

# Why We Do It

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I recently had the opportunity to travel with a colleague, an infectious disease medical doctor, to Uganda, Africa, where he has on-going studies on malaria, as well as other infections. He invited me to go as a “mosquito guy.” I put that in quotes because I have long struggled with how best to describe myself. Am I a “public health entomologist?” I do have a Masters of Public Health, so that makes some sense. Or am I a “medical entomologist?” This has a nice, somewhat old fashioned ring to it, and I am in a traditional department of entomology. I also often published in journals with “medical entomology” in the title, and teach classes called “medical entomology.” Or maybe I am a “vector ecologist,” which has more cache in academia and sounds very sophisticated. Of course, this is all semantics, and I had that opportunity to go, let’s face it, because I can at least wear the hat of a “mosquito guy.” [Note to readers: I recognize “guy” is gendered—but I would have been able to go equally well as a “mosquito gal” or “mosquito person”—but I do identify as a “guy.”]

As someone who has studied mosquitoes for over 20 years now, I have taught about malaria, its exclusive (for human malarias, anyway) transmission by *Anopheles* mosquitoes, and its paramount historical and contemporary role in affecting human health.

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## President's Message

**Matt Dupont**



In 1965 the North Carolina Mosquito and Vector Control Association was founded to promote public health through mosquito and vector control in North Carolina. Members of the association and others who dealt in mosquito and other pests and vectors recognized the dangers and nuisance vectors posed and emphasized public health protection through the approach of integrated pest management. Emphasis was placed on surveillance, research, and control efforts. Now, 56 years later, that vision and legacy remain and is as key as it was since day one.

It is an honor and privilege for the opportunity to serve as the 57th president of the North Carolina Mosquito and Vector Control Association. I don't come from a long line of mosquito control workers. I didn't have a lot of experience in entomology. Before I started working at Brunswick County, I worked in retail technology, managing a cell phone store. I've been in mosquito control for 5 years. But in my short career, I've been able to sit under the learning tree with some of the best minds in mosquito and vector control, learning from them. Any schooling I gained for mosquito control came firsthand from Hickman, Brown, Young, and a list of others.

In my role, I've been able to take the integrated pest management methods for mosquito control and tailor them to practical and operational use. I've been able to find what works in our

program and identify what needs improvement firsthand. I've been able to see how new technologies and advancements in surveillance and control methods are helping to usher in a new, technological-based era of mosquito control.

As president, I have two main goals. I want to emphasize the importance of adult mosquito control investigations and surveillance. For example, some tools that may help you identify the mosquito problem during an investigation are:

- What time of year is it?
- What is the mosquito habitat of the surrounding area?
- Is it even a mosquito? Does it have a proboscis?
- This eliminates the non-mosquito requests including crane flies (Family Tipulidae), biting gnats (Family Culicoides) and midges (Family Chironomidae) and other biting flies (Family Tabanidae). All of these insects are cousins to mosquitoes and belong to the order Diptera which includes mosquitoes but are not of public health concern in North Carolina
- Is it the Asian Tiger Mosquito (*Aedes albopictus*)? The best control strategy for these requests is public education

These are all variables that can be used to help identify what you are dealing with and help determine the correct approach to take when controlling an issue.

It's time to get back to the basics and learn to identify adult mosquitoes from other insects while out in the field.

Next, I have reinstated the Mosquito Management Task Force (MMTF). In the case of relief from a natural disaster, mosquito control programs are advised to refer to the Public Assistance Program and Policy Guide, or PAPPG, put out by FEMA. We currently have the opportunity to provide the association's disaster response expertise to the state of North Carolina. We have several Subject Matter Experts (SME's) in the association. I have asked the members of the MMTF to offer their experiences at the state level. Preparation is key. Why wait until a disaster occurs before developing a plan of action?

Many programs need the expertise our association has to offer. We can be that guide; the task force can interact and be a resource with local programs. I have already directed Subject Matter Experts Dr. Stephanie Richards, Jeff Brown, and Abram Young to gather materials and information on this matter and asked them to present their ideas to the first Executive Committee meeting.

All of these goals can be accomplished with the help of the association and its members. Stories and articles from members explaining what surveillance techniques work best for their needs are waiting to be heard. These can be sent to our newsletter editor so they may be published and be used by other members and programs as an aid in surveillance techniques.

