

Mosquitoes arthropod



Many different mosquitoes species can be found in California. The most problematic mosquitoes are composed of four genera's: The *Culex*, *Culiseta*, *Anopheles*, and *Aedes*. The crucial difference among these mosquitoes is the water they breed in. The *Culex* mosquito breeds in stagnant water without any animal &/plant life to flourish. This is the mosquito that is found in plant trays that have been over watered, discarded tires, and neglected containers. The *Aedes* mosquito breeds in flood water. The *Anopheles* mosquito needs moderately still oxygenated water that is alive with plants &/animals (ie: ponds). Most *Culiseta* are cold weather mosquitoes. These species occur in warmer climates during the cooler seasons or in high elevations

There are four distinct life stages to a mosquito's life cycle: Egg, Larva, Pupa, and Adult, which are aquatic until reaching the adult stage. Larvae go through four instars (stages between molts). With every molt they become larger in size. When larva reaches its final instar it enters the pupa stage where it metamorphosis's and emerges as an adult. When the mosquito lays its eggs they float on the surface of the water. Some mosquito species, like the *Culex* and *Culiseta*, eggs are stuck together in rafts containing hundreds of eggs. To the naked eye these rafts look like bits of pond scum. *Anopheles* and *Aedes* species lay their eggs separately. *Aedes* lay their eggs on damp soil that has the potential to flood while *Culiseta*, *Culex*, and *Anopheles* all lay their eggs on surface water. It takes approximately 48 hours for most eggs to hatch into the larvae stage. However this time frame can change depending on environmental conditions and species type. Larvae (larva – singular) are aquatic surface breathers. After each molt the larva grows larger. Most mosquito larvae, except *Anopheles*, have siphon (tubes for breathing) and they hang from the waters surface for oxygen. *Anopheles'* larvae get their oxygen supply through spiracles (an opening used for oxygen) and must lie parallel to the water surface. Larvae feed on organic matter and microorganisms. After the fourth molt the larvae

metamorphoses into the pupa stage. This is a non-feeding stage (resting stage) that takes approximately two days. When this stage is complete, the pupa skin splits and an adult mosquito emerges. For a brief period the newly emerged adult mosquito will rest on the water's surface. This permits the mosquito to dry and it's body parts to solidify before it can take flight.

Only the female mosquito bites obtaining a blood meal for breeding purposes. The male mosquito feeds solely off plants for nectar. *Aedes* mosquitoes are persistent with a painful bite. They generally bite during the day preferably on mammals such as humans and they can enter human homes. This mosquito is a strong flier giving it the ability to fly miles away from its breeding zone. Another painful and persistent biter is a *Culex* mosquito. These mosquitoes readily enter homes and prefer to attack around dawn and dusk. These mosquitoes prefer wild and domestic birds over large mammals. The *Culex* species is generally a weak flier staying close to its breeding site but can fly up to two miles with the assistance of wind when blood meal is limited. *Culiseta* mosquitoes generally attack in the evening or in shaded areas during the day. *Culiseta* are moderately aggressive biters. The *Anopheles* mosquitoes are the only known mosquito able to transmit malaria to humans.



***Culex quinquefasciatus* (Southern House mosquito)**

This is a medium size brown mosquito with brown unbanded legs. This mosquito peaks in the summer and fall but can be seen year round. It lays its larval in warm, sheltered, polluted (or foul) water, such as waste treatment ponds, neglected swimming pools, cesspools, septic tanks, fishponds, and catch basins. The *quinquefasciatus* primarily feeds on birds and will feed on mammals as a second choice. They readily enter homes and bite indoors at night. In California this mosquito has tested positive for: Western Equine Encephalitis (WEE), St Louis Encephalitis (SLEv), and West Nile virus (WNV). The

Cx quinquefasciatus maybe the prime vector for WNV in urban areas as well as a probable vector of dog heartworm.

***Culex tarsalis* (Western encephalitis mosquito)**

A medium-size brown mosquito that is capable of flying long distances (approximately 16 plus miles, 20 – 25mi with wind assistance) which is important to the transmission and distribution of the encephalitis viruses. This species has a white band on the proboscis (biting part), V's on their abdomen, and banded black and white legs. The *Cx. tarsalis* is active during spring and fall laying its larvae in various places from clean to partially foul water; using rain pools, decorative ponds, and irrigation water as it's breeding zone. Both the male & female mosquito are attracted to light traps and are highly attracted to CO₂ baited traps. This mosquito primarily

feeds off birds but will readily feed on humans at night &/if disturbed. The *Culex tarsalis* is the primary vector of WNV, WEE, and SLEv.

