

# DIDEEBYCHA

## GMCA Newsletter

### Community Clean-Ups and Their Role in Mosquito Control

Winter is a great time to plan a community clean-up event for Spring. These events can be organized by citizens, civic groups or local governments and often have a theme or targeted area in a town or community. Clean-up events provide many benefits to a community including raising the awareness of litter prevention, developing pride in our communities and restoring the natural environment.

A seldom recognized and underappreciated benefit of these programs is the permanent elimination of larval mosquito habitats. Some of the most common mosquito pests around the world develop in the containers, litter, debris and used tires that are commonly collected during a clean-up event.

#### Comprehensive mosquito suppression

As a refresher, there are a number of characteristics that are consistent for all mosquitoes. The females will deposit their eggs on soil that will become flooded, above the water line in natural and artificial containers or on the surface of standing water. All types of mosquitoes require standing water for their larval (wiggler) and pupal (tumbler) stages to [develop](#).

A prominent subgroup of mosquitoes is commonly classified as “container breeding mosquitoes,” which usually develop in containers and debris closely associated with people and

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### 2024 GMCA Annual Meeting

What is Amicalola Falls and Lodge? Northeast of Dawsonville, Georgia, on the cusp of the North Georgia Mountains, sits Amicalola Falls State Park & Lodge. A nature lover’s wonderland, it’s only 8 miles from the Appalachian Trail and within the Chattahoochee National Forest. The park is named after its most treasured feature, Amicalola Falls – a magnificent 729-foot waterfall that’s the third-highest cascading waterfall east of the Mississippi River. In the thick of the spectacular terrain, stands Amicalola Falls Lodge – a beacon of comfort, rejuvenation, and true Georgia adventure. At Amicalola Falls Lodge, almost every room has a view. The breathtaking vistas and spectacular sunsets await behind the door. Time spent at a destination of this caliber turns an ordinary trip into a great escape. Whether you are planning a corporate meeting, a family reunion, a friendly mountain getaway or a romantic rendezvous, Amicalola Falls State Park & Lodge offers amazing accommodations and world-class recreation on the southern tier of the Appalachian Mountain Range.

This was the site that we chose for the 2024 GMCA meeting, and thanks to Past President and chief negotiator Tiffany Nguyen, we got a great deal. The only downside was that the hurricanes that did so much damage to parts of Georgia meant that some of our membership were unable to join us for the meeting.

We had a varied agenda, with speakers from many areas of mosquito surveillance and control, as well as talks on equipment, novel control methods, ticks, and yellow-legged hornets. We had speakers from University, Public Health, Industry, and municipal and commercial mosquito control. There were procedural talks, research information, arboviral disease updates, and the whole range of possible topics to give everyone present something of interest to take home with them. You can check out the agenda at [http://www.gamosquito.org/resources/2024\\_GMCA\\_Program.pdf](http://www.gamosquito.org/resources/2024_GMCA_Program.pdf).

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their living areas. By eliminating containers, debris and used tires from our communities, we can help to reduce these nuisance and disease-transmitting mosquito populations by permanently eliminating sites where they could develop.

The premise of integrated mosquito management incorporates five general practices to form a comprehensive approach to an effective and cost-efficient mosquito suppression program. These [practices](#) include education, source reduction, surveillance, larviciding and adulticiding.

Educating both the public and mosquito control practitioners is an important first step for mosquito prevention. A comprehensive source-reduction effort is the next step and is a pillar of any integrated mosquito management program. Source reduction involves eliminating sites, situations and circumstances where water is allowed to stand or collect for extended periods. Such sites can commonly serve as habitats for extensive larval populations.

#### Eliminating breeding grounds

The [American Mosquito Control Association](#) lists source reduction as the single most effective means of mosquito control. As part of an integrated program, source reduction can include clearing drainage ditches, manipulating water levels, eliminating abandoned pools, and removing tires and debris from our neighborhoods. By eliminating these larval and pupal development sites we can help to reduce the need for insecticide applications, reducing both costs and the risk of pesticide exposure for pollinators while preserving pesticide susceptibility in target mosquito populations.

One of the Southeast's most common and widespread container-inhabiting mosquito pests is the Asian tiger mosquito, *Aedes albopictus*. This mosquito was introduced to the U.S. in used tires in Houston, Texas. Tires have long been recognized for their potential to create an ideal larval mosquito habitat. The dark rubber holds heat while the shape and design are notorious for catching water and not drying out. Consequently, the improper storage and disposal of used tires can cause significant mosquito populations in our communities. Tires are also extremely durable by design, consequently they stay in the environment for a very long time when disposed improperly.

