Zika Panic Still Premature in NC

Bad news travels way faster than the Zika virus. And that is good news. It is true that Zika has now been transmitted within Southern Florida (as of July 27th). BUT, Southern Florida is not North Carolina. In North Carolina, we still have NO known cases of Zika transmitted by mosquitoes. The few cases in North Carolina are travel-related, and were not transmitted by mosquito. In other words… it is still not time to panic! North Carolinians are calling-off outdoor fun, spraying far more pesticide around their homes and families than usual, and are looking suspiciously at, if not shrieking and running from, every mosquito that they see.

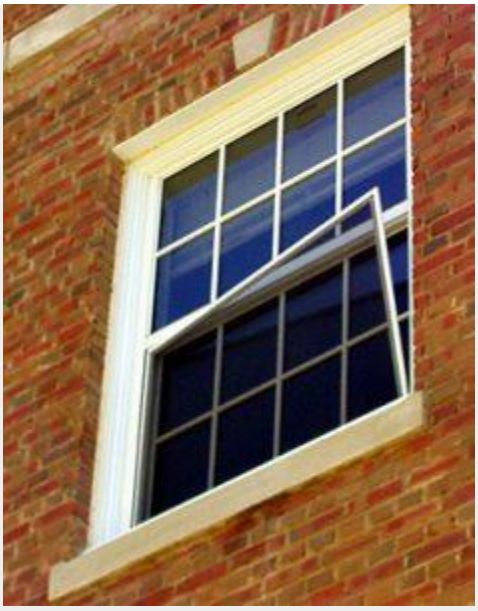
Zika is a significant disease and is being monitored closely, as it should be. However, seeing mosquitoes in a North Carolina yard now (like every summer) does NOT indicate a greater risk of getting Zika virus. At this stage, there is not even a need to get the mosquitos you see tested, according to Dr. Michael Waldvogel, Extension Entomologist at NC State University. This is not a North Carolina problem yet, other than experts carefully watching for spread toward our area. In fact, the mosquito famous as a vector of Zika virus, the Asian tiger mosquito, has not even been found in recent years in entomological surveys in North Carolina (monitoring for them continues of course). We, as an Extension of North Carolina State University in Lincoln County, will be getting the word out immediately if the University detects a rising threat that should concern you.

Even if you are not reacting to any immediate threat of Zika virus, the reduction of mosquito populations is still important. Fewer mosquitos mean a reduction in both nuisance biting and the risk of other mosquito-borne diseases which do occur in low numbers in North Carolina.

If you want to get proactive about mosquitos in a practical and sensible way, you have effective options besides spraying. One big one is draining, filling-in, or removing receptacles for standing water around your property. That includes low spots in the yard, old tires, rusty old red wagons, forgotten tea cups, fallen magnolia leaves, outside potted plant saucers, etc.

Please see our web page at http://lincoln.ces.ncsu.edu for detail information on safely controlling mosquitos on your property, or call our office at 704-736-8461 with your questions.

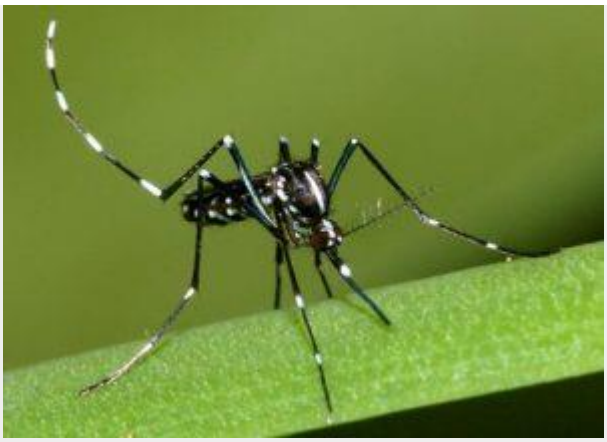
The following information from Dr. Waldvogel and NC State University will give you further insight into pest management to protect your family from mosquitos.