***Culex stigmatosoma* (Foul water mosquito)**

This is a medium brown mosquito with ovals on its abdomen and black and white striations on its legs. Commonly referred to as a "foul water" mosquito because of its association with polluted water. This mosquito larval habitat can be in either natural or man-made polluted waters (dairy ponds, sewage). As an adult, the *Culex stigmatosoma*, activity peaks in the summer months. Feeds primarily on birds, rarely bites humans. This species occasionally creates domestic, industrial and agricultural pest problems. Western Equine Encephalitis (WEE) has been associated with this mosquito however the *Culex stigmatosoma* efficiency towards WEE carriers has been reduced due to their reluctance in biting humans. *Cx. Stigmatosoma* has also been identified as a carrier of WNV.



***Culex erthrothorax* (Tule mosquito)**

medium, reddish-orange mosquito with unbanded brown legs. This species breeds in tule marshes (thick with vegetation). The larvae can survive throughout winter and emerge as adults in June through October. This is an opportunistic, aggressive mosquito that will bite during the day if disturbed as well as dusk and dawn. This mosquito feeds off birds and humans and is capable of reaching high numbers. This mosquito is rarely a public nuisance because it does not venture far from its breeding grounds. However, for those who reside near wetlands (breeding habitat) find this mosquito to be a huge pest. *Cx. erthrothorax* has the ability to transmit WEE, SLEv, &WNv.



***Culiseta incidens* (Cool weather mosquito)**

This large mosquito can be seen throughout California mostly in the mountain, coastal, and foothill regions. *Cs. incidens* has slender white bands on the tarsi (part of lower leg) and dark patches on its wings. This mosquito is found in areas where the summers are hot and winters are cold and they mainly breed during the fall, spring, and winter seasons while remaining dormant during summer months. They breed in clean, cool water that has some shade: rock pools, melted snow, and hoof prints. In some areas this mosquito is considered a pest to humans but the *Cs. incidens* prefers to feed off large mammals such as livestock and is not consider a vector for human disease.

***Culiseta inornata* (Winter marsh mosquito)**

These are large rusty brown mosquitoes with no noticeable markings on its wings and unbanded legs (tarsi). The *Cs. Inornata* has been observed throughout California. This cool weather mosquito is prevalent during the fall and spring and occasionally observed in the winter months going into its dormant mode in the summer. In the sierras this species breeds in fall, summer, and spring while aestivating (dormant) in the harsh winters. Eggs are laid in standing water found in or near shaded and/or sunlit areas and sometimes breed in containers. The larvae are tolerant of salinity and alkalinity levels in water as well as moderate organic pollution. *Cs. Inornata* adults are strongly attracted to light sources. Females frequently feed at dusk on livestock, sometimes on humans, and when large populations of this species exist it can cause economic loss through livestock distress. This mosquito is not considered a vector of human disease however, in California the *Cs. Inornata* has been found infected with Jamestown Canyon virus (JC)



Anopheles hemsi (Southern California Malaria mosquito)

This is a slender, brown medium size mosquito with unbanded brown tarsi (legs). Their larvae can be found in several different habitats: willow tress, cattail, river margins, pools, river edges, and canyon springs. The general distribution of this mosquito appears to be limited to the coastal regions south of San Luis Obispo, occasionally south and west of Tehachapi Mountains, and some isolated cases in the northern coastal regions. In San Diego County the *An. hermsi* rarely appear throughout the year with peak activity in June and July. This is an aggressive flighty biter, with peak activity ½ hour, or more,

before and after sunrise and sunset. This mosquito attempts to obtain blood meal on a variety of different hosts such as: goats, chickens, dogs, cattle, and humans. In San Diego County *An. Hermsi* has recently been implicated as the vector in locally transmitted human malaria outbreaks.



Aedes sierrensis (Tree hole mosquito)

This species is most prevalent in the woodlands and coastal regions of Sierra Nevada foothill communities in Northern California but is found widespread throughout the state. Adults have contrasting black bodies with white scales, black and white banded tarsi (legs), an unbanded proboscis (elongated appendage from head), and the palpi (appendage attached to mouth serving as a sense organ) tips are white. Their larvae often occur in the same habitat as other mosquito species and they usually have extremely long anal papillae (gills). Larvae and eggs can over winter and are found in rotten tree holes of many different tree species that have developed a small external cavity. Sometimes larvae can be found in old tires, water

barrels, leaf litter, and tubs. Adult *Ae. Sierrensis* activity peaks in the early spring getting their blood meal primarily from rodents, small and large mammals (including humans) in the day, at night, and around dusk. This mosquito has limited flight range and stays within breeding sites. *Ae. Sierrensis* is not considered a vector of human disease but has been implicated as the most important vector of dog heartworm in northern California.

A critical concern regarding natural control over mosquitoes is that winter climate temperatures no longer are cold enough to kill off the adult mosquito populations. The Aedes mosquitoes are adapting to cooler temperatures as they move north and some Aedes eggs can survive below freezing temperatures. These factors play an urgent role in the future of mosquito populations and consequently, the rise in, mosquito borne diseases.