Again, it is an honor and privilege to serve as the president of this association. I look forward to working alongside and meeting all of you. Mosquito Control is a challenging but rewarding field. Together, I feel we can learn a lot from each other, and push forward to better serve the community needs of North Carolina.

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## **Brunswick County and Clarke Mosquito ULV Calibration Workshop**

### **April 20 and 21, 2022**

The Brunswick County Operation Service Department and Clarke Mosquito are offering a 2-day Mosquito Control Calibration workshop. The first day will be classroom with a virtual option and the second will be ULV and UAV sprayer calibrations. The day 1 will be held at the Cooperative Extension Training room, Building 25 Referendum Dr. Bolivia NC 28422. Day 2, ULV calibrations will be held at 235 Greywater Rd NE, located off Hwy 211, also known as Green Swamp Rd, in Supply NC.

There is no cost associated with this training. There will be 3.5 credit hours of Category B Pesticide Continuing Education credits. Also for the first time in a mosquito control ULV workshop 1 credit hour of continuing education for Aerial Methods will be offered. If you have or are considering a drone (UAV) for your program you will not want to miss this workshop. The program will cover how to license your UAV with the FAA and an NCDA representative will be there to discuss the North Carolina requirements for drone operations in mosquito control. There will also be a presentation about calibrating your drone for larvicide applications.

This workshop is being sponsored by Clarke mosquito for additional information please contact Sydney Brogden at [sbrogden@clarke.com](mailto:sbrogden@clarke.com) or call her at 828-435-1760. Please keep in mind, COVID requirements may change this workshop to a virtual option only on the first day. ULV calibration will be conducted outside on the second day. Be sure to follow any local guidance about COVID on the day of calibrations.

## Legislative Committee Update

**Meredith Spence Beaulieu**

**NCMVCA Legislative Chair**

The federal budget process has still not been completed and we are currently operating under a continuing resolution (an agreement by Congress to keep the federal government funded at the previous fiscal year's levels to avoid a shutdown). It's unclear when or whether Congress will be able to pass their appropriations for fiscal year 2022 due to partisan divides, but the good news is that at least some of our priorities have been included in the appropriations bills from both the House and the Senate. Included in these appropriations bills is funding to support the Kay Hagan Tick Act, which, among other things, would continue the Centers of Excellence on Vector-Borne Diseases. However, missing from the appropriations bills is funding for the Strengthening Mosquito Abatement for Safety and Health (SMASH) Act, which would provide resources for state, local, tribal, and territory entities for comprehensive mosquito control and abatement programs grounded in integrated mosquito management. The SMASH Act has been a key issue actively advocated for by mosquito control stakeholders for multiple years and, despite being passed into law, still does not have any funding to support it on the horizon.

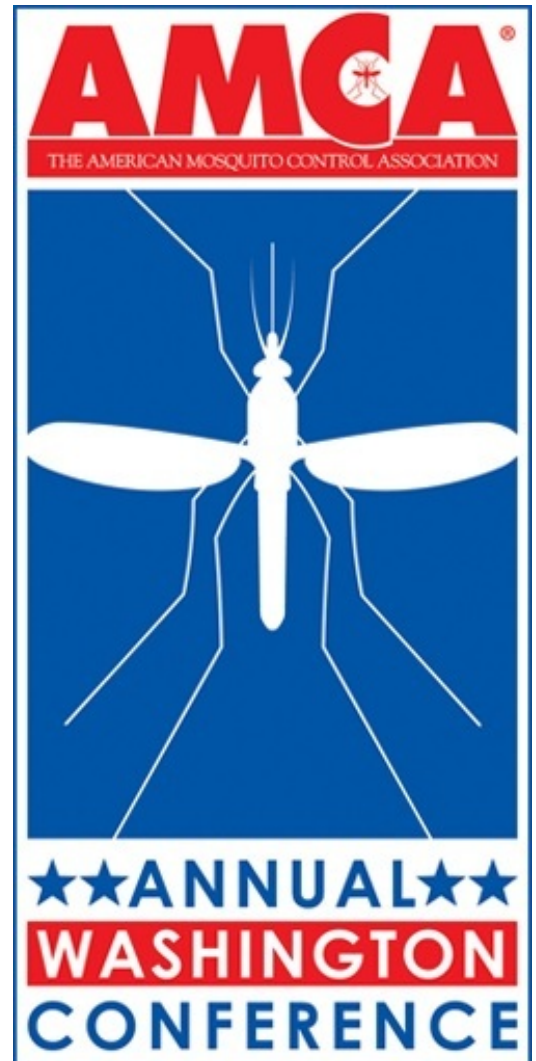
Although the lack of inclusion of the SMASH Act is disappointing, there is cause for optimism that the Kay Hagan Tick Act will be funded based on its inclusion in both the House and the Senate appropriations bills. NCMVCA signed onto a [Vector-Borne Disease Network](#) support letter encouraging completion of the appropriations process, including appropriations of \$10 billion to CDC and an increase of \$15 million specifically for vector-borne diseases (as written in the House version of the bill). I also contacted Congressman David Price, NC's only appropriations committee member, to state our support for this.

