

FACTS ABOUT MOSQUITOES

1. All mosquitoes need water to complete their life cycle.
2. There are over 20 different types of mosquitoes in Marin and Sonoma counties.
3. Only the female mosquito bites to obtain a blood meal. The male mosquito feeds only on plant juices.
4. The female mosquito may live as long as three weeks during the summer or many months over the winter in order to lay her eggs the following spring.

THE MOSQUITO LIFE CYCLE

Mosquitoes have four distinct developmental stages: egg, larva, pupa and adult. The average time it takes a mosquito to develop from egg to adult is five to seven days. Mosquitoes require water to complete their life cycle. Prevent mosquitoes from breeding by eliminating or managing standing water.

EGG RAFT

Most mosquitoes lay egg rafts that float on the water. Each raft contains approximately 100 to 400 eggs. Within a few days the eggs hatch into larvae.



LARVA

The larva or "wiggler" comes to the surface to breathe through a siphon tube. 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 or "tumbler" cannot eat. It breathes through two tubes on its back. The adult mosquito grows inside the pupal casing and within a few days, when 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 in which 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

MOSQUITOFISH



**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.ms mosquito.com



PROTECTING PUBLIC HEALTH SINCE 1915



Mosquitofish, *Gambusia affinis*, are native to the southern and eastern parts of the United States. They were introduced into California in the early 1920's for the control of mosquito larvae. Mosquitofish continue to be an important component of the Marin/Sonoma Mosquito and Vector Control District's Integrated Pest Management program. Their voracious appetite for mosquito larvae and pupae make these fish an excellent alternative to insecticides in backyard ponds and other man-made water features. For more information on obtaining these fish, call our office at 1.800.231.3236.

BIOLOGY

The mosquitofish is a member of the family Poeciliidae. They do not lay eggs, but rather give birth to live, well developed, and very active young. Mosquitofish breed throughout the summer with new broods of up to 100 young produced at intervals of about six weeks. Young mosquitofish are approximately ¼ inch in length and grow to nearly three inches long. Mosquitofish have insatiable appetites and are capable of consuming up to three times their body weight, or 100-500 larvae, per day. The average life span for a mosquitofish is two to three years.

FEEDING

Established ponds will naturally supply mosquitofish with their daily diet. However, when placing mosquitofish in newly constructed or recently cleaned water features where natural food is absent, supplemental feeding (i.e. fish flakes, crackers, stale bread, or crumbled dog food) is necessary.

After bacteria and algae have had time to build up in the water the fish will no longer need to be supplied with additional food. The continuation of supplemental feeding could actually decrease the effectiveness of mosquitofish for controlling mosquito larvae.



STOCKING FISH

Mosquitofish are appropriate for use in ornamental ponds, water troughs, wine barrels, neglected swimming pools and numerous other man-made water sources with a minimum water depth of 18 inches.

Mosquitofish prefer sunlit areas of ponds and do not thrive well in heavily shaded areas. This is important to remember when deciding on the placement of wine barrels or the location of new ponds. Be mindful of areas such as under trees where the potential for heavy shade could occur, as well as the accumulation of leaf

litter which may cause the pH level to become lethal.

It is against California Department of Fish and Game regulations for private citizens to plant mosquitofish in waters of the State without a permit. (Title 14 CCR, Fish and Game Code, Section 1.63, Section 6400, and Section 238.5).

Generally, mosquitofish are stocked in small numbers because of their ability to quickly reproduce.

MOSQUITOFISH STOCKING RATES

Ornamental Pond	4 to 6 fish
Swimming Pool	10 to 15 fish
Wine Barrel	3 to 4 fish
Water Trough	4 to 6 fish

Mosquitofish are extremely hardy, and can tolerate a wide range of temperatures. During the winter months these fish move to the bottom of the pond, become inactive, and do not feed. In most cases they will survive the winter and become active again in the spring when the temperatures rise.

POND MANAGEMENT

These fish can also endure varying levels of organic content load. While there is generally no need to test the pH level of the water on a regular basis, it may be necessary when stocking fish in new ponds or wine barrels because they have the potential to leach lime or other chemicals into the water.

A pH level of 6.5-8.0 in the water is best. Inexpensive pH kits are available at pool or pet stores.

Certain pond design considerations and regular maintenance may help minimize mosquito production. For example, aeration may discourage mosquito production because female mosquitoes aren't likely to lay their eggs on turbulent water surfaces. Aeration also creates water circulation, which will slow algae growth and increase dissolved oxygen levels in the water. Elevated dissolved oxygen levels are also beneficial for mosquitofish.

The water in newly established ponds must be treated to remove chlorine that most cities add to drinking water. You can purchase water conditioning treatment kits from your local pet shop or pond and garden store. There is no need to treat water used for topping off a pond due to evaporation, as long as the amount of water added is less than 20% of the pond's total volume.

VEGETATION

A pond with vegetation is both aesthetically pleasing and beneficial when properly managed. Choosing the correct type of vegetation is important for the health of the mosquitofish as they cannot survive in ponds where the vegetation has taken over. Keeping the pond well-groomed will also help to reduce mosquito production. Many pet stores have products that help control vegetation and are safe to use with fish.