Make sure window screens fit properly to exclude mosquitoes. (Photo – M. Waldvogel, NCSU)

Integrated Mosquito Management

When used properly, pesticides are an important component of a mosquito control program. However, we can actually have a far greater long-term impact on mosquito populations when we use an ***integrated mosquito management*** *approach which starts with some simple and common sense tactics, such as keeping mosquitoes out of our homes and businesses. Although this sounds easy enough for those of us who have air conditioning and can keep our homes closed up tightly, there are many people who do not have air conditioning and must keep their windows and doors open and rely on fans to circulate some fresh (and hopefully cooler) air throughout their house. In those situations, keeping window and door screens in good condition and fitting properly is critical to keeping out mosquitoes.*



Asian tiger mosquito (photo – Susan Ellis (www.bugwood.org)

Although we have about 65 species of mosquitoes in North Carolina, our primary "mosquito of interest" is the Asian tiger mosquito (ATM), Aedes albopictus *(see here). The primary "vector" or transmitted of Zika virus is the "yellow fever mosquito",* Aedes aegypti*, which has not been found in recent surveys in North Carolina (but could possibly show up at some point). Back to our main culprit – Asian tiger mosquito likes to feed during the daytime when we're out working and/or playing, but it will feed "dawn to dusk". If we really want to put a dent in the mosquito populations around our homes and communities, then we need to focus on the fancy-sounding concept of* ***source reduction****. What that simply means is we need to get out in our yards and community and find ways to disrupt or (preferably) eliminate the many mosquito breeding sites that can be around our homes and are likely due to our own activities (or inactivities!). Asian tiger mosquito does not breed in lakes or ponds (it may be found in pockets of water along the fringes of lakes or ponds). It prefers to lay its eggs in temporary resources – objects/areas that fill with debris and water (or will fill with water). The debris is a food source for the hatching larvae (immature mosquitoes) and as the water slowly stagnates, it attracts more female mosquitoes. The eggs are very durable and can survive cold winter temperature as well as periods of drought. It may actually take several periods of flooding and drying in these areas before all of the mosquito eggs hatch. However, when eggs hatch, a new generation of mosquitoes can be produced in two weeks.*

An unpublished study in the 1980s led by Dr. Charles Apperson (Entomology professor emeritus at NCSU) looked at potential Asian tiger mosquito breeding sites found in typical residential settings down in the Wilmington area. Here's what they found:

Containers used as breeding sites by Aedes albopictus

Source	*No. Positive*	*Total Examined*	*Percent*
Misc. containers	*92*	*148*	*62.2%*
Buckets	*24*	*39*	*61.5%*
Plant dishes	*33*	*48*	*68.8%*
Tree holes	*7*	*8*	*85.5%*
Plastic film (tarps)	*8*	*11*	*72.7%*
Bird baths	*8*	*27*	*29.6%*
Tires	*11*	*20*	*55.0%*
Toys	*8*	*14*	*57.1%*

Quite obviously – in the war against the Asian tiger mosquito, we are often our own worst enemy. If we are serious about wanting to reduce mosquito populations and reduce the likelihood of mosquito-borne diseases, then we need to focus our attention on a community-wide effort to "tip and toss" these mosquito breeding sites:

Bird bath with stagnant water. (Photo – M. Waldvogel, NCSU)

***Bird baths** – clean them out periodically and flush them out routinely with a garden hose. You'll flush out the mosquito larvae in the process. Plus, the birds will appreciate the fresh water. Do the same with the outdoor water bowls for your pets. Horse (and livestock) owners that have water troughs near stalls or out in pastures can also use products such as "Mosquito Dunks®" which contain the bacteria Bacillus thuringiensis israelensis which kill*

*mosquito larvae (but **not** adult mosquitoes) and a few fly species while not posing a hazard to the animals that use the troughs as their drinking water.*

