Pest e-alerts

Entomology and Plant Pathology, Oklahoma State University
127 Noble Research Center, Stillwater, OK74078
405.744.5527

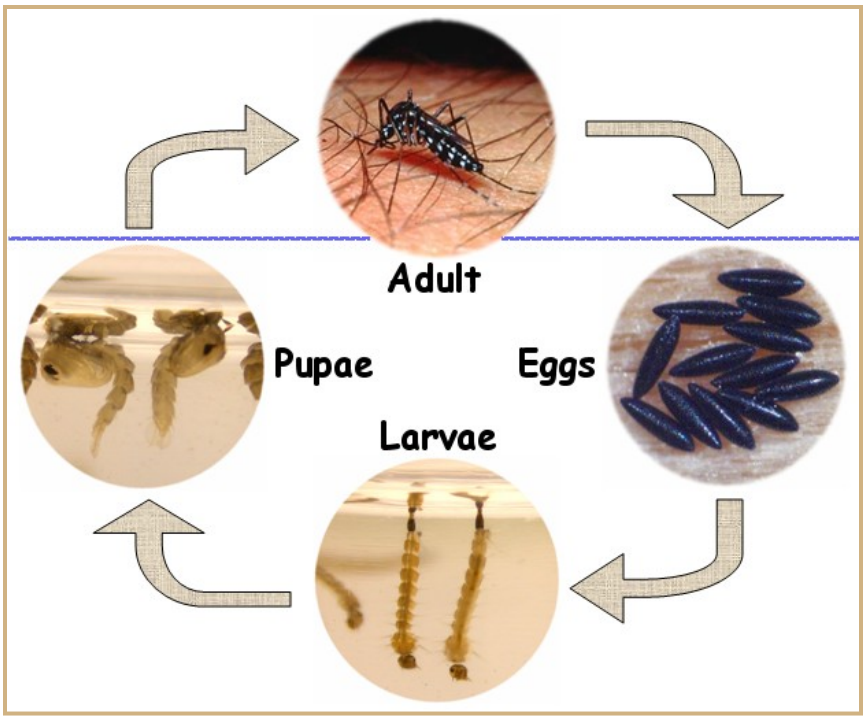
Vol. 13, No. 20 http://entoplp.okstate.edu/Pddl/ **Jun 20, 2014**

Rain and the mosquitoes they bring!

Justin Talley, Extension Livestock Entomologist
Bruce Noden, Medical/Veterinary Entomologist

There are over 60 species of mosquitoes in Oklahoma, but it is important to know a little about mosquito biology, the season when the important biting and transmitting species are abundant, and how one can help reduce populations of mosquitoes.

Mosquitoes have four distinct life stages: egg, larva (four stages), pupa, and adult. The larval and pupal stages are found only in water. Eggs are laid on the water or at the edge of the water depending on species. Only adult female mosquitoes bite and feed on blood. They must do so to develop their eggs.



Asian tiger mosquito life cycle

One way mosquitoes can be grouped is by the type of water (aquatic habitat) in which the larvae are found. Two such groups are flood water mosquitoes and container mosquitoes.

Flood Water Mosquitoes (*Aedes*, *Ochlerotatus,* and *Psorophora* species)

These mosquitoes are most often found in standing water remaining after heavy rainfalls or flooding. Mosquitoes in this group spend the winter as eggs that have been laid at the edge of standing water the previous year. Some species can have several generations in the same year, but in all cases the eggs hatch only after they have been dried for a time and then are **flooded** in some manner. Flood water pools must remain long enough for larvae and pupae to develop, 7-15 days depending on temperature. Many thousands of eggs are hatched at the same time and huge numbers of mosquitoes develop and emerge as adults within a few days.

These species tend to have **population peaks in the spring and early summer**, April through June, and are the primary nuisance pests that we experience this time of year. Sometimes locally heavy thunderstorms in the summer and early fall cause localized flooding resulting in large mosquito populations in those areas. Species in this group bite during the evening hours or when disturbed in shaded wooded areas. Most species feed readily on humans and a wide range of animal hosts, but do not prefer birds. Most of these mosquitoes live two to three weeks, but die sooner when the weather gets very hot. If there are no heavy rains and flooding we do not have summer populations of this group. Generally these species **are not the ones that transmit WNV**. However**,** they often can be severe nuisance pests and often warrant some type of control measure.

***Ochlerotatus* sp.**

Container mosquitoes

Several species of mosquitoes lay their eggs on or at the edge of water in containers of all types ranging from small cans, buckets, bird baths, flower pot bases, plugged rain gutters, poorly maintained water gardens to old tires. Most of these species develop from egg to adult in 7-10 days and can have continuously emerging adults all summer. The **Asian tiger mosquito, *Aedes albopictus***, an introduced species, occurs in almost any kind of container and has become the **most important pest species** in most urban areas of Oklahoma **from early June through the fall.** It readily bites humans and feeds during mid-afternoon to early evening. Although scientists are not certain yet, they suspect this species may be good intermediate vectors that can become infected with West Nile Virus (WNV) from birds and later transmit it to humans or horses. While its importance as a vector for WNV is suspected, *Aedes albopictus* is the main vector of heartworm (the filarial worm that causes significant many problems for dogs and cats) in Oklahoma.

