

Mosquito Control

Mosquitoes breed in all kinds of water - from small containers such as treeholes and tin cans to large bodies of water like lakes or marshes. Mosquito breeding water may be salty or fresh, polluted or clean, standing or slow moving. All of these breeding places create a variety of mosquito problems.

Mosquitoes can be controlled either as adults or larvae. Adult mosquitoes can fly from the breeding site and become difficult to find. Controlling mosquitoes after they have become adults requires expensive and complicated equipment. This equipment is usually run by a city or county. These machines create a very fine mist of insecticide that kills adult mosquitoes flying into it.

Wherever possible, it is best to use larval mosquito control. This prevents adult mosquito problems before they get started. There are many ways to perform larval control. They may include eliminating or changing the breeding sites, using insecticides, or introducing predators such as fish. Many times the mosquitoes that are a problem to homeowners result from breeding sites in their own backyards! Water-holding containers such as treeholes, tires, tin cans, uncovered boats, leaf-clogged rain gutters and planters may breed mosquitoes. Emptying the water from these places can be a quick and effective way to control mosquito problems around the house.

Preventing Mosquito Bites

Wear long sleeve shirts and long pants.

- Avoid outdoor activity when mosquitoes are most active.
- Use one of the three mosquito repellents recommended by Centers for Disease Control (CDC). DEET (30 percent or less for adults and 10 percent or less for children) and picaridin are considered to be the most effective mosquito repellents. Oil of lemon eucalyptus also repels mosquitoes but is less effective than DEET. Follow the label directions when using any of these products.
- Use screened windows and doors.

Another way to reduce mosquito bites is to get rid of mosquito breeding places around the home.

- Empty, destroy, recycle or cover containers like tires, tin cans, buckets and bottles where mosquitoes can lay their eggs.
- Change water in birdbaths and pet bowls at least once a week.
- Remove or empty dishes under potted plants.
- Stock ponds and ditches with fish.

NEED MORE INFORMATION?

Contact your Local Health Department or the Public Health Pest Management Section at **(919) 733-6407.**



*N.C. Department of Environment
and Natural Resources
Division of Environmental Health
Public Health Pest Management Section*
<http://www.ncenvirohealth.org>

Revised 09/15/08

Mosquitoes



...Some Facts

Mosquitoes are a problem to humans because they are annoying and they may carry disease. Here are some facts about mosquitoes.

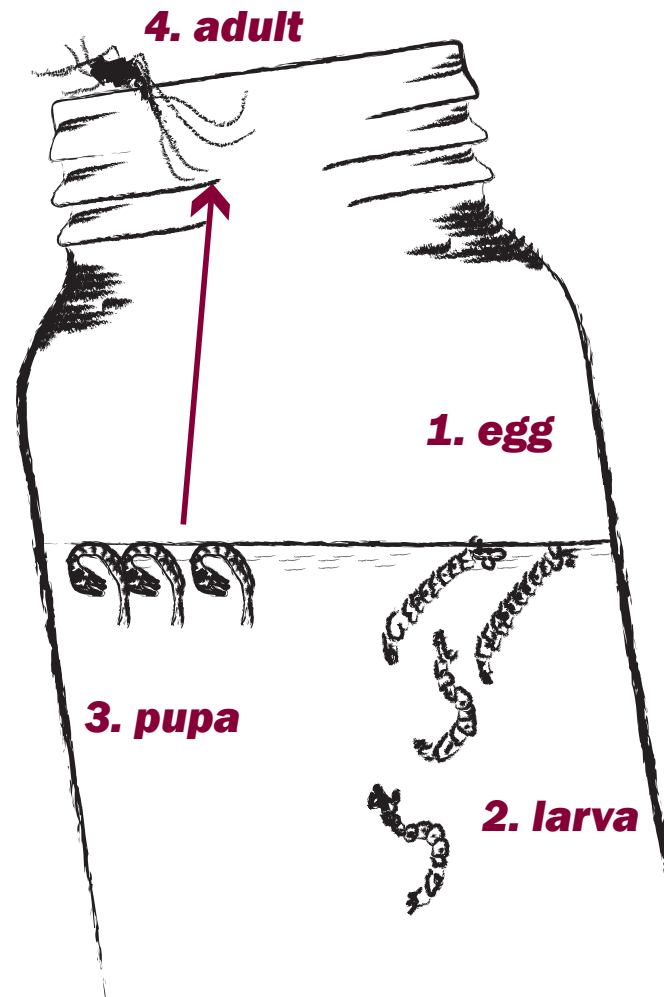
Mosquito Biology

Mosquitoes are insects that are close relatives of houseflies. There are four stages of growth in the mosquito life cycle – egg, larva, pupa and adult.