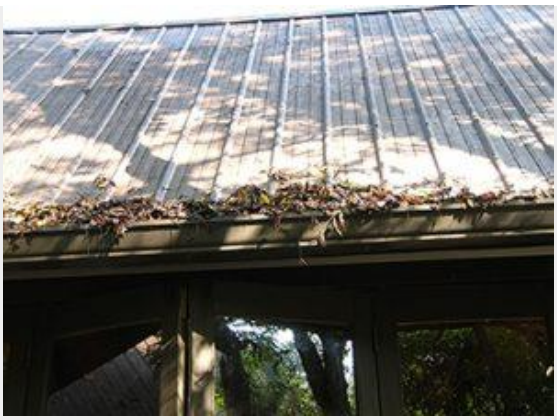
Asian tiger mosquito larvae in a paint can filled with debris and rainwater. (Photo – M. Waldvogel, NCSU)

***Cans and other containers** – now is the time to empty them and dispose of them properly at your municipal recycling center (if suitable) or at a designated landfill. Improperly/illegally discarded items such as cans, appliances, tires, etc. can become a serious problem in terms of mosquitoes.*

Swimming pool tarp filled with rainwater, debris and mosquito larvae (Photo – M. Waldvogel, NCSU)

Plastic tarps *that cover your boat, pool, grill, firewood, etc. can collect pockets of water that can remain for several weeks.*

Swimming pools *and kids' wading pools that are not used or maintained are probably being used by the mosquitoes (and maybe some toads) – empty and overturn them (and make sure that the pool water drains from the area). These same problems can occur with poorly maintained in-ground and large above-ground pools (e.g., pools on abandoned or foreclosed properties). Here's a picture of a poorly-maintained tarp-covered swimming pool that is collecting stagnant water filled with algae, dead leaves and Asian tiger mosquito larvae.*



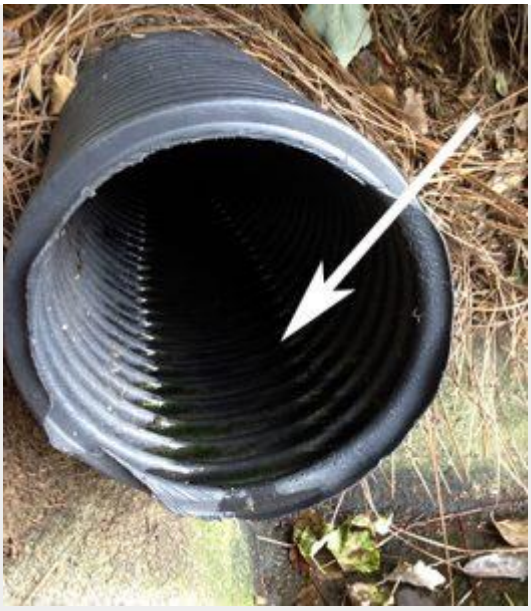
Keep your gutters free of debris so rainwater drains properly. (Photo – M. Waldvogel, NCSU)

Gutters *– Remove all of the leaves and other debris that build up in your gutters. Although the leaves on the top may seem dry, the water and wet decaying material trapped underneath this layer attract mosquitoes and can also lead to structural problems with*

wood-decay in the roof and fascia boards and create conditions conducive to problems with wood-damaging pests such as termites and carpenter ants.

