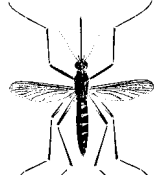


# MOSQUITO NOTES



## WESTERN MALARIA MOSQUITO

### *ANOPHELES FREEBORNI*

### LIFE CYCLE

#### GENERAL INFORMATION

*Anopheles freeborni* is commonly referred to as the “western malaria” mosquito. It is the primary vector (carrier) of malaria in the Western United States. It is also sometimes called a “rice mosquito” because it often develops in the water of rice fields.

This species is a medium sized mosquito with dull brown to black coloration. The two sense organs on the head of the female, known as the palpi, are about as long as the proboscis (beak) and give the appearance of a head with three beaks. The outer half of the wings has four to five spots, which are easily seen with the eye or a hand magnifying glass.

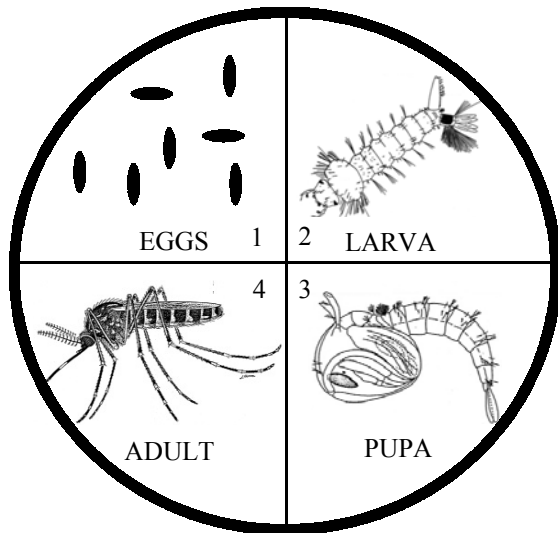
This specie occurs in the Western United States north to Southwestern Canada and south into Mexico.

Mosquitoes have four distinct life stages as seen in the illustration, with the first three stages of *Anopheles* (egg-larva-pupa) are spent in the water. An adult female lays about 200 eggs, individually, on the surface of the water, which floats until they hatch in about two days. The female usually seeks out clear pools in full sunlight with emergent vegetation and/or green algae for laying her eggs. Sources include rice fields, rain pools, margins of lakes and streams, grassy irrigation ditches, agricultural tail-waters and farm pond reservoirs.

The eggs hatch into larvae (wigglers), which then feed on small organic particles and microorganisms in the water. *Anopheles* larvae are usually found lying parallel to and at the water surface.

The larval stage usually averages 15 days. At the end of the larval stage, the mosquito molts and becomes the aquatic pupa (tumbler). The pupa is active only if disturbed, for this is the “resting” stage where the larval form is transformed into the adult.

This takes about three days, during which time feeding does not occur. When the transformation is completed, the new adult splits the pupal skin and emerges. Under optimum conditions development from egg to adult takes about three weeks. However, all mosquito developmental times are dependent on the temperature of the water in which they develop.



## HABITS (ADULT BEHAVIOR)

The adult population reaches its' peak in August and September. Females hibernate during the winter months and disperse from their hibernating sites in February or March. Females are most active at dusk and will readily enter houses. Males do not bite but feed on nectar and plant juices.

## ECONOMIC AND MEDICAL IMPORTANCE

*Anopheles* is the only group of mosquitoes capable of transmitting malaria. Four species of *Anopheles* are found in California, but only two are considered potential carriers of malaria. *Anopheles freeborni* is currently considered to be the most important vector species. Western Equine Encephalitis and St. Louis Encephalitis viruses have also been isolated from this mosquito.

## CONTROL METHODS, PREVENTION AND CORRECTION

Where possible, the best approach is to prevent mosquitoes from breeding is by eliminating or modifying breeding sites. Techniques such as filling, pumping, ditching, draining or re-shaping of sources may be used. In some cases re-circulation of the water is effective.

## BIOLOGICAL CONTROL

Often the malaria mosquito may be controlled in a source by stocking mosquito fish (*Gambusia affinis*).



FEMALE

## CONTROL MEASURES

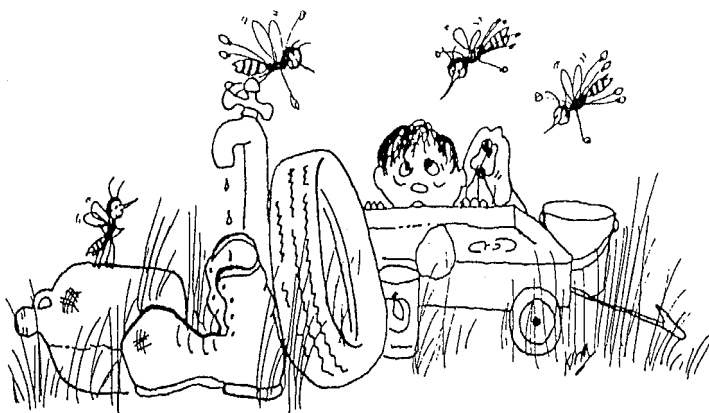
Due to the often delicate environmental inter-relationships of some ponds, chemical control should only be practiced by trained mosquito abatement or health department personnel. These officials have knowledge of the proper compounds and application techniques to assure minimal environmental side effects. Public health agencies generally are able to provide information and assistance where organized mosquito control programs are unavailable.

It is important to remember that chemical control provides only temporary relief and is used by public agencies until other measures can be implemented.

Commonly available insect repellents may be useful if it is necessary to be in an area where large numbers of this species exist.

## YOU CAN PREVENT MOSQUITO BREEDING

### MOSQUITO SOURCE...



### WHAT TO DO?

- EMPTY OR COVER RECEPTACLES THAT WOULD OTHERWISE HOLD WATER.
- PUT MOSQUITO FISH IN PERMANENT PONDS.
- STORE OLD TIRES INSIDE OR COVER THEM.
- CLEAN CLOGGED GUTTERS.
- MANAGE IRRIGATION WATER EFFECTIVELY.
- REPORT MOSQUITO BREEDING SITES.

MARIN / SONOMA MOSQUITO  
& VECTOR CONTROL DISTRICT  
595 HELMAN LANE  
COTATI, CA. 94931  
707-285-2200 or 800-231-3236  
www.ms mosquito.com