

THE MOSQUITO AND YOU: WHAT YOU NEED TO KNOW

Bite

FIGHT THE

INSIDE

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SACRAMENTO-YOLO
MOSQUITO
& VECTOR
CONTROL
DISTRICT



MOSQUITO-101 SOME FACTS

“...nature has equipped them to suck blood – just like the vampire of fiction.”

- There are 3,500 species of mosquitoes around the world, 170 in North America.
- 24 mosquito species live in Sacramento and Yolo counties.
- Only the female mosquitoes bite us; the blood they suck provides protein for making eggs.
- Mosquitoes zero in on their human, mammal and bird targets using exhaled carbon dioxide, body odors, temperature and movement.
- Female mosquitoes live from three to 100 days, males from 10 to 20 days.
- The female of most species can lay 100 to 300 eggs at a time, and she may lay 1,000 to 3,000 eggs during her lifetime.
- Mosquitoes need water to complete the first three stages of life that precede adulthood. These stages are: egg, larva, pupa. Remember, no stagnant water means no mosquitoes!
- Larvae and pupae can be found wherever there is standing water. A few items around your home where mosquitoes can breed include: old tires, street basins (storm drains), buckets, containers, neglected swimming pools, the bottom dish beneath flower pots, bird baths, pet dishes, clogged rain gutters, children’s inflatable pools or other kids toys, decorative ponds, etc.
- Most adult mosquitoes remain within one mile of where they hatched, although a few species range to 20 miles or more.
- Mosquitoes have been around since the era of dinosaurs. They’re not going away.

MOSQUITO POPULATIONS CAN BE KEPT FROM EXPLODING!

THE EFFORT TO DO THIS TARGETS THEM AT THE LARVAL AND PUPAL STAGES, BEFORE THEY BECOME AIRBORNE THREATS TO PUBLIC HEALTH.

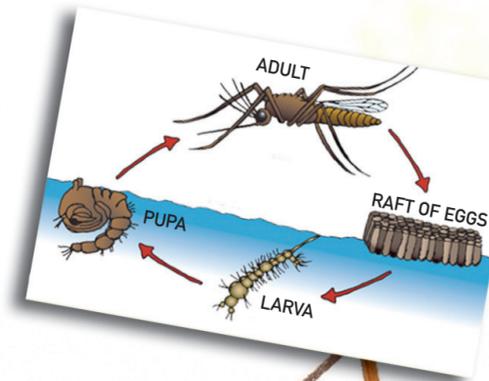
LIFE CYCLE OF THE MOSQUITO

Mosquitoes lay their eggs in or near water, or on soil that eventually will be flooded.

Mosquitoes need water to live and to lay their eggs because water activates the hatching process – the warmer the water and atmosphere, the quicker the journey from egg to adult. Some species, such as *Culex pipiens*, lay their eggs by the hundreds, bundled together in rafts; others lay them individually. The incubation process of *Culex pipiens* takes two days from when the eggs are laid to when the larvae emerge.

Each egg hatches into a larva, or “wiggler,” which hangs its head down in water, breathing through a tube in its tail section, which breaks the water’s surface. The larvae feed on decaying plant matter and organic material in the water. Grab a cupful of water from a street basin or neglected pool, and you’ll probably see a number of larvae swimming about.

After 7-14 days, the larva transforms into a pupa, or “tumbler.” The hardened, comma-shaped pupa breathes through a pair of trumpet-like appendages located on its thorax. The pupa does not feed in its watery environment; it is busy making the transformation into an adult, which takes around two days. Even so, the pupa remains aware of its surroundings, and can flip away reflexively to avoid threats.