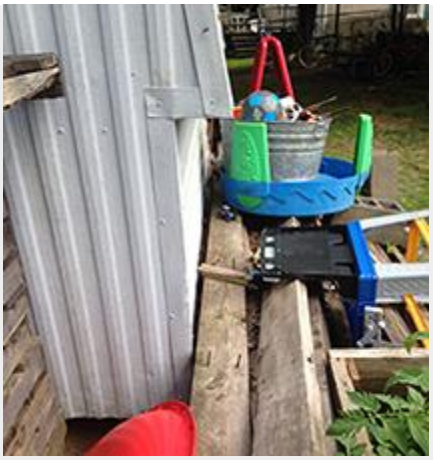
Keep rain barrels screened to exclude debris and mosquitoes. (Photo – M. Waldvogel, NCSU)

Rain barrels – *They're a great way to conserve water resources by collecting rainwater from your roof's downspouts. However, they can also unintentionally become a great way to raise mosquitoes. The commercial versions of these barrels are equipped with screens that keep out trash and keep mosquitoes from laying eggs inside. If you decide to make your own rainwater collector by using an old barrel, then you be sure to place ordinary window screening over the top.*



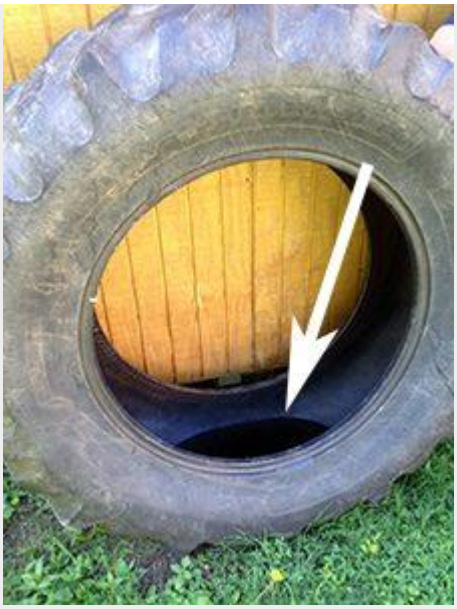
Make sure drain pipe tilt down and drain away from your home. (Photo – M. Waldvogel, NCSU)

Downspout drain pipes *– The concept is simple – channel rainwater so that it drains away from your house (and doesn't pool up against your foundation). Also, if you install those black plastic drainage pipes to the downspout, remember this thing called "gravity". I don't mean the movie. Water isn't going to flow uphill on its own. Make sure the pipe is placed properly so that the water drains out and away and water doesn't pond in one spot near your house. Here's a picture of a plastic pipe behind a restaurant in Raleigh where even a slight upturn in the pipe causes water to pool and stagnate inside it and so it becomes an Asian tiger mosquito habitat. (My thanks to Randy Buchanan with the Henrico Co. (VA) DPWEES Standing Water Initiative for mentioning this common problem to me).*

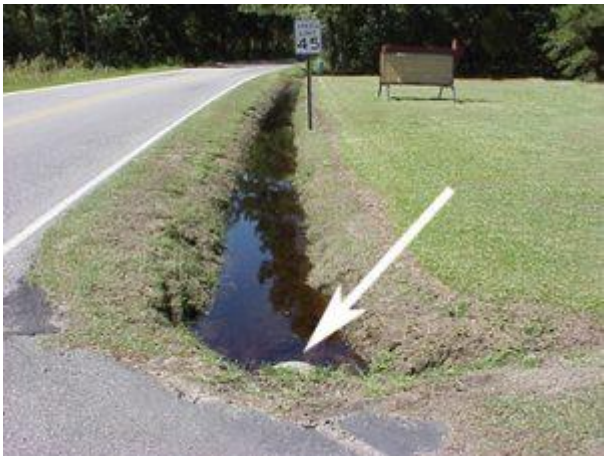


Clutter in this yard collects and holds storm water & debris which attracts mosquitoes

Trash, trash cans and tires *– Simple equation: Clutter + Rain = Mosquitoes. Make sure trash cans have tight-fitting lids which will also keep out pests such as rats and raccoon which can damage trash bags creating more problems. Discard or at least cover old tires (but don't let water pool in the plastic cover either!). If you use tires to make a swing for your kids, be sure to drill holes through the bottom of the tires so rain water drains out quickly.*



Even the small about of trapped rainwater in this tire can support hundreds of mosquito larvae (Photo – M. Waldvogel, NCSU)



