animals, lowering productivity and efficiency of farm animals.

### Life Cycle

Adult mosquitoes are small, fragile insects with slender bodies; one pair of narrow wings (tiny scales are attached to wing veins); and three pairs of long, slender legs. They vary in length from 3/16 to 1/2 inch. Mosquitoes have an elongate “beak” or piercing proboscis. Eggs are elongate, usually about 1/40 inch long, and dark brown to black near hatching. Larvae or “wigglers” are filter feeders that move with an S-shaped motion. Larvae undergo four growth stages called instars before they molt into the pupa or “tumbler” stage. Pupae are comma-shaped and non-feeding and appear to tumble through the water when disturbed.



### Habits & Diseases Carried

Mosquitoes may over-winter as eggs, fertilized adult females or larvae. Eggs, larvae, and pupae must have water to develop. Some female mosquitoes lay their eggs directly on the water surface. Others lay their eggs on substrates above the water line (flood pool mosquitoes); the eggs hatch upon flooding. In some cases, the eggs will remain viable for several years until further flooding occurs. Mosquitoes belonging to the genus *Culex* lay their eggs in bunches or “rafts.” Each raft may contain up to 400 individual eggs. Larvae feed on bits of organic matter dispersed in the water, becoming full grown in about one week. The pupal stage lasts two to three days. Female mosquitoes are ready to bite one to two days after adult emergence. Male mosquitoes do not bite but feed on flower nectar or plant juices. Some mosquitoes have only one generation per year, whereas others may have four or more. Adults may fly 5-10 miles, but usually rest in grass, shrubbery or other foliage close to the water breeding area.

Mosquitoes may transmit diseases such as dengue, yellow fever, and malaria to humans.

Mosquito-borne encephalitis is a viral inflammation of the brain. Encephalitis can infect humans, horses, and a variety of other mammals and birds. Eastern equine encephalomyelitis (EEE), although very rare is frequently fatal. A small rural outbreak in late 1991 resulted in more than 20 farm animal fatalities, most of which were horses. Transmission of the disease occurs when an infected mosquito takes a blood meal. Birds serve as natural hosts for EEE and St. Louis encephalitis (SLE). St. Louis encephalitis, like EEE is an epidemic disease, meaning that it is usually rare. It can be absent from an area for several years and then reoccur suddenly without warning. LaCrosse encephalitis (LAC) is the third type found in Ohio.

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It is considered endemic to Ohio and occurs year after year at low levels. Ohio has more recorded cases of this disease than any other state. LaCrosse encephalitis is the least severe of the three types of mosquito-borne encephalitis that are found in Ohio, and occurs most often in children. Small woodland mammals, such as chipmunks and squirrels serve as the natural host for the virus, however LAC virus can also be passed, trans-ovarially, from mother mosquito to her offspring.

Mosquitoes can also transmit filariasis (heartworm) to animals. Dog heartworm is the most significant of these, however in some areas, veterinarians are beginning to see more heartworm in cats.

Common Name	Scientific Name	Importance
Asian Tiger Mosquito	<i>Aedes albopictus</i>	AC, EEE, SLE, Pest
Banded Spring Mosquito	<i>Aedes canadensis</i>	LAC, Pest
Eastern Tree-hole Mosquito	<i>Aedes triseriatus</i>	LAC
Flood-Water Mosquito	<i>Aedes trivittatus</i>	Pest
Vexans Mosquito	<i>Aedes vexans</i>	Pest
Malaria Mosquito	<i>Anopheles quadrimaculatus</i>	Malaria, Pest
Cattail Mosquito	<i>Coquillettidia perturbans</i>	EEE, Pest
Northern House Mosquito	<i>Culex pipiens</i>	WNV, SLE

WNV=West Nile Virus    LAC = LaCrosse Encephalitis    EEE = Eastern Equine Encephalomyelitis    SLE = St. Louis Encephalitis

## Biology

### ***Aedes albopictus***

Adults are known as tiger mosquitoes due to their conspicuous patterns of very black bodies with white stripes. Also, there is a distinctive single white band (stripe) down the length of the back. The body length is about 3/16-inch long. Like all adult mosquitoes, Asian tiger mosquitoes are small, fragile insects with slender bodies, one pair of narrow wings (tiny scales are attached to wing veins), and three pairs of long, slender legs. They have an elongate proboscis (beak) with which the female bites and feeds on blood. Eggs are elongate, usually 1/40-inch long, and dark brown to black near hatching. The egg stage will successfully overwinter in Ohio. Breeding occurs in used tires holding water in addition to tree holes, tin cans, bottles, etc. Scientists are almost positive that this mosquito entered this country in shipments of used tires from Northern Asia (probably Japan). The U.S. imported 4.5 million tires from Asia from 1983 to 1985 and the interstate commerce of used tires spread the mosquito to new locations

### ***Aedes canadensis***

This dark mosquito has the tarsi banded with white at both ends of the segments. It is a serious pest in woodlands. This species overwinters in the egg stage and is one of the first mosquitoes to appear in early spring. Larvae breed in woodland pools filled by melting snows or by spring rains. It shows preference for pools with a bottom of dead and decaying leaves, although it is sometimes found in roadside puddles, sink holes, wooded swamps, etc. There is one generation per year with the adults living for several months. Eggs are laid singly on the ground or above the waterline in woodland pools. Eggs hatch only after they have been flooded. Eggs are able to survive long periods of drying. Biting occurs most frequently during the evening hours, but can occur during the day or night. *Aedes canadensis* is a secondary vector of LaCrosse encephalitis in Ohio.

