HOW DO WE PROTECT YOU?
The Marin/Sonoma Mosquito and Vector Control District is aware of the impact high populations of treehole mosquitoes can have on the public. Some of the things we do to manage treehole mosquito populations are:

- Support research that is designed to identify more efficient control methods.
- Conduct adult mosquito surveillance to monitor mosquito population levels and help direct control operations.
- Engage in community-wide efforts to reduce adult mosquito abundance.
- Conduct outreach to educate the public about mosquitoes and mosquito-borne disease.

WHAT CAN YOU DO?
Ways you can control treehole mosquitoes on your property are:

- Inspect trees for holes, including holes as small as 1/2” that lead to cavities that may hold water. Contact a licensed arborist to discuss appropriate measures to remove or prevent water from accumulating in treeholes.
- Remove buckets, toys, tarps or other items holding water.
- Check your gutters for clogs and standing water.
- Contact the District for help inspecting your property and identifying problem areas; where appropriate, an adulticide may be applied to reduce numbers of adult mosquitoes.
- For temporary relief from treehole mosquitoes in your backyard, try using one or more oscillating fans pointed away from seating areas. Treehole mosquitoes are weak flyers and have difficulty flying against the wind generated by the fans.

THE MOSQUITO LIFE CYCLE
All mosquitoes have four distinct developmental stages: egg, larva, pupa and adult. Depending on the species, a female mosquito will either lay her eggs in the form of an egg raft, in clusters, or singularly.

EGGS
The adult treehole female deposits eggs individually on the damp sides of the treehole. The eggs remain dormant until the treehole fills with enough water to flood the eggs, usually the following spring.

LARVA
The larva comes to the surface to breathe through a tube called a siphon. It feeds on micro-organisms and organic matter in the water. In a matter of days the larva will molt (shed its skin) four times. On the fourth molt it will change into a pupa.

PUPA
The pupa cannot eat. It breathes through two tubes on its back. The adult mosquito grows inside the pupal casing and within a few days, when it is fully developed, it will split the casing and emerge as an adult mosquito.

ADULT
The newly emerged adult rests on the surface of the water until it is strong enough to fly away and feed.

OUR SERVICES
The Marin/Sonoma Mosquito & Vector Control District is committed to protecting the health and welfare of the communities we serve. Our programs and services are supported by property taxes and are provided free of charge to all residents in Marin and Sonoma counties.

Our services include:
- Mosquito Control & Mosquitofish
- Ground-Nesting Yellowjacket Control
- Rodent Control Advice

www.twitter.com/MSMVCD
www.facebook.com/MSMVCD

Marin/Sonoma Mosquito & Vector Control District
595 Helman Lane, Cotati, CA 94931
Monday through Friday 7:00am to 3:30pm
1.800.231.3236 or 707.285.2200
www.msmosquito.com
Treehole mosquito larvae can also be found in discarded tires or containers where plant debris and leaves have accumulated. The eggs remain dormant until the cavity or container is filled with water by rain or irrigation. Female mosquitoes can lay 200 to 300 eggs on the damp surface of a treehole or container just above the water line. When the treehole or container is filled with water the eggs hatch, producing larvae which develop into pupae as temperatures become warm enough to support adult mosquito activity. A few days later, adult mosquitoes emerge. Female mosquitoes will then seek a blood meal, mate, and return to a suitable water-filled treehole or container to continue the cycle.

**ADULT MOSQUITO BEHAVIOR**

The mating behavior of treehole mosquitoes is unlike other mosquitoes you may encounter. Generally, adult males emerge about two weeks before the females. They feed on nectar or other plant juices, and then form “mating swarms” around mammals, including humans. Once the female mosquitoes hatch, they unknowingly enter the mating swarms while looking for a blood meal from a human or other mammal.

When people encounter the male mating swarms in the early spring they may feel they are being attacked; however, male mosquitoes do not bite. After emergence of the female mosquitoes, aggressive biting is possible. In years where summer rain occurs, it is possible to have treehole mosquitoes present later in the year.

**WHERE TREEHOLE MOSQUITOES DEVELOP**

The treehole mosquito life cycle is centered around standing water that accumulates in holes in the trunks and branches of trees, or in artificial containers and tires. A wide variety of trees are commonly used by treehole mosquitoes, with oaks, bay, walnut and eucalyptus being the most common due to the high tannin levels.

**CAN TREEHOLE MOSQUITOES TRANSMIT DISEASE?**

Treehole mosquitoes are not known to commonly transmit pathogens or disease to humans, but due to their aggressive biting secondary infections may occur. These mosquitoes, however, are the primary vector of the parasite that causes heartworm (Dirofilaria immitis) in dogs and cats.

Treehole mosquitoes are unlikely to transmit West Nile virus.

**TREEHOLE MOSQUITOES AND DOG HEARTWORM**

The treehole mosquito is the primary vector of dog heartworm (Dirofilaria immitis) in Marin and Sonoma counties. Treehole mosquitoes become infected when they feed on dogs or coyotes that harbor the heartworm parasite.

Once the mosquito has become infected, it can transmit the parasite to other animals. There are medications available that can prevent the infection of dog heartworm.

Contact your veterinarian for more information about preventing dog heartworm.

**HEARTWORM SYMPTOMS**

Symptoms may vary from animal to animal. Generally, in the early stages of infection the dog will appear to be healthy. Symptoms begin to show as the disease progresses, usually in the advanced stages.

**EARLY STAGE**

- Usually no symptoms

**ADVANCED STAGE**

- Chronic cough
- Swelling
- Lethargy
- Jaundice
- Respiratory distress

**KEEP YOUR DOG HAPPY AND HEALTHY WITH REGULAR HEARTWORM CHECKS**

**DOG HEARTWORM LIFE CYCLE**

When an infected mosquito feeds, the heartworm larvae drop out of the mosquito’s mouth parts and enter the animal through the puncture wound.

The heartworm larvae live in the subcutaneous tissue for an average of two months before migrating to the dog’s lungs and pulmonary artery of the heart where they multiply.