Stormwater run-off and debris in drainage ditches become mosquito breeding grounds. (Photo – M. Waldvogel, NCSU)

***Drainage ditches** – they're meant to collect storm water that runs off roads and yards temporarily. Over time, they also collect soil and debris from storms, erosion and mowing. Keep them free of debris so that water flows and has time to filter into the soil. In the picture above from Hurricane Fran (1996), storm and other debris had created a dam at the end of the culvert running under the driveway (arrow) which caused the ditch to become mosquito-infested in just a matter of days*

Tree holes created by damaged limbs collect water and debris for mosquito breeding (Photo – M. Waldvogel, NCSU)

Tree holes *– when limbs fall off trees, the remaining hole in the trunk can collect water. Flush out the tree hole and fill the hole with expandable foam (not concrete).*

Outdoor flower pots *– empty the water from the dishes/trays underneath them. Your plants have plenty of water without the overflow. Overwatering plants can also lead to problems with root rot and fungus gnats infesting the plant soil.*

Mosquito Traps

There are a number of traps available at retail stores and online. Some of these use special chemicals that mimic odors that attract mosquitoes. The traps will catch lots of mosquitoes if placed properly but using them to "control" mosquitoes is unlikely to succeed.

Personal Protection

The majority of mosquito-borne disease incidences, whether they're human or otherwise, are due to a lack of personal protection. Horse owners need to spend the time and money to get their horses vaccinated against mosquito-borne diseases such as eastern equine encephalitis. For us two-legged creatures, we simply need to take precautions when we're outdoors for work or recreation. If it's too uncomfortable to wear long-sleeved shirts and long pants, then apply insect repellent to your clothing and/or ***exposed*** *areas of your skin (never apply these repellents under clothing). We recommend using products registered with the EPA rather than using home-remedies or "web legends" (such as the dryer sheets) that rely on anecdotes rather than actual scientific data to back up their effectiveness.*

DEET is the most commonly used repellent but some people prefer to use other products which are also effective but may not provide protection for the same length of time. This becomes a matter of common sense – choose a product that fits your needs and preference and ***READ THE PRODUCT LABEL*** *and follow the recommendations for how often to apply it. So, if you prefer a non-DEET product that has a short period of effectiveness, then it's simply a matter of applying it more frequently (but not over-applying it). Use repellents carefully, particularly on young children. Some repellents are not intended for infants and reduced concentrations are often recommended for children under the age of 12 years old. Never allow children to apply repellents to themselves or to other children. Spray the chemical on your hands and rub it onto their legs, arms and neck. For infants, mosquito netting placed over a stroller is an excellent choice.*

For more information on mosquito repellents, visit these sites:

- *Insect Repellent Products*
- *EPA – Insect Repellents: Reducing Insect Bites*
- *Consumer Reports Review of Insect Repellents*

Chemical Control

Before you spray any pesticide, "bee" aware of bees and other pollinators in your yard and surrounding properties.

There are many products available if you decide to treat your property to kill adult mosquitoes. Please keep in mind that chemical doesn't always land where you direct your spray particularly under windy conditions and it can end up on someone else's property. Look before you spray and communicate with your neighbors. Not everyone wants pesticide drifting into their yard. Make sure you know what's on the other side of your shrubs. ***Read the pesticide label before you spray****. Never treat where children or pets are found (and don't let them return to the area until the chemical has dried on surfaces). Many products contain insecticides that cannot be applied to edible plants. So, it is important to be very careful when spraying near vegetable & herb gardens or fruiting trees. Even if your herb garden is for decorative purposes only, you never know when a neighbor or even visiting wildlife may decide to "borrow" a few sprigs.*

Many (most) of the insecticide products commonly used against mosquitoes are "pyrethroids" which are toxic to bees (not just honey bees) and other pollinators and beneficial insects (such as lady beetles). The product labels have restrictions on applying them to flowering plants or else restrict their use to times when pollinators are not actively visiting flowers. If your neighbor has bee hives in his/her backyard, you should talk to them first and make sure chemical doesn't drift into their backyard (and onto their plants and/or bee hives) and possibly harm the bees.