The eggs of some types of mosquitoes are laid on water and hatch in one or two days. Eggs of other types of mosquitoes are laid in places that are dry but will fill with water. These eggs may survive several months before hatching. Larvae hatch from the eggs and live, feed and grow in the water. Fully-grown larvae change into pupae. During the pupal stage, feeding stops and changes occur that lead to the adult stage. Adults emerge from the pupae, leave the water and take to the air. The cycle from egg to adult mosquito may be as short as a week.

Soon after becoming adults, male and female mosquitoes mate. Only the female mosquito takes a blood meal; this is required to produce her eggs. Each type of mosquito may prefer blood from a different kind of animal – birds, frogs, deer or humans.

There are more than 60 types of mosquitoes in North Carolina. Many of these are not a problem because they do not attack humans. Adult mosquitoes may live about two to three weeks, During this time the female can take several blood meals and lay hundreds of eggs.



Mosquitoes and Disease

Mosquitoes are carriers (or vectors) of many diseases around the world. Malaria, yellow fever, dengue fever and filariasis are some of the most common. While these diseases occur overseas, they are not currently spread by mosquitoes in North Carolina. Malaria was once found throughout the southern United States but has been stopped in this country as a result of mosquito control, medical treatment and improved living conditions. In North Carolina, three viruses are carried by mosquitoes to people – Eastern equine, La Crosse and West Nile. In some cases, the illness caused by these viruses may be severe and result in encephalitis or death. Heartworm is a common disease of dogs carried by mosquitoes.



Mosquito Problems Start At Home!

**For More Information
Contact the**
Department of Environment and
Natural Resources Public Health
Pest Management Section
at (919) 733-6407.
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Mosquito Problems Start At Home



Throw away old bottles and cans

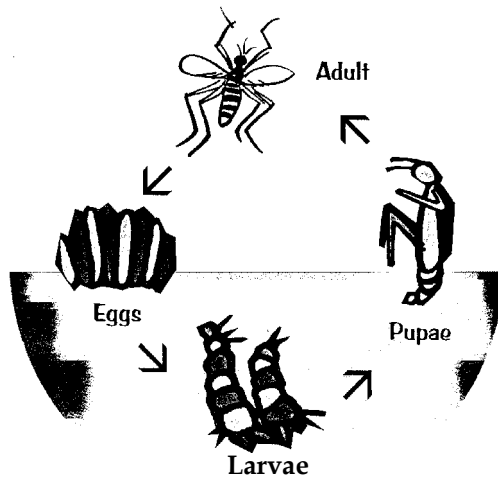


Clean overgrown ponds and stock with fish



Clean leaf-clogged gutters

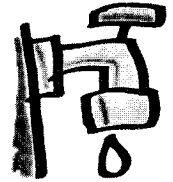
Mosquito Life Cycle



It takes about one week for a mosquito to grow from egg to adult



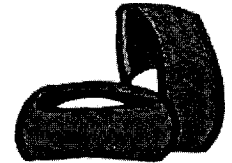
Empty water from flower pot dishes



Repair Leaky Faucets



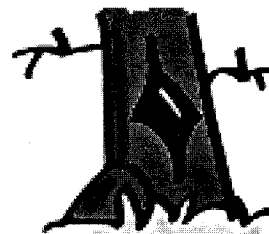
Screen or cover rain barrels



Throw away or destroy old tires



Change water in birdbaths weekly



Fill treeholes

DON'T GIVE MOSQUITOES A CHANCE!!

