

## SOLUTIONS- Best Practices

**Identify:** Female mosquitoes are blood-feeders whereas males are not. Females need the extra protein in blood in order to mature their eggs. Eggs are laid in still waters such as lakes, ponds or artificial containers. Effective mosquito control programs integrate habitat modification, control of aquatic larvae and suppression of adult mosquitoes.

**Monitor/Establish Threshold:** Can a few mosquito bites now and then be tolerated? Mosquitos are usually active at very specific times of day and year. Can you remain indoors during those times? Or wear protective clothing/repellents? These are questions you must decide for yourself. Be aware that the more tolerant you are the fewer treatments you will have to do.

**Prevention:** Habitat modification should be your first concern. Since mosquitoes require standing water you should drain these areas whenever possible. Clean gutters, flush fountains and birdbaths once a week, empty or treat any container that holds standing water for more than a week. Even temporary puddles following rain or snow melt can support a thriving mosquito community.



**Control:** Control of larvae usually is done with insecticides or oil applied to the water. This can be hazardous since aquatic organisms of all sorts are extremely sensitive to anything added to their environment. *Bacillus thuringiensis subsp. israelensis* (Bti) is a natural bacterium that infects and kills mosquito larvae. It is highly selective, killing only mosquitoes and larvae of a few other related flies such as black flies. Bti is produced commercially and marketed in a variety of formulations. For the homeowner, Bti is formulated into blocks that can be floated in ponds and fountains. These blocks release the bacterium as they dissolve and are quite effective. Regardless of method/product used ALWAYS read and follow package instructions, and NEVER spray when beneficial insects are present.

Natural enemies such as fish, birds and bats prey on mosquitoes but alone may not reduce adult numbers to acceptable levels. In some areas the encouragement of bats with artificial bat houses has proven useful.

In combination with scrupulous attention to control of breeding areas, window screens and mosquito nets are the most effective measures for residential areas. Insecticide-impregnated mosquito nets are particularly effective because they selectively kill those insects that attack humans, without affecting the general ecology of the area.

If contact with mosquitoes is unavoidable then bite prevention is your only recourse. Repellents containing DEET (N,N-diethyl-3-methylbenzamide or N,N-diethyl-methyltoluamide) work extremely well and have a good safety record when used according to directions. Generally concentrations of 10-35% DEET are adequate. DEET-based repellents may damage

plastics and synthetic fabric but can be applied to natural fabrics. For children use a repellent that contains 10% DEET or less and apply it more often if needed. Food supplements and natural herbs have not been as effective as DEET-based repellents. Other topical lotions (those that do not contain DEET as the active ingredient) are far less effective as well. Insect repellents may be applied on skin and give short-term protection against mosquito bites. The chemical DEET repels some mosquitoes and other insects. Some CDC-recommended repellents are picaridin, eucalyptus oil (PMD) and IR3535. Others are indalone, dimethyl pthalate, dimethyl carbate, and ethyl hexanediol.



## FURTHER RESEARCH

[http://entomology.oregonstate.edu/system/files/u1473/Mosquito\\_Control.pdf.pdf](http://entomology.oregonstate.edu/system/files/u1473/Mosquito_Control.pdf.pdf)

<http://www2.epa.gov/mosquitocontrol>

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7451.html>

## MOSQUITOES



Mosquitoes have caused, and continue to cause, devastating epidemics that significantly

affect people’s health and well-being. West Nile Virus and encephalitis are serious mosquito-borne threats in the U.S.

Female mosquitoes must get a blood meal in order to lay eggs. By taking the blood meal she may infect her host with diseases such as encephalitis, yellow fever and malaria. World-wide malaria is still the most important infectious disease. While we are lucky here in Oregon that malaria is no longer a threat, less than a hundred years ago malaria was common in the US, and with global warming it will likely return.

### IDENTIFICATION

Like all flies, mosquitoes go through four stages in their lifecycles: egg, larva, pupa, and adult or imago. The first three stages—egg, larva, and pupa—are largely aquatic. Mosquito adults are small, delicate, two-winged flies. At first you might mistake them for the widely distributed, nonbiting midges. However, female mosquitoes differ from similar insects because of their long, slender proboscis, a tubular feeding organ adapted for piercing skin and sucking blood. Male mosquitoes also have a proboscis, but they use them only for sucking plant juices and other sources of sugar rather than blood. Mosquito larvae, or wigglers, usually are black or brown and occur in stagnant or nearly still water in surface pools, tree holes, or man-made containers such as abandoned tires.

### CHECKLIST OF POSSIBLE MOSQUITO SOURCES AROUND THE HOME

Mosquito Sources	Solutions to Reduce Populations
Bird baths	Change water at least once a week.
Cesspool or septic tanks	Seal and cover openings, so mosquitoes can’t lay eggs in them.
Containers	Empty water. Store in an inverted position. Dispose. Cover so mosquitoes can’t lay eggs in them.
Cooler drains	Prevent water from standing.
Irrigated lawns or fields	Avoid excessive irrigation. Drain standing water.
Plastic pools	Drain when not in use, or cover so mosquitoes can’t lay eggs in them.
Ponds	Stock pond with fish, or use <i>Bacillus thuringiensis</i> subspecies <i>israelensis</i> . Remove excess vegetation.
Roof gutters	Clean periodically to remove debris.
Standing water	Eliminate by draining. Fill in low areas.
Street gutter or catch basins	Remove litter and garden debris. Don’t overwater lawns.
Swimming pools	Keep water off the cover. Maintain water quality at all times.
Tree holes	Fill hole with sand or mortar.
Watering troughs	Stock with fish, or change water weekly.

Adapted from the Sacramento-Yolo Mosquito and Vector Control District.

Best Practices

# Mosquitoes

An IPM Approach to Control



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