KEEPING MOSQUITOES AWAY FROM YOU AND YOUR YARD

Mosquitoes are delicious food for fish and other aquatic creatures, but their buzzing and itchy bites make them a great annoyance to people. Mosquitoes can also carry a variety of diseases; so controlling them, especially by eliminating breeding sites, should be a priority for everyone in the community.

The emergence of West Nile virus (for more information, see inside) has focused public attention on mosquitoes. Fear may cause us to reach for a pesticide spray can, but this is an ineffective control. Pesticide sprays reach relatively few mosquitoes, and outside, they probably cause more harm to beneficial insects. Residents can have a greater effect on the numbers of mosquitoes in urban areas by following the tips in this fact sheet.

The young (or larvae) of mosquitoes live in water and feed on microorganisms and organic matter. Just about any area or container that can hold water for more than a few days can produce a large crop of mosquitoes. Only adult female mosquitoes bite humans and other animals to feed on blood. Adult male mosquitoes feed on flower nectar.

Note: If you are experiencing serious or persistent mosquito problems, call your mosquito and vector control district (see inside) before considering the use of pesticides.

There are many different species of mosquitoes. Some bite during the day, while others feed at night. Although some mosquitoes can fly long distances from their watery breeding sites, others travel only a short distance to find their blood meals. Your bites may be coming from mosquitoes you are raising in your own backyard.

PREVENTION

The most effective way to control mosquitoes is to find and eliminate their breeding sites.

- **Eliminate standing water in containers** around the home, including water in cans, plastic containers, potted plant saucers, buckets, garbage cans, barrels, wheelbarrows, and any other container that holds water for more than a few days. Empty the water and then either: invert, cover, punch drainage holes in, or dispose of these containers.
- **Change water in birdbaths** and pet water dishes at least once a week, preferably every 2 to 3 days.
- **Fix leaky outdoor faucets and sprinklers**, and don't overwater your yard. Any standing water can produce mosquitoes.
- **Recycle tires or store them so they do not collect water.** Tires are extremely hard to drain, and each one can produce thousands of mosquitoes.
- **Keep roof gutters clean** so water drains; otherwise mosquitoes can breed in the leaf and water mixture.
- **Don't dump yard waste into street gutters, storm drains, or creeks.** It can impede the flow of water, allowing mosquitoes to breed. The decaying organic matter then provides food for dense numbers of growing mosquito larvae.
- **Drain plastic wading pools or fountains when not in use,** or cover tightly to deny access to mosquitoes. If the fountain is large enough, stock with mosquitofish (see below).
- **Keep swimming pools and hot tubs chlorinated and filtering.** When not in use for extended periods, cover pools or tubs tightly or stock with mosquitofish (see below). One untended pool or hot tub can breed enough mosquitoes to affect a whole neighborhood.
- **Use mosquitofish (*Gambusia affinis*)** in backyard ponds or water gardens, watering troughs, and stockponds. These fish are available, at no cost, from your mosquito and vector control district (see inside). *Gambusia* are cannibalistic, so be sure

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to provide rocks and plants in your backyard pond to help shelter young fish, but not so many plants that the pond becomes heavily shaded. *Gambusia* do not require supplemental food. Overfed fish may not feed on mosquitoes, and excess food in the water may cause bacterial blooms that harm the fish. Do not release mosquitofish into the wild. *Caution: Check with your water district before using tap water to fill your pond. Water containing chloramine is toxic to mosquitofish and must be chemically treated first. Products (such as Aqua Plus) are readily available at pet stores.*

- **Fill tree holes** with a polymer such as Soil Moist or Broadleaf P4. In the winter, the granules absorb water and eliminate mosquito breeding habitat. The granules can last for many years, absorbing water in winter and drying out in the summer. If necessary, consult a certified arborist about the condition of the tree.

  The western tree hole mosquito is the primary vector of canine heartworm in this area. Keep your dog's heartworm medicine up to date.

- **Contact your local mosquito and vector control district** if you are aware of uncontrolled mosquito sources in your neighborhood, or if you need assistance with a mosquito problem on your property. Most district services are provided free of charge.

PROTECT YOURSELF

- **Install screens on windows and doors** and keep them in good repair.
- **Certain species of mosquitoes are attracted to light, so keep outside lighting to a minimum near entry doors**; keep those doors screened or close them at sunset.
- **Wear long sleeves and long pants** when mosquitoes are biting. Learn the times of day when mosquitoes are most active in your area and avoid outdoor activity at those times.
- **Use insect repellents.** Studies show that DEET-based repellents are the most effective.* (DEET has been in use for 40 years. After nearly 8 billion human applications, fewer than 50 cases of serious toxic effects have been documented in the medical literature.) Don't use a stronger or longer-lasting product than you need. The American Academy of Pediatrics says that repellents with a DEET concentration of 30% are safe for both children and adults, but that a concentration of 10% can be used on children if there is concern about potential risks and the threat of mosquito-borne disease is low. Apply repellent to exposed skin and wash treated skin with soap and water after coming indoors. Do not apply to infants under 2 months old, and follow all directions on the product container.