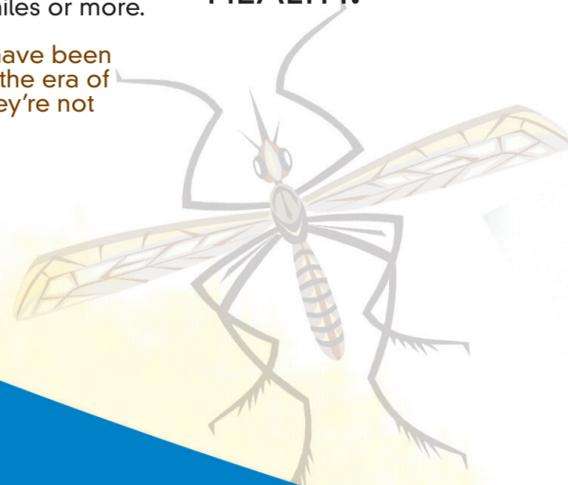


At the conclusion of the pupal stage, the adult, which has been growing inside the pupa’s submerged shell, fills it with air until it bursts. The adult emerges, rests on the water surface long enough for its wings to dry and stiffen, then it flies away. Most adult mosquitoes will feed on nectar from sources like plants, flowers or rotting fruit. But female adults of most species need to feed on animal blood to make eggs, and nature has equipped them to suck blood – just like the vampire of fiction.

Because some adult female mosquitoes alternate between biting humans, other mammals and birds, they are called **vectors**, or carriers of a disease to other animals or humans. (Other arthropods identified as vectors include ticks, mites and fleas.) **Vector control**, concerning mosquitoes, includes controlling their populations by attacking them at the larval and pupal stage, before they can become disease-carrying airborne vampires.

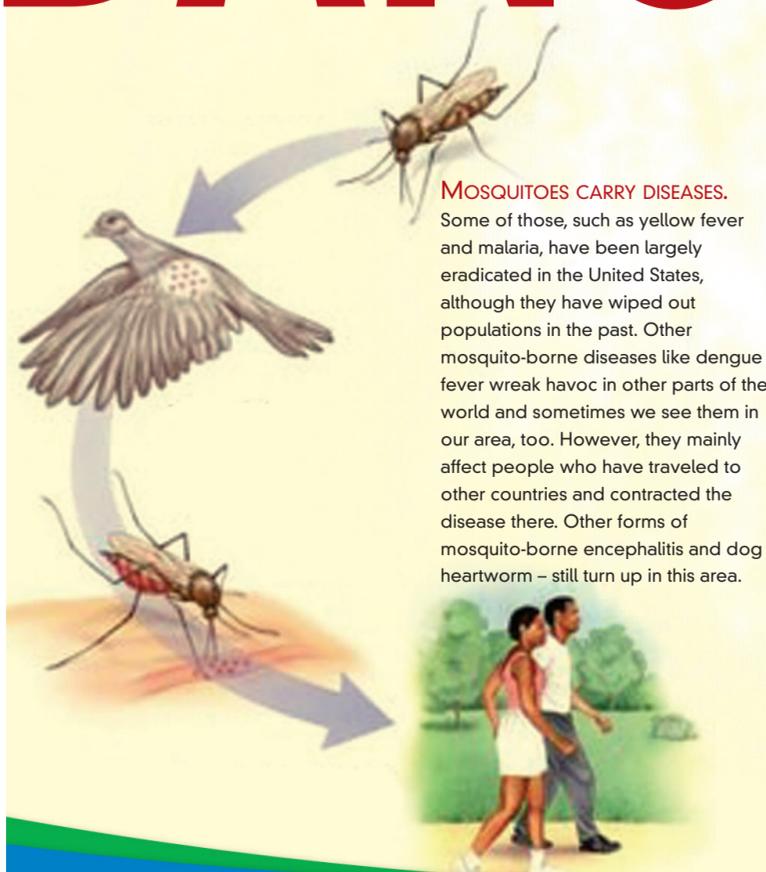
Mosquito borne diseases kill more people around the globe than any other single disease factor.

* In the United States, mosquitoes vector – or spread – West Nile virus, various types of encephalitis, dog heartworm, malaria and dengue fever



MOSQUITOES TRANSMIT DISEASES

KNOW THE DANGERS



MOSQUITOES CARRY DISEASES.

Some of those, such as yellow fever and malaria, have been largely eradicated in the United States, although they have wiped out populations in the past. Other mosquito-borne diseases like dengue fever wreak havoc in other parts of the world and sometimes we see them in our area, too. However, they mainly affect people who have traveled to other countries and contracted the disease there. Other forms of mosquito-borne encephalitis and dog heartworm – still turn up in this area.