Mosquitoes need water to breed and grow. It doesn't take much water and it doesn't take much time. So, almost anything that will hold water for one week or more can produce these pests. Many places around your home may be causing mosquito problems. Destroy or empty these places and mosquitoes won't have a chance!

Viruses that are carried by mosquitoes are called **arboviruses**. Arbovirus stands for arthropod-borne virus. In North Carolina, there are three arboviruses that are spread by mosquitoes to people, eastern equine encephalitis (EEE), LaCrosse encephalitis (LAC), and West Nile Virus (WNV).

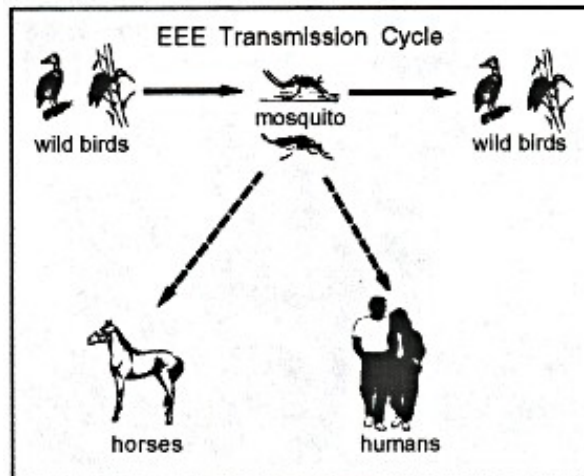
Most arboviruses occur in wild animals especially certain types of birds or small mammals. In nature the virus is spread from animal to animal by mosquito bites. Sometimes, however, an infected mosquito will bite a human or domestic animal (like a horse). The most common way for humans to get an arbovirus is from the bite of an infected mosquito. In rare situations virus has come from blood transfusions. The virus cannot be spread directly from infected animals or humans to another human. Several humans may be infected with an arbovirus each year. In North Carolina you can do several things to reduce your chance of getting an arbovirus.

Eastern equine encephalitis (EEE)

Eastern equine encephalitis (EEE) is mainly a bird disease. Occasionally, when mosquito populations grow very large, the disease can be transmitted to horses or humans. EEE is a rare disease, but it can cause death in both humans and horses. Usually one to

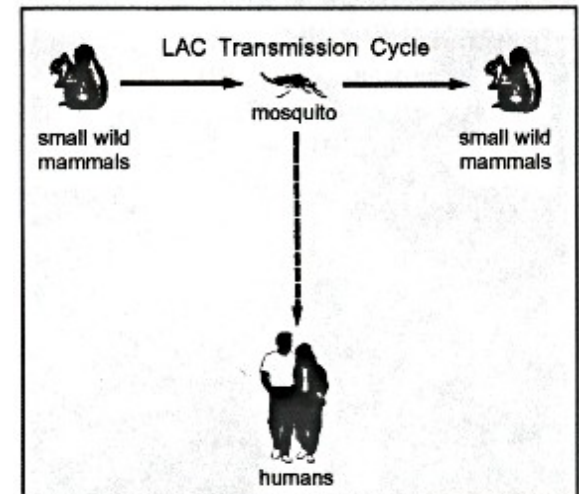
three human cases are reported in North Carolina each year. About 50 percent of human EEE cases are fatal. Young children and elderly people are most susceptible to the disease. In North Carolina this disease is more likely to occur in coastal or eastern piedmont areas late in the summer or early fall.

Symptoms can develop from a few days to two weeks after being bitten by an infected mosquito. They include rapid onset of fever and headache and can resemble a case of flu. In some cases, the disease can progress, causing tremors, convulsions, comas and death. Survivors of EEE infections may suffer from long-term effects to the nervous system. Therapy is limited to treating the symptoms of the disease but there is no specific cure. There is a vaccine for horses but not for humans.



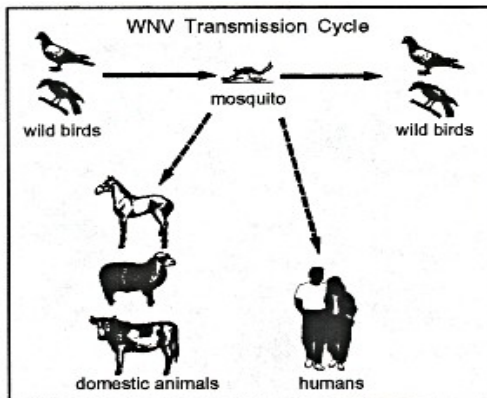
LaCrosse encephalitis (LAC)

LaCrosse encephalitis (LAC) is a disease associated with small mammals like squirrels, chipmunks, rabbits, and mice. In North Carolina, the disease is found in the western part of the state. Symptoms occur from a few days to a couple of weeks after being bitten by an infected mosquito. These symptoms include fever, headache, nausea, and vomiting. In more severe cases, convulsions, tremors, and coma can occur. LAC usually causes a milder disease than EEE and rarely causes death. Young children seem to be most susceptible. About five cases of LaCrosse encephalitis are reported each year in North Carolina, but many other cases may be mild and unreported.



West Nile virus (WNV)

West Nile virus (WNV) was first found in the United States during 1999. Since then the virus has spread throughout the country, including North Carolina. Like EEE, WNV is mainly a disease of birds and is carried by mosquitoes. In some birds, especially crows and blue jays, WNV may cause death. Sometimes WNV may infect people, horses, or other animals. Symptoms of the disease in humans are usually mild and include fever, headache, swollen glands, and a rash. Encephalitis and death may occur rarely. WNV is most serious in people who are 50 years of age or older. There is now a vaccine to protect horses against WNV, but there is no vaccine for people yet.



Preventing Mosquito Bites

Because so few mosquitoes carry the viruses, reducing mosquito bites can help prevent the diseases:

- Wear long sleeve shirts and long pants.
- Avoid outdoor activity when mosquitoes are most active.
- Use one of the three mosquito repellants recommended by CDC. DEET (30% or less for adults and 10% or less for children) and Picaridin are considered to be the most effective mosquito repellants. Oil of lemon eucalyptus also repels mosquitoes but is less effective than DEET. Follow the label directions when using any of these products.
- Use screened windows and doors.

Another way to reduce mosquito bites is to get rid of mosquito breeding places around the home:

- Empty containers like flowerpots.
- Discard water-holding containers, especially used tires.
- Repair leaky outdoor faucets.
- Keep gutters clean and in good repair.
- Put fish in ponds.
- Fill in potholes and puddles.
- Change water in birdbaths and pet bowls every 3-4 days.

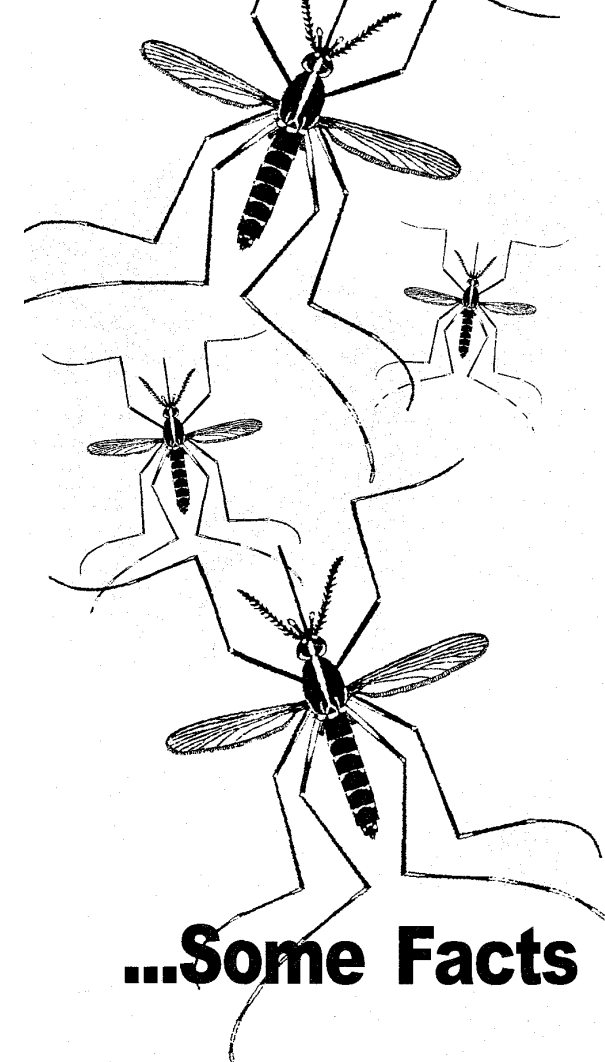
You can also treat standing water with products containing the bacteria *Bacillus thuringiensis, var. israelensis* (Bti).



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North Carolina Department of Environment and
Natural Resources
Division of Environmental Health
Public Health Pest Management Section



Mosquito Viruses



...Some Facts

What should I do if I think I have been infected with West Nile virus?

Anyone who may be ill from WNV should see a doctor as soon as possible. Although there is no cure for the infection, most people who are infected with WNV have only mild symptoms, if any at all, and recover fully with supportive treatment.

What is North Carolina doing about West Nile virus?

North Carolina has a well established history of managing other diseases carried by mosquitoes, such as Eastern Equine encephalitis and LaCrosse encephalitis. As it has done with these other viruses, North Carolina health officials will manage WNV through early detection, mosquito control and education.

If WNV poses a public health risk for an area, local and state public health officials will respond with appropriate mosquito control measures and encourage residents to follow personal protection strategies.

As always, communities and individuals should follow preventative steps to reduce mosquito breeding and protect themselves against bites.



NEED MORE INFORMATION?

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N.C. Department of Environment and Natural Resources
Division of Environmental Health
Public Health Pest Management Section
<http://www.deh.enr.state.nc.us/phpm/index.htm>

Revised: 4/03/09

West Nile Virus



What is it?

What is West Nile Virus? West Nile is a virus carried by mosquitoes that can cause illness in some people.

How is West Nile virus spread? People mainly get West Nile virus (WNV) from the bite of an infected mosquito. After biting an infected bird, the mosquito can transmit the virus to people or other animals. The virus has also been transmitted with infected blood through transfusion. Transmission from person to person by casual contact does not occur.

What are the symptoms of West Nile virus? Most people who are infected with WNV suffer no symptoms at all. WNV may cause headache, fever, swollen glands, muscle aches and often a rash. In severe cases, it may cause an infection of the brain called encephalitis.

Who is most at risk from West Nile virus? People 50 years of age and older and those with health problems are most at risk for serious illness from WNV.

Is there a vaccine for West Nile virus? Currently, there is no vaccine to protect people from WNV. Scientists are working to develop one in the near future.

Can animals become infected with West Nile

West Nile virus infection is common in birds and horses but has also been found in cats, dogs, cattle and many other animals.

virus? Signs of infection in a horse may include nervousness, irritability, staggering and lack of coordination.

There is a vaccine to protect horses from WNV infection.

What can I do to protect myself from West Nile virus?

Avoiding mosquito bites can greatly reduce your chance of becoming infected with West Nile virus. To avoid bites:

- ✓ Wear long-sleeved shirts and long pants.
- ✓ Avoid places where there are mosquitoes.
- ✓ Avoid being outdoors when there are a lot of mosquitoes, particularly at dusk and dawn.
- ✓ Use repellents containing DEET (30 percent or less for adults, 10 percent or less for children) or picaridin, carefully following the label instructions. IR3535 and oil of lemon eucalyptus, a plant-based repellent, has also shown to be effective at preventing mosquito bites.
- ✓ Keep screens on windows and doors in good repair.

Use the tips below to protect yourself, your family and your community from West Nile virus and other illnesses carried by mosquitoes by reducing mosquito breeding sites.

✓ Empty, destroy, recycle or cover containers like tires, tin cans, buckets and bottles that hold water where mosquitoes can lay their eggs.

✓ Change water in pet bowls and bird baths at least once a week.

✓ Remove or empty dishes under potted plants.

✓ Stock ponds and ditches with native fish.

✓ Cover unused pools.

✓ Clean clogged rain gutters.

✓ Repair leaky outdoor faucets.

✓ Put special 'donuts' made with mosquito-killing bacteria in water where mosquito eggs may hatch.