#### Tire amnesty

Fortunately, the Georgia Environmental Protection Division (EPD) has a Tire Management Unit that is responsible for enforcing state regulations on used tires. The Solid Waste

Trust Fund Grant Program is funded by the fee on the sale of new tires in Georgia. This fund is used to clean up scrap tires and support statewide recycling efforts. The Scrap Tire Abatement Reimbursement (STAR) Program can cover the cost of removing, transporting and processing scrap tires cleaned up from illegal dump sites, city and county rights-of-way and collected during scrap tire amnesty events.

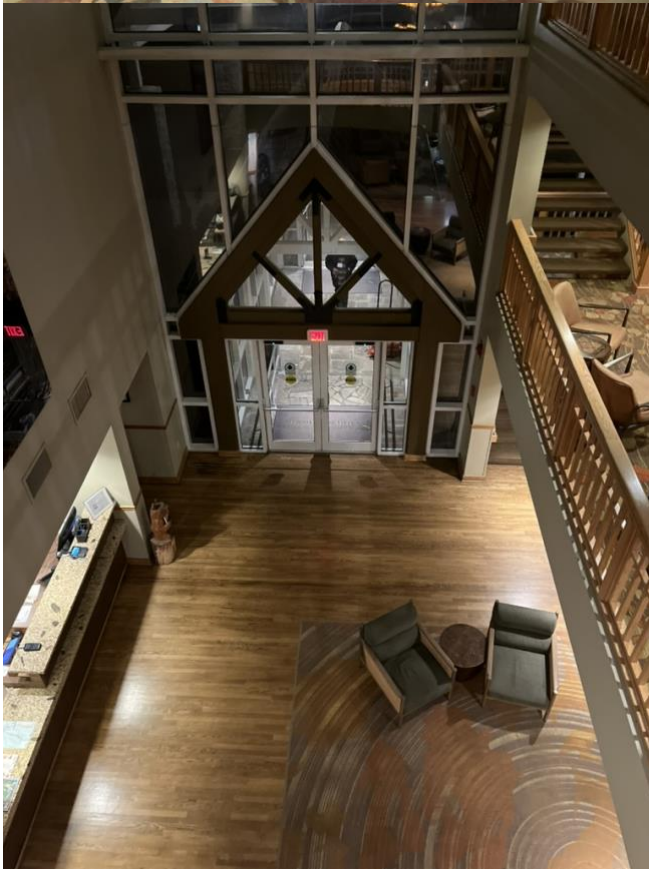
A scrap tire amnesty event can serve as the centerpiece of a broader community clean-up event. Tire amnesty events must be organized through a town or county government entity, which will serve as the reimbursable agency. The entity conducting the event works in collaboration with the EPD to organize the collection, storage, shipping and processing of the collected tires. All costs associated with the process are reimbursable through the STAR program. This program is a tremendous resource that can help residents eliminate larval mosquito habitats while improving their community and the environment. For more information on the STAR program, email [epd.star@dnr.ga.gov](mailto:epd.star@dnr.ga.gov).

Learn more about how to control mosquitoes from the University of Georgia Department of Entomology at [ent.uga.edu](http://ent.uga.edu). Residents of the Southeast should also check out [UGA Cooperative Extension](#) Circular 1266, "[Mosquito Control Around the Home](#)."

Elmer Gray



Educating both the public and mosquito control practitioners is an important first step for mosquito prevention, says Elmer Gray, public health specialist for UGA Extension. (Photo by Sean Montgomery)