But the main disease of concern in the Sacramento Valley is **West Nile virus**, which first appeared in the U.S. in 1999 and in California in 2003. The virus now can be found in all 58 California counties, and it is now the number-one disease transmitted by mosquitoes. West Nile virus can be carried by various types of mosquitoes, the main ones being the common house mosquito (*Culex pipiens*) and the encephalitis mosquito (*Culex tarsalis*). When those mosquitoes bite birds infected with the virus, and then bite humans, they can transmit the disease. Both mosquito species are found in our area and depending on temperature, can be active and transmit the virus.

For 80 percent of people infected with the virus, there are no symptoms; a person can harbor West Nile virus without ever knowing it. But for the 20 percent of people who do get sick, the symptoms of infection mimic the flu. These symptoms can include fever, headache, fatigue, muscle aches, occasional skin rash, eye pain, or swollen lymph glands, and can last for two to three weeks for most people. For approximately 1 in 150 infected people, a West Nile virus fever can develop into something far more serious, with symptoms that include fever, seizures, weakness, changes in mental state and paralysis; even death can result. Age, pre-existing poor health, a suppressed immune system, high blood pressure and diabetes can make a person more susceptible to the virus.

In 2008, California registered 445 human infections, with 15 of those people dying. In rare cases, West Nile virus infection is transmitted via organ transplant or blood transfusion, or by a mother breastfeeding her child. It cannot be transmitted by casual contact: touching, kissing or breathing.

West Nile virus is transmitted by mosquitoes, which get the virus when they bite a bird already infected by the virus. Some birds – specifically the corvid family, which includes crows, ravens, jays and magpies – are especially susceptible to it. That's why if you see a dead bird, it's important to report it by calling the District at 1-800-429-1022 or by going online at www.FIGHTtheBITE.net, so it can be tested to see if it's been infected. Dead birds help in the tracking of West Nile virus and can provide clues to where human cases may develop.

WHEN MARIE HEILMAN NOTICED HOW DIZZY AND LETHARGIC SHE SUDDENLY FELT, SHE KNEW SOMETHING WASN'T RIGHT.

A few days earlier, the vivacious 40-year-old mother of four, a retired computer engineer, had been feeling quite well, but on this morning in early August 2006, upon arriving home in the western Yolo County town of Winters after driving her daughter to the airport, she went back to bed. When her husband got home that evening, she was still under the covers. "Which is really unusual for me," Marie recalled. "I don't sleep a lot. And I just said, 'I don't know, I've got vertigo, I don't feel good, I'm vomiting.' And the next day, I just started having really bad spasms." So Marie went to the doctor, who prescribed something for the nausea and vertigo and sent her home.

Her condition soon worsened. The spasms felt like someone was jabbing a knife in her lower back and pulling it up her spine to her shoulders. "By the time it got to my neck, the pain was so horrible," she said. "I would just yell or pass out. It was like a frying pan was hitting me behind the ears really hard." Marie's vision was blurred and she was confused, so she went back to her doctor in Woodland, who sent her to the emergency room and ordered up a lumbar puncture, better known as a spinal tap. The diagnosis: meningitis, a byproduct of West Nile virus infection.

Marie spent two weeks in the hospital – partially blind, unable to eat. "There's no cure for West Nile virus," she said. "All they can do is treat your symptoms." She was medicated heavily. The doctors told her husband that her organs were shutting down, and that death was a real possibility.

Marie's family, church and community came together to pray for her. When she finally came to, she wanted to go home. But damage done by the virus remained. "When it attacks your system," she said, "it does what it's going to do, and then it leaves your body. It does its damage."

Her lingering symptoms, three years after Marie figures she got infected from a mosquito bite while gardening, or maybe mowing her lawn, include optical nerve damage – "eventually I'll be blind," she said – along with deafness in one ear and hearing loss in the other. The spasms haven't gone away, and she has insomnia. She's lost all muscle tone, although she regained the weight she lost, and her hair is no longer falling out. And she tires more easily. "It's unusual," she said. "I'm a high-energy person."