There have been two noteworthy actions related to pesticides in recent months. First, a network of organizations filed a petition with the EPA in November 2021 to revoke tolerances and cancel registrations for all remaining organophosphate pesticides, including malathion and naled (you can read the petition [here](#)). This is simply a petition at this stage, but it is being organized by the same network and using the same approach that successfully [revoked all tolerances for chlorpyrifos in August 2021](#). The American Mosquito Control Association (AMCA) is monitoring this issue closely. Second, the [Protect America's Children from Toxic Pesticides Act \(S.3283\)](#) was introduced in the Senate. This is essentially the same legislation as that introduced during the last session of Congress, and if passed, would ban state-wide pesticide preemption, which would allow local jurisdictions to ban pesticides unilaterally and potentially result in a complicated patchwork of regulations. There has been no action on the bill since it was introduced in November, and we will continue to monitor.

I hope that these funding and pesticide-related issues illustrate the importance of early and sustained engagement with policymakers. It is absolutely critical to make our voices heard so that we can most

effectively protect NC from vector-borne diseases. An easy way to get involved is to attend the [AMCA's Washington Conference](#), which will be held in-person this year May 17th and 18th in Washington, DC. The Washington Conference is the largest mosquito control advocacy event held throughout the year, and AMCA is great about supporting new attendees throughout the process. You'll be briefed on important issues, get tips on how to have a successful visit with legislators, receive support in setting up appointments, and can even shadow along with experienced attendees to get comfortable with the process. Please consider attending the Washington Conference, as sharing your boots-on-the-ground stories and perspectives with your legislators can really make a difference in policy actions. NCMVCA typically also has some funds available to support representation of our state at this conference.

If these issues are of interest to you, you could also get involved by joining the NCMVCA Legislative Committee, which currently has two open seats for Members-At-Large. Let me know if you are interested in attending the Washington Conference, joining the NCMVCA Legislative Committee, or learning more about either of these things – I'm happy to chat with you! You can always reach me at [meredithspence@gmail.com](mailto:meredithspence@gmail.com).



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Have something to share in the next issue of Biting Times? Contact Kyle Godbey at:  
[godbeynk@forsyth.cc](mailto:godbeynk@forsyth.cc)

## Why We Do It (cont.)

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Figure 1. Typical larval habitat close to a river in Kasese District, Uganda.

But I had never researched malaria, nor been to sub-Saharan Africa, where it is the second leading cause of childhood mortality and a major barrier to improving people's lives. This trip helped make the more "theoretical" malaria I teach about very real to me. It also underscored how what we do—not just "vector ecologists", but every "mosquito person"—has implications for people around the world.

One of the remarkable things about malaria is how mosquito control interventions **have a direct and measurable impact on people's health**. In many areas, including my colleague's study site, malaria is endemic, with population prevalence above 50% or more. Blunting transmission through mosquito control often has an immediate, measurable effect on incidence, usually measured in children. This has been most profound in the insecticide treated bed nets I am sure many of you have heard about.

