



PUTTING THE BITE ON MOSQUITOES

Spokane County Health District Fact Sheet

Mosquitoes are among the most serious and annoying insect pests that have a direct impact on humans. Mosquitoes can carry human disease agents such as malaria, encephalitis, yellow fever, dengue, filariasis, and, most recently, West Nile Virus. For additional information visit the website for the Washington State Department of Health at www.doh.wa.gov. In the United States, the primary reasons for controlling mosquitoes are the annoyance caused by their bites and the transmission of human and equine viral encephalitis and dog heartworm. In the Spokane area, incidence of mosquito-related disease is very rare. Mosquitoes in this area are primarily considered nuisance pests.

All mosquitoes develop in water that is still or very slow moving. Mosquitoes develop through four distinct stages: egg, larva, pupa and adult. Mosquito eggs are deposited either in permanent water sources or in the mud at the edges of temporary water sites to hatch when flooding occurs. The egg phase generally last two to six days, and it can last as long as five years in some species is capable of surviving freezing temperatures.

The larvae of all mosquitoes live in water. They have adapted to a wide variety of habitats, including permanent ponds, marches, woodland pools, tree holes and artificial containers (such as old tires.) The larvae take four to ten days to complete their development, depending on the species, water temperature and other factors. They pass through four separate developmental stages, or instars, and after the fourth larval stage the mosquito pupates.

The pupal stage lasts from one to ten days. During this time the mosquito undergoes metamorphosis, eventually emerging or hatching into an adult. The adult at this stage will mate, take a blood meal (female only), lay a batch of eggs, and seek another meal to repeat the cycle. The average life span of an adult mosquito is one to two months; however, some can overwinter and live up to six months. The adult mosquito generally has a flight range of ½ to 2 miles but has been documented to range as far as 5 to 20 miles. Adult mosquitoes are generally attracted to light, body warmth and carbon dioxide (exhaled breath).

Due to population growth, an increasing number of housing developments are being built in areas with high mosquito prevalence. Therefore, safe and effective mosquito control strategies require more attention, time and effort, especially where persona,. Health and ecological concerns limit pesticide uses Good mosquito control requires a combination of several pest control measures including community supported professional control as well as individual effort. The following facts and control information have been listed to provide solutions to mosquito problems.

MOSQUITO FACTS AND CONTROLS

The following is a list of common mosquito breeding sites around the home:

Birdbaths Boats that have not been drained Cans, jars and other containers Catch basins at road sides Clogged roof gutters Debris and garbage piles Drain pans on air conditioners Dripping outdoor faucets Flat roofs Flower pots Livestock troughs	Old tires Ornamental ponds Overwatered lawns and fields Plastic tarps Rain barrels Standing water in puddles and ruts Stumps and tree holes Wading pools Wells Wheelbarrows
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

To reduce exposure to mosquitoes, the following categories of control strategy can be applied:

Physical Controls

- Repair window and door screens.
- Screen porches, decks or gazebos.
- Check carefully for standing water in low-lying areas and drain or add fill material when feasible.
- Repair leaky outdoor faucets and sprinklers.
- Keep lawn and garden irrigation minimal.
- Dispose of trash and discarded containers.
- Keep house rain gutters clean and working properly.
- Keep your grass cut short and shrubbery well trimmed.
- Change water in troughs, fountains, or bird baths twice weekly.
- Fill tree holes and remove old stumps.
- Wear mosquito netting and long sleeve clothing when feasible.

Biological Controls

The following is a list of organisms that kill or feed on mosquitoes:

- Amphipods (fresh water shrimp)
- Ants
- Backswimmers
- Bacteria (*Bacillus thuringiensis israelensis* -BTI)
- Birds
- Crabs
- Dragonflies and Larvae
- Fish (*gambusia affinis*, goldfish, guppies)
- Flatworms
- Frogs
- Fungi
- Giant Water Bugs
- Beetles
- Hydra
- Mites
- Parasitic Nematodes (*Romanomermis culcivorax*)
- Predacious Mosquito Larvae
- Predacious Snails
- Rotifers
- Spiders
- Viruses
- Water Scorpions
- Water Striders

Chemical Controls

A wide variety of chemical controls are available for the management of mosquitoes. These controls can be separated into the following categories:

- Repellents
- Surface Films (larvicide)
- Insect Growth Regulators
- Superabsorbent Polymers
- Laricides (chemical application to water habitat)
- Ground-Fogging/Aerial Applications (adulticide)

Please Note: Application of chemicals and insecticides for mosquito control should be performed by a professional licensed pesticide applicator. Use of over the counter pesticides may present health risks to people, animals and the environment. Please be sure to **READ THE LABEL** when using pesticides and repellents. Follow instructions and precautions for specific use only. Do not exceed recommended concentrations or dosage application amounts. The use of concentrations and applications which are greater than manufacturers' recommendations can present health hazards to people and the environment.

A WORD ABOUT REPELLENTS

Repellents provide effective personal protection from mosquitoes and reduce the need to spray pesticides over entire ecosystems. DEET, or diethyltoluamide, is the most widely sold repellent, and is available in concentrations up to 100%. A word of caution: Recent research suggests that repeated applications of DEET to the skin may be hazardous, especially to children. To minimize the possibility of adverse reactions to DEET, the following precautions are suggested:

- Wear long sleeves and long pants when possible, and apply repellent to clothing to reduce exposure to DEET (DEET can damage some synthetic materials).
- Apply repellent sparingly only to exposed skin or clothing.
- Avoid applying high-concentration products to the skin. Avoid DEET concentrations exceeding 30%.
- Use repellent sparingly; one application will last 4-8 hours. Saturation does not increase effectiveness.
- Avoid applying repellents to portions of children's hands that are likely to have contact with eyes or mouth.
- Never use repellents on wounds, irritated skin or sunburn.
- Do not inhale or ingest repellents or get them into the eyes.
- Wash repellent-treated skin when repellent use is no longer needed.
- If a suspected reaction to insect repellent occurs, wash treated skin and call a physician. Take the repellent to the physician for label information.