Marie no longer can play paintball, a favorite recreational outlet. "I physically can't handle the endurance part of it," she said. "It's warm, and I get overheated easily." But losing her vision is the worst consequence of West Nile virus infection. "I'm a heavy reader," she said, "and I won't be able to drive much longer."

As difficult as things have gotten, Marie remains active. She and her husband travel abroad every other month to do missionary work, although the vertigo she still experiences makes flying very uncomfortable. She also performs community service with Meals on Wheels and a food ministry through her church, but her vision loss makes those more difficult.

In January 2008, someone suggested that Marie represent Winters on the 13-member Board of Trustees that governs the Sacramento-Yolo Mosquito & Vector Control District. She accepted the position, after realizing that as a person who had survived the worst ravages of West Nile virus this side of dying, she could be effective at making a case for public awareness of mosquito-borne disease. "Anything you can do to inform people, I think, is really crucial," she said, adding: "I think that you have a public responsibility, once something like that has happened to you, to let people be aware."

Unfortunately, Marie recently had to resign from the board, because her failing vision makes it impossible to drive to Elk Grove for District meetings. But she will continue to volunteer as a spokesperson for the District.

"We have to fight to protect the public," she said. "It's kind of scary, because we're trying to protect you."

“Don't you get it? This is serious. It could kill you. Protect your family.”



WHAT YOU CAN DO

WHAT CAN THE PUBLIC DO TO PREVENT THE MOSQUITO POPULATION FROM EXPLODING?

Once you become aware that mosquitoes need standing water to develop and that mosquito prevention focuses on eliminating these breeding spots – along with keeping mosquito larvae and pupae from growing to adulthood where they can fly, bite and infect – then you're better equipped to eliminate those places in your environment where mosquitoes can breed.

THINK LIKE A MOSQUITO

Mosquitoes don't really *think*; they're more like a microchip with a set of programming: find bird or mammal, suck blood; find water, lay eggs. But knowing what mosquitoes look for around your home to further their species can help keep that local mosquito population explosion to a minimum.

STREET BASINS (STORM DRAINS) have been identified as problem areas where many mosquitoes breed. Drainage from lawns mixes with garden waste in street basins to provide the perfect environment – water and decaying organic waste – where mosquito populations explode. One remedy: Instead of piling your lawn and garden clippings in the gutter, put them in a garden waste container.

RAIN GUTTERS designed to catch and funnel rooftop runoff into drains can provide places for mosquitoes to breed, should they get obstructed with leaves and other material. Check your gutters to make sure that water can flow unimpeded, so mosquitoes won't use them as a nursery.

GRASS PILES can create pools of standing water, which soon attract mosquitoes. When possible, place your grass piles in a garden waste container.

STANDING WATER: Remember that standing water produces mosquitoes. And it doesn't have to be swimming pool-sized; even a glass of water will result in mosquitoes. Check your pet watering bowls, bird baths, buckets, old tires, potted plant dishes, and pool or boat covers – if water can gather, mosquitoes will breed.

HELP A NEIGHBOR: If you see conditions present for mosquito breeding on their property, bring it to their attention, and don't be afraid to ask if you can help them correct the problems. And if you sense a problem on your property but need help dealing with it, ask someone to help you.

HOW TO PROTECT YOURSELF

Protecting yourself from bloodthirsty mosquitoes is a matter of common sense. The Sacramento-Yolo Mosquito & Vector Control District recommends following the **7 Ds** of Mosquito Prevention to stay safe during months when mosquitoes are active.

DRAIN any standing water that may produce mosquitoes. Today's puddle is tomorrow's mosquito nursery.

DAWN and **DUSK** are times to avoid being outside. This is when mosquitoes are most active. Remember: When the sun goes up or it's going down, that's when mosquitoes are flying around.

DRESS appropriately by wearing long sleeves and pants when outdoors. Yes, on some hot days, it's hard to think about wearing additional clothing – but those extra clothes may protect you from mosquito bites.

DEFEND yourself against mosquitoes by using an effective insect repellent, such as DEET (N,N-Diethyl-m-toluamide), Picaridin or Oil of Lemon Eucalyptus. Make sure you follow label directions! Repellents keep mosquitoes away, so they won't bite you.