  Bite Blocker, made from soybean, coconut, and geranium oils, is the next most effective repellent. In one study, it compared very favorably with a 6.65% concentration of DEET for repelling mosquitoes for 3 1/2 hours.

  Note: If mosquito-borne disease is a serious concern, other repellents should not be relied upon for prolonged protection.

  Wristbands treated with insect repellent have been shown to be ineffective since repellents protect only a few centimeters from the site of application. Ultrasonic devices are also ineffective. Products containing other plant oils, such as citronella, have been found to provide little if any protection.

- **Use a screen tent** for outdoor eating (it will keep out yellowjackets too).

PRODUCTS AND RESOURCES

Examples of trade names of products listed in this fact sheet.

Polymer for filling tree holes (also for use in soil to reduce plant waterings)
- Soil Moist
- Broadleaf P4

Bacillus thuringiensis* subsp. *israelensis (Bti)
- Bayer Mosquito Preventer Granules
- Mosquito Dunks
- Mosquito Bits
- Vectobac

Insect Repellents
- Bite Blocker (active ingredients: soybean, coconut, and geranium oils)
- Cutter Advanced Insect Repellent (active ingredient: picaridin)
- OFF! (active ingredient: DEET)
- Repel Lemon Eucalyptus (active ingredient: oil of lemon eucalyptus)

Product for making chloramine-treated water safe for fish
- Aqua Plus

Methoprene (insect growth regulator)
- Pre-Strike (granule type only)

* For more information on DEET, see the *New England Journal of Medicine* (www.nejm.org), July 4, 2002, Volume 347, Number 1, pages 13 to 18: "Comparative Efficacy of Insect Repellents against Mosquito Bites" by Mark S. Fradin, M.D., and John F. Day, Ph.D.

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MOSQUITO TRAPS AND ELECTRIC BUG ZAPPERS

Propane powered traps, such as Mosquito Magnet, are not recommended by the American Mosquito Control Association. Although they attract adult mosquitoes with carbon dioxide and heat, they do not reduce the chance of being bitten. These devices can be very expensive and they only remove adult mosquitoes without addressing their source. Energy and money would be better spent reducing breeding habitat and purchasing products containing *Bacillus thuringiensis* (see left) that can provide more effective control.

Don't use electric bug zappers because they kill far more beneficial and neutral insects than mosquitoes.

LESS-TOXIC CONTROLS

The products described below can be used in ponds and water gardens, birdbaths, fountains, pools, tree holes, and other standing water where mosquitoes lay eggs. Apply when mosquito larvae are first noted in the spring and continue at the intervals recommended on the package.

- ***Bacillus thuringiensis* subsp. *israelensis*** (Bti) is the active ingredient in a number of mosquito control products (Mosquito Dunks, Mosquito Bits, Vectobac) that are used in water. This bacterium is a stomach poison and must be consumed by mosquito larvae to be effective. Only mosquitoes, black flies, and some midges are susceptible. Other aquatic life are unaffected. Follow all label directions.
- **Methoprene** (Pre-Strike) is an insect growth regulator that interferes with the normal development of mosquitoes. It must be present in the larval habitat to be effective. Larvae continue to grow until they reach the pupal stage, at which point they die. Do not apply to waters that drain into public waterways.

OTHER PESTICIDES

- **Do not use pesticide sprays** to control adult mosquitoes. Use a combination of the techniques listed above or call your mosquito and vector control district.
- **Do not treat street gutters or storm drains with pesticides.** Storm drains are connected directly to the Bay, and pesticides cause serious problems for aquatic life. Call your mosquito and vector control district if you suspect mosquitoes are breeding in the storm drains or catch basins.

WEST NILE VIRUS

West Nile virus made its appearance in the U.S. in 1999. Most of the small number of serious cases in this country have been among the elderly. According to the Centers for Disease Control and Prevention, only 1% of people bitten by infected mosquitoes become seriously ill — most people who get infected do not develop any disease.

Birds serve as a host for this virus. Mosquitoes acquire the virus from infected birds and then transfer the virus to people. The Department of Health Services is encouraging anyone who finds a dead bird (especially a crow, raven, magpie, jay, or hawk) to report it by calling:

877-WNV-BIRD (877-968-2473)

Do not pick up the bird with your bare hands.

WEB SITES FOR MORE INFORMATION:

California Department of Health Services: www.westnile.ca.gov

Mosquito & Vector Control Association of California: www.mvcac.org including contact information for your local Mosquito and Vector Control District.

For more information, contact:

Your local mosquito and vector control district
www.mvcac.org

Bio-Integral Resource Center (BIRC)
(510) 524-2567; www.birc.org

University of California Cooperative Extension Master Gardeners in your area (in the phone book)

Central Contra Costa Sanitary District website
www.centralsan.org

University of California IPM website www.ipm.ucdavis.edu

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