

## Materials Used to Control Mosquitoes

The majority of District resources are devoted to preventing mosquito problems before they occur. Prevention is accomplished by seeking out potential sources of larval development, monitoring them on a regular basis, and treating them as needed. Control of mosquitoes in the larval stages has several benefits:

- **Less Toxic.** *The pesticides used to control the larval stage are much less toxic to the environment and highly specific to mosquitoes.*
- **Less Pesticides.** *The pesticides are applied to a smaller area than would be required for treatment of adult mosquitoes.*
- **Less Disease.** *Targeting immature mosquitoes kills them before they are capable of transmitting disease.*

The final result is a program that protects public health, is more cost effective, and has less impact on the environment. **The District uses a number of biorational materials that are specific to mosquitoes and have been shown to have minimal effects on non-target species. These materials are regulated by the US Environmental Protection Agency and the California Department of Pesticide Regulation and are approved for use in aquatic habitats.**

**Methoprene** is a synthetic hormone that prevents larvae from developing into adults. This hormone occurs only in mosquitoes and does not affect birds, fish, mammals, amphibians or other species of aquatic invertebrates. The product is most effective when ingested by fourth instar larvae.

***Bacillus thuringiensis israelensis (Bti) and B. sphaericus (Bs)*** are bacteria that kill larval mosquitoes by poking holes in their digestive tract. These products are effective against actively feeding first and second instar larvae. Bacteria in this group occur naturally in nearly all aquatic environments. The strains used are specific to mosquitoes and black flies, and do not affect other organisms. Both are approved for use in organic farming.

**Golden Bear Oil (GBIII)** is a highly refined petroleum distillate that forms a thin film on the top of the water and kills larvae through suffocation. It breaks down rapidly in the environment (within 24-48 hours) and is used for temporary control of mosquito pupae when other forms of control are not feasible or fail.

**Agnique** is a surface film derived from plant materials. This product disrupts the surface tension of the water and prevents larvae from attaching to the surface to obtain air.