DOOR and window screens should be in good working condition. Keep doors closed and make sure your screens are free of holes. This will prevent mosquitoes from entering your home and biting you when you are asleep.

DISTRICT personnel are available to address any mosquito problem you may be experiencing. Call the District at **1-800-429-1022**.

SWIMMING POOLS ARE A MAJOR PLACE WHERE MOSQUITOES CAN BREED

ONE NEGLECTED SWIMMING POOL CAN RESULT IN MILLIONS OF MOSQUITOES WHICH CAN INFECT AN ENTIRE NEIGHBORHOOD PUTTING YOUR HEALTH AT RISK.

 You can request mosquitofish from the District for an un-maintained pool by calling 1-800-429-1022, or by going online at www.FIGHTtheBITE.net. If you have a smaller portable or Doughboy pool, consider draining the water.



Use your containers!

Green waste on the streets gets into drains and gutters, creating mosquito habitats



ABOUT THE SACRAMENTO-YOLO MOSQUITO & VECTOR CONTROL DISTRICT



In 1915, amid a growing awareness that mosquitoes transmit disease, the California Legislature adopted the Mosquito Abatement Act, which provided the impetus for creating mosquito abatement acts throughout the state. On June 18, 1946, the Sacramento County-Yolo County Mosquito Abatement District was formed to protect the public from mosquito-transmitted diseases and provide relief from serious pest nuisances. The name was changed in July 1990 to better reflect the District's expanded services regarding ticks, yellow jackets and other vectors. The District is governed by a Board of Trustees; its members are appointed by municipal and county governments the District serves. The Sacramento-Yolo Mosquito & Vector Control District covers 2,013 square miles of territory. Its 74 employees are dedicated to providing safe, effective and economical mosquito and vector control to the two counties served by the District, which also emphasizes a strong program to inform and educate the public.

The District is a forward-thinking agency that employs **Integrated Pest Management (IPM)**, a comprehensive scientific approach to implement vector control strategies and management tactics. The District has been honored twice with the IPM Innovator Award from the Department of Pesticide Regulations, for developing and promoting effective methods of mosquito and other pest control that reduce the risks associated with using traditional chemicals and promote a healthier environment.

IPM incorporates five components:

Public information and education uses media, advertising, governmental affairs, community events, school programs and presentations to various organizations to inform people about mosquito control, West Nile virus and prevention methods.

Mosquito and vector surveillance monitors mosquito activity, mosquito populations, climate change and virus activity by testing mosquitoes, sentinel chickens and wild birds for the presence of virus or parasites; this information helps guide all control efforts.

Biological control uses living organisms to control a biological pest. For example, the mosquitofish (*Gambusia affinis*), when placed in abandoned pools eats mosquito larvae before they grow to adulthood.

Physical control, or manipulating the environment to reduce mosquito breeding sites, includes promoting effective drainage, controlling vegetation and timing irrigation appropriately.

Microbial and chemical control is the prudent use of chemical compounds (insecticides) to reduce mosquito populations; these are used when biological control methods have not maintained mosquito numbers below a tolerable level.

Some other services the District provides:

To keep neglected or un-maintained **swimming pools** from turning into breeding grounds for mosquitoes, the District will deliver mosquitofish to pools so the fish can eat mosquito larvae, before they turn into blood-sucking adults. Mosquitofish are offered free of charge for placement in pools, ponds, animal troughs or wherever else they may be needed. Street basins, or storm drains, are also major mosquito breeding spots, and yard waste placed at curbside can clog the basins, so the District actively encourages people to place yard and garden clippings in **green waste containers** instead of loose on the street.

Another breeding spot is in **cemeteries**, where flower vases can allow water to stagnate. The District works with cemeteries to add water crystals to the vases that turn water into a gel that keeps flowers fresh and keeps them from turning into mosquito nurseries. The District encourages cemetery visitors to keep the water crystals in the vases.

Other services include working with ticks that may transmit Lyme Disease and dealing with yellow jackets if they present a public health threat.

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