However, the advances in malaria control through bed nets has started to plateau, likely because of a combination of insecticide resistance (most bed nets use pyrethroids, similar to backyard control chemistry) and a shift from indoor, night-time transmission, to outdoor dusk/dawn transmission by different species of mosquitoes. As such, there is a renewed need for innovative, or even retrograde, control approaches that target a broad array of *Anopheles* species in ways that are economically feasible, ecologically sound, and can be deployed sustainably. Some of the day to day control

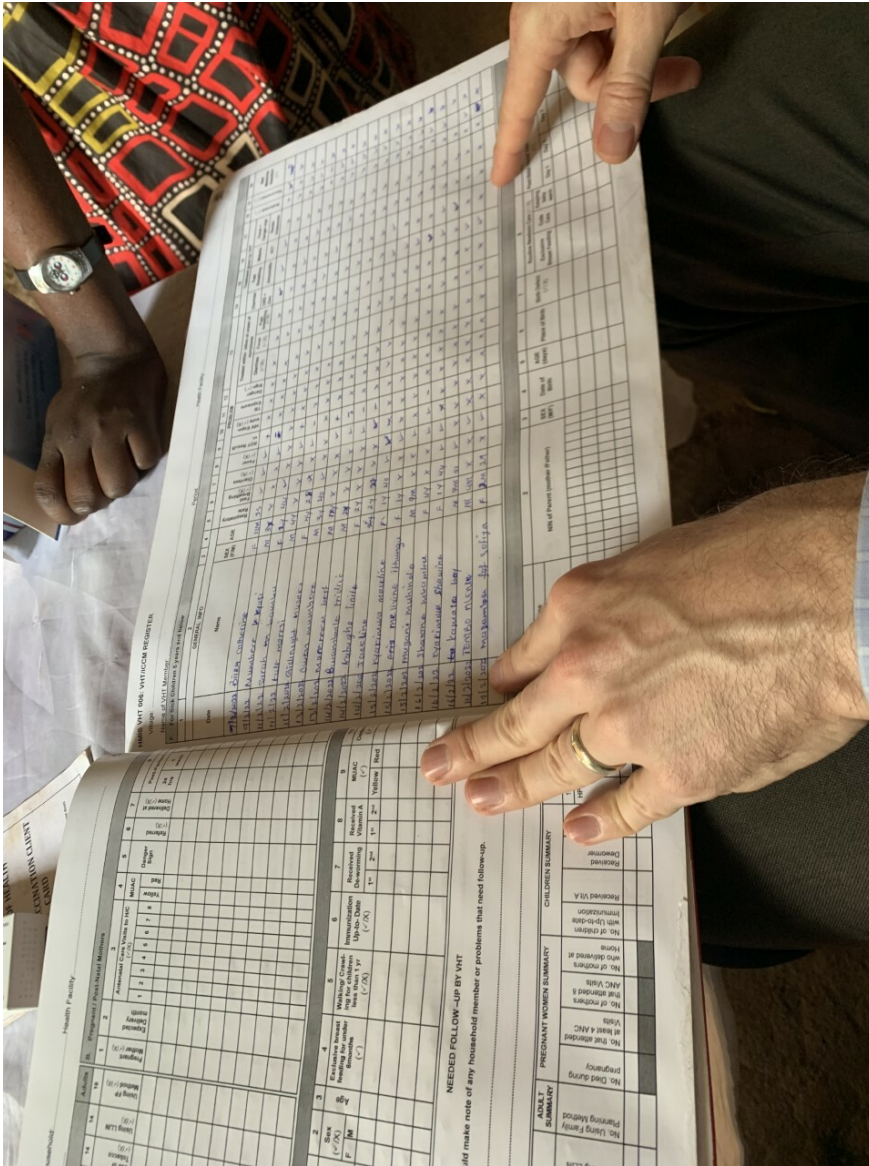


Figure 2. Scanning written records for malaria cases in local health center log-books.

## Guess That Skeeter!



I'm a native mosquito species whose populations spike after water levels reach high on the landscape. Some people say my shaggy legs look like Popeye's, "I yam what I yam, and I yam big enough to eat tadpoles!" I have tested positive for EEEV, VEEV, WEEV and WNV, and as an adult I am sometimes confused with *Ps. howardii*. What am I?

Photo: by Garrie Rouse

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approaches we take, such as long-acting larvicides, may be the next phase in attacking malaria.

