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# School Pest Solutions

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## Mosquitoes

Although there are 45 identified species of mosquitoes in Maine, only about half of them are considered biting pests of humans and even fewer are sufficiently abundant to be considered important pests. Female mosquitoes feed on blood to acquire the extra protein they need to produce and lay eggs. In this process they can carry disease organisms and parasites from one animal to another. Eastern Equine Encephalitis and West Nile Virus are serious human diseases vectored by mosquitoes.



*Mosquito adult*

### Habitats and Life Cycles

All mosquitoes breed in standing water. The majority of biting species live in the temporary spring pools formed by melting snow. Some species live in fresh water swamps, ponds, salt marshes, grassy ditches, culverts, and natural or artificial containers, such as tree holes, hollow stumps, rock holes, tires, swimming pools, and cans.

Eggs are deposited by females either individually or in groups on the surface of water or on soil where flooding will produce pools or ponds. In southern Maine, mosquitoes begin hatching in early to late March and continue until late April or early May, each species having a particular temperature range favorable for egg hatch. In central and western Maine, hatching occurs about 2 weeks later. At the Canadian border, mosquito eggs do not hatch until the last week of April. The larvae are called wigglers because of their thrashing motion in the water. They breathe through a straw-like tube held at the water surface. The length of this life cycle varies by species from 4–30 days.

Adults begin emerging in late April. As long as water is available in their habitats, mosquitoes tend to gradually increase in abundance throughout the summer. Their numbers generally depend on the amount of rainfall. During wet summers, mosquitoes will be abundant; in dry summers, numbers will be low and individuals short-lived. Peak annoyance to humans usually occurs during the month of June. Mosquitoes can spread diseases through their bites, including Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV). The Maine Center for Disease Control has created an informative pages about these and other mosquito-borne diseases. EEE has never been reported in a Maine resident.



*Mosquito larvae*

### Management

Prevention is an important way to manage mosquito populations. Elimination of breeding and resting sites are usually beneficial methods.

## ***Eliminate breeding sites***

Locate breeding sites before the adults emerge (late April). Drain or remove all stagnant water in unused buckets, pools, old tires, tin cans, and other discarded containers. Be sure gutters and downspouts are cleaned. Keep dumpsters and trash receptacles covered to prevent water accumulation. Drill holes in playground tires, if necessary, to prevent water accumulation.

## ***Eliminate adult resting sites***

Cut back or remove dense brush and other vegetation from around buildings. Keep grassy areas mowed. Manage landscapes to allow air movement to reduce mosquito problems.

## ***Avoidance***

- Avoid outdoor activity when mosquitoes are most active—at daybreak and dusk and on cloudy, warm days.
- Avoid areas where mosquitoes tend to concentrate—in tall grass, margins of wooded areas, or in heavily wooded areas in dense vegetation.
- Avoid wearing dark colors. Mosquitoes and other biting flies are attracted to dark greens, browns and black. They are less attracted to light colored clothing, especially whites, and yellows.
- Wear long sleeves and pants.
- Make sure window and door screens are in good repair.

## ***Protect natural predators***

Predators such as dragonflies provide some natural control of mosquitoes, especially in and around small ponds and salt marsh pools. However, importing dragonflies is not recommended. Bats and birds, often cited as important natural controls for mosquito populations. Consider putting up bat and bird houses.

## ***Repellents***

Schools may wish to adopt a policy for use of repellants. Some schools require parents to sign a consent for school staff to assist younger students in applying repellants provided by parents. Repellants are pesticides, and although they are exempt from many pesticide regulations, care should be taken to avoid over-exposure. Insect repellents can repel mosquitoes for 2 or more hours depending on the ambient temperature, amount of perspiration, exposure to water, abrasive removal, etc. The CDC recommends the use of repellents containing the EPA registered active ingredients DEET, Picaradin, oil of lemon eucalyptus PMD), or IR3535. “Pure” oil of lemon eucalyptus (e.g. essential oil) is not registered and, therefore, not recommended. Oil of lemon eucalyptus should not be used on children under the age of three years. Concentrations containing 50% or more of any active ingredient do not significantly increase protection time.

Do not allow children to handle the product. Adults should first apply to own hands and then wipe it sparingly on the child, avoiding the child’s hands. Apply repellants only to exposed skin and/or clothing (as directed on the product label). Do not apply to eyes, mouth, cuts, wounds, or irritated skin. When using sprays, spray first on the hands and then apply to the face, sparingly around ears. After returning indoors, thoroughly wash treated skin with soap. If use of repellent results in a rash or other bad reaction, immediately wash the repellent off and contact the local poison control center.

## ***Questionable control methods***

“Bug zappers” are commonly sold for mosquito control. Using an electrified grid and an ultraviolet light, they attract and kill any insect entering the trap. Unfortunately, the lights are not

especially attractive to female mosquitoes who are more attracted to host odor. These devices generally kill more beneficial insects than pests. Light traps and carbon dioxide traps used by mosquito control programs are for monitoring purposes and are not effective in reducing mosquito numbers.

There have been several ultrasonic “mosquito repellents” on the market. The sound emitted by these devices is supposed to confuse mosquitoes and prevent biting. Tests under carefully controlled conditions have shown that these devices are totally useless for repelling mosquitoes.

### ***Chemical control***

There are several chemicals and formulations specialized for mosquito control. Chemical control is only a temporary solution to mosquito problems. Overuse of chemical pesticides can adversely affect nontarget organisms and can lead to pesticide resistant mosquito populations that are more difficult to control. However, if there are extensive mosquito breeding areas on school property, consider having a licensed operator apply a carefully chosen insecticide to the breeding areas to kill mosquito larvae. This method eliminates mosquitoes before they disperse and gives more effective, longer lasting control than applications that target adult mosquitoes. The population should be monitored to determine proper treatment timing. Larviciding should be used when mosquito egg hatch is complete, but before the larvae transform into pupae. Larvicides will not affect eggs or pupae.

Use the least toxic materials to minimize contamination of aquatic environments and adverse effects to other organisms in the area. Note that any treatment of the surface waters of Maine requires a special permit issued by the Department of Environmental Protection.

Insecticide applications that target adults are the most expensive and least effective method of mosquito control and are not recommended for controlling mosquitoes on school grounds. This method will rapidly reduce mosquitoes in a local area, but the effect does not last long and applications must be repeated several times to keep mosquito populations low.

**Anyone making pesticide applications on school property must be licensed by the Board of Pesticides Control. See “Standards for Pesticide Applications and Notifications in Schools”.**

### **Photo Credits**

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### **For More Information**

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