### ***Aedes (Ochlerotatus) triseriatus* (Tree-Hole Mosquito)**

These black mosquitoes have silvery white scales at the sides of the thorax. They breed principally in tree holes, tires and other artificial containers. The bites are painful and sometimes very troublesome in the woods. They do not wander far from the breeding places. Larval development is rather slow with nearly a month required to reach maturity. *Aedes triseriatus* is the principal vector of LaCrosse encephalitis in Ohio. This species has several generations a year and overwinters in the egg stage.

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## **Aedes trivittatus**

The upper surface of this mosquito's thorax is marked with two conspicuous whitish stripes. It is a fierce biter and can be extremely annoying. Larvae occur mostly in floodwater pools and temporary rain pools. Young larvae feed at the water surface with later instars spending most of their time concealed in the vegetation at the bottom of the pool. Larvae are seldom encountered, even though adults can be present in large numbers. Adult emergence begins about eight days after hatching. Adults rest among shaded grasses and other vegetation during the daytime but bite if disturbed. They bite mostly in the evening and do not migrate far. This species overwinters in the egg stage.

## **Aedes vexans**

A medium-sized brown mosquito, it has narrow rings of white scales on the hind tarsi and a "V"-shaped notch at the middle of each band of white scales on the upper surface of the abdomen. This mosquito is very abundant and breeds in rain pools, flood waters, roadside puddles and most all temporary bodies of fresh water. Eggs are laid on the ground above the water line, hatching when flooding occurs. Larvae can be found in huge numbers. In receding water, up to 500 or more larvae are found to each pint of water. Development of the aquatic stages requires ten days to three weeks, depending on the temperature. Adults fly long distances from their breeding places with flights of five to ten miles being rather common. Adult females are vicious biters and are especially annoying at dusk and after dark. Adults live for nearly two months and are attracted to light. They rest during the day in shaded grass and other vegetation. *Aedes vexans* overwinters in the egg stage. It is considered the principal pest mosquito in Ohio and in many parts of the United States. It may also be a secondary vector of the Eastern equine encephalitis virus.

## **Aedes quadrimaculatus (Malarial Mosquito)**

These large, dark brown mosquitoes have four dark spots near the center of each wing. The tarsi are entirely dark. Eggs are laid singly on the water surface with lateral floats to keep them at the surface. One hundred or more eggs are laid at a time. A single female may lay as many as 12 batches of eggs and a total of more than 3,000 eggs. This species is the most important vector of malaria attacking humans in the eastern United States and can be found frequently in houses and other shelters. Their bites are less painful than many other mosquitoes and often go unnoticed. These mosquitoes breed chiefly in permanent freshwater pools, ponds and swamps that contain aquatic vegetation or floating debris. Common habitats include borrow pits, sloughs, city park ponds, sluggish streams and shallow margins of reservoirs and lakes. During the daytime, adults remain inactive, resting in cool, damp, dark shelters such as buildings, caves, under bridges, etc. Feeding occurs at night. These mosquitoes enter houses to feed on humans. Cows, horses, mules, pigs and chickens are also attacked. Adults fly about one half mile from their breeding site but are not taken in light traps in great numbers. Breeding occurs throughout the summer months, with overwintering taking place as an adult fertilized female.

## **Coquilleltidia (Mansonia) perturbans**

The scales on the wings of this mosquito give the wings a "peppered" appearance. The mosquito also has a rounded abdomen and white bands on the tarsi and proboscis. It breeds in permanent water, especially marshes with emergent plants. Larvae and pupae attach to the roots and underwater stems of a wide variety of aquatic plants, most commonly cattails (*Typha* sp.). Overwintering occurs as larvae in mud. There may be more than one generation produced in a year. There is usually a very large emergence of adults in May, with the population peaking in June and declining through July and August. It is primarily a mammal feeder and readily attacks humans. This species can fly long distances from its breeding site and is primarily a pest species in Ohio.

It has been shown to be involved in the transmission cycles of California group viruses, Eastern equine encephalitis virus, and dog heartworm in other areas of the U.S.

## **Culex pipiens (Northern House Mosquito)**

These brown mosquitoes of medium size have cross bands of white scales on the abdominal segments, but are without other prominent markings. They commonly enter houses.

This mosquito is a vector of St. Louis encephalitis. Breeding occurs in rain barrels, tin cans, tires, storm-sewer catch basins, street gutters, polluted ground pools, cesspools, open septic tanks, etc.

Eggs are laid in clusters of 100 to 400, known as egg rafts, which float on the water surface. Hatching occurs in a day or two in warm weather. Eight to ten days are needed for completion of the larval and pupal stages. In cooler weather of early spring or late fall, two weeks or more may be required. Breeding continues throughout the warm months of the year. One subspecies can survive and produce fertile eggs without a blood meal. This mosquito does not fly far, except when great numbers are produced. Adults are active only at night and can be found resting during the day in and around houses, outbuildings and various shelters near their breeding places. They are readily attracted to carbon dioxide (CO<sub>2</sub>) baited light traps. This mosquito overwinters as a fertilized adult female.

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Statement Revised September 2018.

Spanish: Atención: La asistencia de idiomas esta disponible. Nepali: भाषा सहायता उपलब्ध छ

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