In the first half of the 20th century, mosquito control **was** public health in the USA. However, as we have eliminated or substantially limited mosquito-borne disease, mosquito control has necessarily shifted towards pest-control, with a goal of making our lives easier, not necessarily healthier. Nevertheless, investment in pest-control can still drive the innovation, expertise, and practical knowledge that can make other people in other places healthier. So, when you head out into the field, or hunker down under the microscope to ID mosquitoes, or throw briquettes into sewer drains, consider what you do part of a noble pursuit that reaches beyond our municipalities, districts, counties, or even North Carolina. The economic ecosystem of mosquito and vector control, and organizations such as the AMCA or the NCMVCA, are part of a network that does real good in the world.



## *Culex coronator* of Forsyth County

Ryan Harrison

On Monday February 7th 2022, Kyle Godbey and I were sitting in our lab discussing plans to start our surveillance season the following week. Historically this is about the time of year when Forsyth County sees its first mosquito larvae, *Aedes canadensis*. Usually, *Ae. canadensis* larvae are plentiful by late February. They are found in the little tiny pools of leaf litter that surround our vernal pool sites. *Aedes canadensis* is the main species we find at this point, but sometimes we find some *Aedes vexans* as well. I am excited to get back in the field and do some collections, so we are laying out plans on which sites to hit first.

Kyle mentions to me, "I found some adult mosquitoes in the freezer from the last traps we set last season, we should probably identify those before we start collecting this year". I figured he had to be wrong, I was confident we had already identified everything from last season. I started to think that maybe these mosquitoes had just been left there from some project that had fizzled out and needed to just be thrown away. Then that persistent, familiar voice echoed in my head "Don't throw them away, make sure to look at them all. Look at every single specimen and ID them the best you can."

"Well, let's take a look I suppose", I said. I assumed it wouldn't take long and we could get through them pretty quickly. Kyle slowly pulls out about 8 petri dishes that were pretty dang full. "DOH! How did we miss all those?", I ask, now I am truly curious to the origin of these critters. These 8 dishes are comprised of 3 flood plain traps and 5 gravid traps, absolutely full of mosquitoes. Sure enough, my brain flashes back to the rainy day on 10/15/2021 as the first serious cold front swept into our region. I can't believe we missed a stack of mosquitoes like this. We both turned to prepare our microscopes and get on to the task at hand.

After about 700 mosquitoes later, give or take a few, there was just one petri dish left to identify. I was getting restless and got up to go to stretch my legs and perhaps walk to the break room. Kyle volunteered to go ahead start on this last dish of 40 or so adults.





When I got back downstairs to my desk, Kyle says to me “You have got to look at this mosquito, it’s a weird one”. “Sure, let’s take a look”, I replied.

Immediately, upon looking at the specimen, I am wondering if this is some sort of a prank. It was beautiful! Unlike any mosquito I had ever seen before. This particular specimen was just gorgeous, like it had just hatched. I see stripes on the legs that are very unfamiliar to me. I check the apical end of the abdomen and see that it is blunt. I check the proboscis. The proboscis has a pale band. HOLY MOLY we found a *Culex coronator*! This specimen represents the first *Cx. coronator* collected in Forsyth County. Wooohooo!

In my 25-year career working with mosquitoes, this is only the second new species to be found in our traps. So needless to say, I was pretty dang excited that we had found this specimen. It is really a great feeling of accomplishment when you find a proverbial “needle in the haystack” after the monotonous grind of identification year after year after year. The crazy thing about this whole story was that this was the very last petri dish to be identified from the very last trap we picked up on a rainy October of 2021. Sometimes listening to that familiar voice in your mind pays off! I cannot wait to see if we catch more this season!

Happy Trapping!

## Member Spotlight



**Nicole Foley**

### **Tell us a little about yourself!**

I am a second year graduate student finishing up my M.S. in Entomology at Cornell University through the Northeast Regional Center for Excellence in Vector-Borne Diseases. During my time in graduate school, I have been able to pursue two rewarding projects, one of which being a community based science project called a [tick blitz!](#) It was from this experience that I discovered my passion for community outreach and education as it relates to vector-borne diseases. In my spare time I enjoy hiking, camping, and taking trips back home to North Carolina!