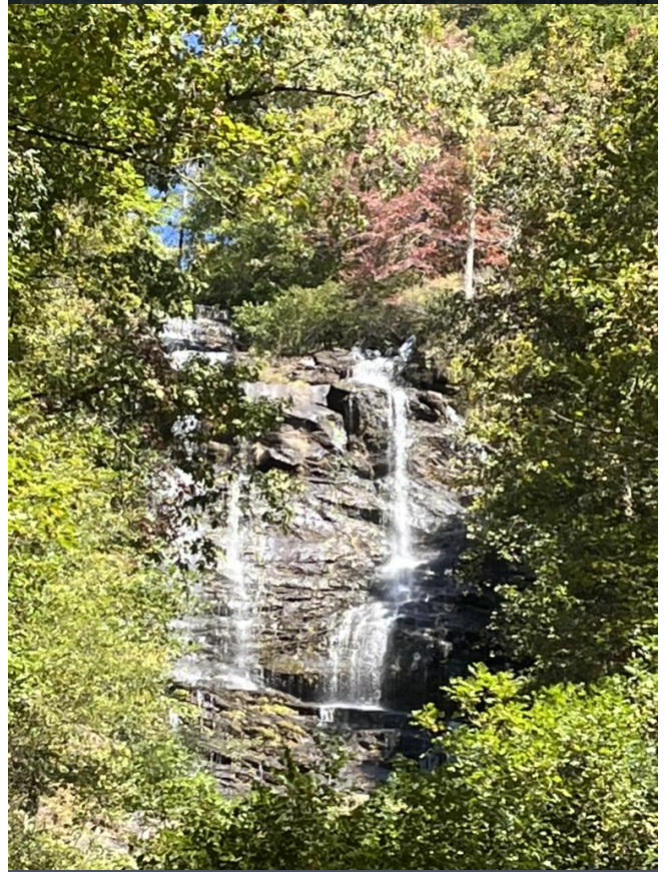


Presentations are available at <http://www.gamosquito.org/Presentations2024.htm>

While the talks were very interesting and the food provided by Amicalola Lodge was fantastic, the scenery made the trip special.

Enjoy the photos. Our 2025 meeting will be back in Athens, and we are looking to possibly having our 2026 meeting in Savannah or back at Jekyll Island.

Views from the meeting, the Lodge, the hills, and the falls.



## Weather and Mosquitoes

How do mosquitoes survive the winter? The short answer is ... diapause.

What we know about diapause comes from the accumulated efforts of scientists who have been studying it since at least 1937 when they first gave the phenomenon its name. Diapause is a period of suspended or arrested development during an insect's life cycle. A dominant feature in the life history of many mosquito species, it offers a mechanism for bridging unfavorable seasons in both temperate and tropical environments and serves to synchronize development within populations, thus directly affecting disease transmission cycles. Some mosquitoes diapause as eggs, some as larvae, and some as adults. One of the interesting things about diapause are changes in behavior leading up to shutting down for the winter. These include endophily (coming inside buildings), changes in food preferences (for nectar instead of blood), and changes in oviposition behavior. Female mosquitoes can gain up to 10 times their warm-weather weight as the cold rolls in.

Many species survive as eggs in the soil in a dormant state in which the eggs do not hatch in response to flooding. Instead, they wait for the days to grow long. Some species spend winter as larvae living in water beneath trees and soil in cypress swamps. Here they avoid freezing temperatures while the cold water slows their development and metabolism. Other species can survive the winter in protected places as adult females. The males almost never survive. The adult females that do overwinter are inseminated and live most of the winter in diapause. In northern states, these mosquitoes are in physiological diapause and develop a fat body to sustain them throughout the cold months. While they may move about during warm spells, they almost never bite. In southern states, diapausing adult mosquitoes are in behavioral diapause and can blood feed during warm spells.

What triggers diapause? When days get shorter and the quality and quantity of food declines, these changes signal that the environment will soon be inhospitable, and they prompt animals of all types to begin preparing for winter. Some animals migrate to warmer climes, but others shelter in place. For many of those that stay put, seasonal changes mean it is time to enter a state of suspended animation. For mammals, like ground squirrels, skunks, and bats this means preparing for hibernation. And for many, but not all, insects these same cues indicate it is time to enter diapause.

Insect diapause is a lot like hibernation, but there are some differences. The main difference is that mammals remain active until winter is well established and temperatures are frigid, but, depending on the location, insects that enter diapause become dormant in the autumn well before it

gets too cold for them to function. Another difference is that mammals can sometimes rouse themselves for short periods of activity during the winter, but once an insect enters diapause in the northern states, it will typically remain dormant until spring even though the weather might be suitable for normal growth and development. This is not always true in the more southerly areas of the US.

The earliest mosquitoes you see on warm days during the winter are *Culex* spp and *Anopheles* spp. Unlike their northern cousins, who may fly about during warm spells, southern *Culex* spp, including *Cx quinquefasciatus*, not only fly about, but can take a blood meal and potentially lay eggs. Diapause in mosquitoes in the south is behavioral rather than physiological. Because *Cx quinquefasciatus* adults can overwinter as WNV-infected adults, a warm or short winter can allow the WNV cycle to get started early, potentially increasing the risk of WNV transmission to people. Additionally, early warm weather leads to early nesting of birds and potentially more broods, increasing the amplification of the virus and infecting more mosquitoes.

Understanding how mosquitoes respond to environmental changes is essential to predict the emergence of nuisance species, as well as the spread of the diseases that vector species transmit.

### REFERENCES

For an interesting presentation on WNV and how weather can affect transmission, check out <http://www.gamosquito.org/resources/2024meeting/Session3/Killingsworth.pdf>

Mosquito Diapause, David L. Denlinger and Peter A. Armbruster, Annual Review of Entomology 2014 59:1, 73-93.

<https://mosquitoreviews.com/learn/mosquitoes-cold/>



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