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 an egg to an 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.

DID YOU KNOW..

- Mosquitoes have existed for at least 210 million years.
- Female mosquitoes find their victims through sight, smell and warmth. They can sense carbon dioxide and lactic acid up to 100 feet away.
- Mosquitoes comprise *less than 1 percent* of a bat's diet.
- 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.
- Mosquitoes fly an estimated 1 to 1.5 miles per hour.

OUR MISSION

The Marin/Sonoma Mosquito and Vector Control District, founded in 1915, protects the health and welfare of the communities it serves from mosquitoes and vector-borne diseases by utilizing cost-effective, environmentally responsible integrated vector management practices.

OUR SERVICES

Our programs and services are funded through property taxes and benefit assessments and are provided at no additional cost to all residents of Marin and Sonoma counties.

Marin/Sonoma Mosquito & Vector Control District
595 Helman Lane
Cotati, CA 94931
Monday through Friday
7:00am to 3:30pm
707.285.2200
www.msmosquito.org

REDUCE, REUSE & RECYCLE WATER RESPONSIBLY

PROTECTING PUBLIC HEALTH SINCE 1915

REDUCE, REUSE & RECYCLE WATER RESPONSIBLY

It is a fact that mosquitoes need standing water to develop and that they have the capability to transmit disease to humans and animals. It is also a fact that water conservation is extremely important as communities face the threat of water shortages caused by drought and waste. However, we must not forget the responsibility of maintaining an environment that does not harm or affect human health.

MOSQUITOES & DISEASE

Mosquitoes can be annoying, but most importantly they have the ability to spread disease like West Nile virus (WNV).

West Nile virus is a serious disease that can be spread to humans, horses and other animals by mosquitoes.

Approximately 80% of people who become infected with WNV will not show any symptoms. 20% of infected individuals, however, will develop West Nile fever. Symptoms of West Nile fever may include headache, fever, body aches, vomiting, nausea, swollen lymph glands and skin rash on the chest, stomach and back. Less than 1% of those individuals may develop a more severe form of illness with symptoms such as high fever, headache, neck stiffness, disorientation, coma, paralysis, and in extreme cases, death. While there is no cure for WNV, it is preventable.

By following simple mosquito-proofing tips for common water conservation methods we can not only help protect the environment, but most importantly protect human health.

Rain Barrels

- Use a rain barrel with a mosquito-proof screen (fine mesh–1/16th of an inch) under the lid and covering the overflow hole.
- Keep your rain barrel lid and all connectors sealed.
- If possible, place your barrel on a surface that will soak up water that has overflowed.
- Keep your barrel free of organic materials such as leaves and debris.
- Remove water that may have pooled on the top of the barrel at least 1 to 2 times a week.
- Consider the use of a downspout diverter to direct water into the barrel.
- Inspect on a regular basis to be sure there are no cracks or leaks and that all seals and fittings remain intact.
- Keep gutters and downspouts clean and free of debris.

Water Tanks (cisterns)

- Cisterns (above and below ground) should be completely enclosed with no openings to the outside environment.
- Tightly seal cistern lids and connections.
- Cover all inlets, outlets, and vents with fine mesh screening (1/16 of an inch).
- Keep gutters and downspouts clean and free of debris.
- Inspect on a regular basis to be sure there are no cracks or leaks and that all seals and fittings remain intact.

- The area surrounding cisterns should be designed to either divert or absorb excess water from overflow.
- The inside of the cistern must be accessible for periodic maintenance as well as inspection by mosquito control personnel.

Best Management Practices (BMPs) for mosquito control

It is important that storm water treatment, storage and re-use features and systems are designed and properly maintained. Correct design and maintenance minimizes the potential for mosquito production, repeated mosquito larvicide applications, mosquito-borne disease transmission, and other public health issues.

The following list provides key components that can help minimize mosquito production in stormwater recycling systems.

Construction and Design

- Select and maintain proper grade for water conveyance (e.g. swales, retention features, cross drains).
- Systems should completely dewater within 72 to 96 hours.
- Avoid loose-fitting rock or rip rap that may trap water, creating an ideal environment for mosquito production.
- Systems should be easily accessible.

Vegetation Selection

- Choose appropriate vegetation for the specific project.
- Native, low-growing vegetation is preferred to minimize the potential for mosquito production in storm water treatment and rain water harvesting systems. This will also allow for efficient mosquito control, if necessary.
- Do not plant cattails or other aquatic plant species that can become invasive such as creeping water primrose (*Ludwigia* species), water hyacinth (*Eichhornia*), and parrot feather (*Myriophyllum* species).
- Do not surround rain gardens, swales, or retention features with dense vegetation that could hinder access.

Maintenance

- Develop and adhere to a maintenance plan and schedule.
- Periodic sediment removal may be necessary to minimize mosquito habitat (e.g. swales, retention features, cross drains) and maintain proper function.
- Aggressively manage unwanted vegetation.
- Mow or thin out vegetation regularly to avoid overgrowth, ensure proper system function, and facilitate access.
- Keep inlets and outlets serviceable and free of debris.

It is your responsibility to maintain <u>any and all</u> water reuse and recycling systems in a manner that does not allow for mosquito production.

The Marin/Sonoma Mosquito & Vector Control District operates under the California Health and Safety Code (Division 3, Chapter 1, Article 5, Section 2060 et. al.).