### **How did you get started in the mosquito control industry?**

I was first introduced into the mosquito realm when I was pursuing my B.S. in Environmental Health at Western Carolina University. It was here that I took a medical entomology course with Dr. Brian Byrd, who then helped me find an internship position with the vector control team at Forsyth County Health Department in North Carolina. My time at the local health department with Ryan Harrison was extremely formative in my life and nudged me further down the path of vector biology. In my graduate studies at Cornell, I have learned an immense amount of practical knowledge from Dr. Laura Harrington concerning vector biology and control as it relates to its practical application in our communities.

**Where do you see yourself in 5 years?**

That is a very exciting question as I am currently in the process of applying for vector biology and control positions! I am hoping to find employment in a government setting (local, state, or federal) conducting tick and mosquito surveillance to help inform human risk. I am very open to moving for a position but I have my fingers crossed that I will be able to find a position on the east coast, as I was born and raised in North Carolina.

**What is your favorite tool used for your job and why?**

One of my favorite tools that I use regularly is the [Walter Reed Biosystematics Unit \(WRBU\)](#). This webpage provides high quality images and species profiles for mosquitoes around the world which has proven to be an indispensable resource for me as an emerging vector biologist!

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## The Biting Times, March 22

**Editor in Chief:**

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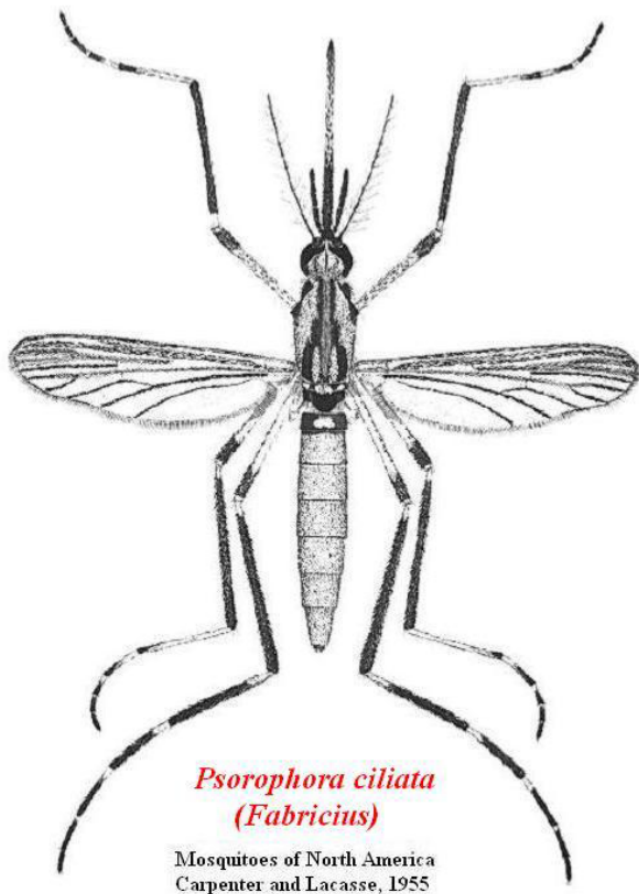
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**Images:**

Michael H. Reiskind, Matt Dupont, AMCA, Garrie Rouse, Ryan Harrison, Carpenter and Lacasse, Nicole Foley

## Guess That Skeeter!



### *Psorophora ciliata*

By Michael Doyle, NC DHHS

After *Aedes albopictus*, *Psorophora ciliata* (Fabricius, 1794) is probably one of the most commonly recognized species in North Carolina. This is because of its large size, ability to inflict a painful bite any time of day or night -- and the media attention it garners after tropical storms. Although it has no common name recognized by the Entomological Society of America, it is commonly referred to as the "shaggy-legged gallinipper."

*Psorophora ciliata* is strictly a New World mosquito, and in the continental U.S. ranges from southern Maine to south Florida, and from southern Minnesota to south Texas (Darsie and Ward 2005). Field-collected adults have tested positive for EEEV, VEEV, WEEV, WNV and Tensaw virus (Chamberlain et al. 1954, Sudia et al. 1975, Mitchell et al. 1987, Chow et al. 2002, and Wozniak et al. 2001, respectively). However, no further studies document its potential level of vector competence. Given its almost kamikaze-like persistence and relatively slow evasive flight maneuvers, it is unlikely that a large proportion of females survive long enough to consecutively bite multiple hosts.



[www.alchetron.com/Psorophora-ciliata](http://www.alchetron.com/Psorophora-ciliata)

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