Most pyrethroid insecticides have "common names" that end in "thrin". The common name is not the brand name (like "Mike's Bug Destroyer"). The common name is found under the "Active Ingredients" section of the label. People who are thinking about having their yard sprayed (or their neighbor is having their yard sprayed) have called me asking about these pesticides because they've been told by the company that they're using "the same chemical found in chrysanthemums". That statement is true if the company is actually using pyrethrum or "pyrethrins" but is ***NOT*** *accurate if they're applying something like bifenthrin or permethrin which are synthetic and chemically altered versions of the pyrethrin molecules ("pyrethroids"). My advice is that before you have your yard treated by anyone, always ask to see copies of the product's label and its safety data sheet (formerly called the "MSDS") so that you know exactly what will be applied and if it's being applied according to directions which reduce the risk of exposure for you and the "good bugs".*

There are other products that target mosquito breeding sites and the mosquito larvae & pupae living in them. Some products contain a bacteria called Bacilllus thuringensis israelensis or "BTi" which is sold under several trade names including "Mosquito Dunks" and "BioBit". The bacteria is related to but is ***not*** *the same BT that many people use in their gardens to kill cabbageworms and cutworms. BTi only affects mosquitoes and a few other fly species (such as fungus gnats and midges). An advantage of these products is that they do not affect beneficial insects or fish or even livestock that might drink out of water troughs in a pasture (which can also become home to mosquitoes if the water becomes stagnant).*

These biological pesticides have an important long-term impact on mosquito populations, but it's important to remember two things: First, these chemicals are ***not*** *a substitute for eliminating mosquito breeding sites wherever possible. Second, they will not eliminate the mosquitoes we see flying around today (or even the next few days). BTI only affects the mosquito larvae, not the pupae in the water or the adults that are already flying around and so the effect the bacteria will be most noticeable in about 10-14 days IF you take the time to eliminate as many breeding sites as possible.*

Natural Control of Mosquitoes

Not everyone shares my love of bats (the fur-covered flying mammals, not the wooden ones used to hit baseballs). Some people put up bat boxes in their yards hoping to attract bats to eat the mosquitoes. While bats do eat mosquitoes, they are "generalists" which simply means they also eat a lot of other flying insects as well. More importantly, keep in mind that public enemy mosquito #1 in most cases is the Asian tiger mosquito which is active during the day whereas bats are active at dusk/night. There are birds (such as purple martins)

that also eat mosquitoes but they too have a diverse diet. So, support our local birds and bats but don't count on them to solve your mosquito problem.

Mosquito fish (also called Gambusia) have also become more popular for natural control of mosquitoes. These small "guppy-like" fish are famous for their consumption of mosquito larvae and pupae (the stage right before the adult). They will also eat other aquatic insects as well as young fish and amphibians. They have some problems with cold weather and may die out (requiring that you restock the pond). We also have many native fish that will also put a dent in a pond's mosquito population. Because of this fish's ability to out-compete native species, releasing Gambusia should be limited to closed ponds that do open to public waters. Also, remember that Asian tiger mosquitoes mostly breed in artificial objects and temporary water sources and so mosquito fish are not likely to control a backyard (or community) mosquito problem.

FINALLY *– remember that mosquitoes have no concept of property lines. Even though species such as the Asian tiger mosquito typically fly just short distances (usually less than 100 yards), the object of the female's attention is a blood meal whether it's in your neighbor's yard or your yard. Mosquito management does work* ***BUT*** *it requires a concerted community effort to be truly effective. You've heard the expression "It takes a village". With mosquitoes, it takes just one uncooperative "village idiot" to make your collective efforts fail.*