This species is difficult to control in the larval stage because it occurs in many small containers that hold water. The usual mosquito adult sprays do not work well because these sprays must be applied around sunset or later when the thermal currents are not rising and when most mosquitoes are active. Since the Asian tiger mosquito is most active in mid-to-late afternoon, the usual mosquito adult spray programs are not applied when the mosquito is active and the spray droplets do not contact the adults.

Asian tiger mosquito, *Aedes albopictus*

Mosquito Control

Mosquito control can be divided into two areas: larval control and adult control. Most often the more successful control programs combine both of these two to reduce mosquito populations. These combined programs are known as an Integrated Pest Management (IPM) program, which take into account ecological, social, and economic criteria when implementing control strategies. An IPM program includes both non-chemical and chemical strategies to reduce mosquito populations. Some non-chemical methods include source reduction (eliminating standing water where mosquito larvae can develop), utilizing biological control agents such as Gambusia fish that feed on mosquito larvae, and invertebrate predators, parasites, or pathogens that also target mosquito larvae.

The first step to implementing any control program for mosquitoes is a surveillance program that identifies and quantifies mosquito development areas. These programs are usually deployed by a local mosquito control district but Oklahoma is lacking in these districts except for the larger metropolitan areas such as Oklahoma City and Tulsa. Some local city governments will implement these on merely a complaint basis but is usually dependent on city budget funds that are available for this specific purpose. Some pest control operators will also provide this service before they implement any control methods.

Larval Control

Probably the most efficient means to reduce a mosquito population is by eliminating any larval development sites on your property. As mentioned earlier reducing mosquito larvae can be accomplished either in a non-chemical (reducing standing water) manner or a chemical (larvicides) manner. Larvicides are chemicals that can be applied to mosquito development areas such as bodies of water and are classified as either stomach toxins (*Bacillus thuringiensis*), contact larvicides (pyrethroids), surface agents (oils or soaps), natural agents, and insect growth regulators (IGR; methoprene, diflubenzuron). When applying larvicides efforts should be made to concentrate application to the edges of the water near shorelines of ponds since mosquito larvae are not present in the entire water body. Listed below are some recommendations from the American Mosquito Control Association (www.mosquito.org):

1. Irrigate lawns and gardens carefully to prevent water from standing for several days.
2. Clean debris from rain gutters and remove any standing water under or around structures, or on flat roofs. Check around faucets and air conditioner units and repair leaks or eliminate puddles that remain for several days.
3. Destroy or dispose of tin cans, old tires, buckets, unused plastic swimming pools or other containers that collect and hold water. Do not allow water to accumulate in the saucers of flowerpots, cemetery urns or in pet dishes for more than 2 days.

Adult Control

When dealing with an adult population of mosquitoes homeowners should consider several factors when choosing a control technique. The first is to understand the specific goal for eliminating the mosquito population for example, controlling a mosquito problem around outdoor entertainment areas versus reducing the impact mosquitoes have on everyday activities. Adult mosquito control options can depend on which goal you are targeting and the quickest and easiest manner to reduce a population is to utilize insecticides that are applied through either a fogger or ultra-low volume applicator.

Personal Protection

Everyone should exercise good judgment in preventing mosquito bites. If mosquito populations are high one should avoid being in areas where they are abundant, wear long sleeves and long pants, and/or use a repellent. All the most effective brand name repellents contain the same repellent, DEET. **Many formulations will not say DEET** on the label, but all must list the active ingredient name, **N,N-diethyl-meta-toluamide** on the label. Look for this chemical name and its percentage concentration before buying a product. Concentrations can range from 7% to 100% with most being in the range of 10 to 24%. All concentrations are effective except that the higher concentrations last longer. Even the lowest concentration, which is preferred for small children, gives one to two hours of protection if it is not washed or rubbed off. Use according to label instructions. Remember that **WNV has a greater impact on people age 50 years and up**, than on children, so it is very important to protect adults. Also, when applying the repellent be sure to apply to your clothing as well since most of the mosquitoes previously described can bite through clothing especially thin types such as t-shirts or any type of shirt such as those that wick away sweat such as athletic apparel.

Another option to consider for personal protection is the use of personal diffusers that attach to one's person (examples include OFF® Clip-on™ Mosquito Repellant and Terminix® ALLClear® Sidekick Repeller). While recent research has demonstrated that wristband, candles and spatial (backyard diffusers) products are of limited value in controlling mosquitoes around the back yard area, personal diffusers that can attach to one's person have provided significant reduction in mosquito nuisance biting in independent research testing.

***The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.**

Dr. Richard Grantham - Director, Plant Disease and Insect Diagnostic Laboratory

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural.