

# The Biting Times

OCTOBER 2024

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### **Guess That Skeeter**

#### **Michael Doyle**

#### NC DHHS



David Weisenbeck, www.inaturalist.org/observations/94827460

I am a large mosquito that is sometimes mistaken for a Chironomid midge when I am in a pile of insects in the trap sorting pan. Why? It's because my integument isn't brown or black like most mosquitoes — it is yellow! In fact, I am all yellow except for my leg joints, a few spots on my scutum and the end of my proboscis. You won't see me often (and never in the mountains) but once you do, you will never forget me. Who am I?

### **Important Notice!**

### **Sustaining Membership Fee Update**

#### NCMVCA Members,

The NCMVCA Board proposes to raise the annual "sustaining" membership fee from **\$350** (cost since 2016) to **\$450** to continue to support our annual educational conferences as venue/food prices continue to rise. This fee is similar to sustaining membership fees at other mosquito control associations (e.g., Virginia Mosquito Control Association: \$650 and Mid-Atlantic Mosquito Control Association: \$650). At the NCMVCA, the sustaining membership fee includes conference registration for one industry representative, booth reservation to display product information at annual conference, contact information with company information displayed on the NCMVCA website and conference program. The annual "regular" membership fee is \$20 and will not change. The change to the sustaining membership fee will be voted on during the business meeting at the November 2024 annual conference in Atlantic Beach, NC.

Thanks, Stephanie Richards NCMVCA Treasurer





# SAVE THE DATE: NCMVCA Annual Conference

Location: DoubleTree Hilton in Atlantic Beach, NC

The NCMVCA Annual Conference will be held in Atlantic Beach, NC at the Double-Tree Hilton from November 18<sup>th</sup> through the 20<sup>th</sup> of 2024. Registration for the conference can be done online or using the registration for on the next page. Hotel accommodations can be <u>reserved now</u> for \$109/night for ocean view through October 22<sup>nd</sup>, 2024. If you prefer to call, the phone number for the front desk is (252) 240-1155, and the group code is **CDT-919**.

We will apply for Pesticide and Registered Environmental Health Specialist continuing education hours for this event.

Abram Young is the NCMVCA Vice-President and in charge of the program this year. We hope to see you there!



NORTH CAROLINA MOSQUITO & VECTOR CONTROL ASSOCIATION

Dr. Avian White, President East Carolina University Environmental Health Program Greenville, NC 27858 whiteav15@ecu.edu

Amanda Morrison, Secretary Pitt County Health Department 1717 W. 5<sup>th</sup> St. Greenville, NC 27834 amanda.morrison@pittcountync.gov

Abram Young, Vice-President Brunswick County Mosquito Control 179 March 9, 1764 Drive NE Bolivia, NC 28422 abram.young@brunswickcountync.gov

Dr. Stephanie Richards, Treasurer East Carolina University Environmental Health Program Greenville, NC 27858 richardss@ecu.edu

#### NC Mosquito and Vector Control Association Conference November 18-20, 2024

DoubleTree Hilton, 2717 W Fort Macon Rd, Atlantic Beach, NC 28512 (Phone: 252-240-1155)

Conference hotel reservation link (for discounted rate) or call the hotel and book using group code "CDT-919".

Book by 10/22/24 so we can include you in our group; Room Rate of \$109/night (ocean view)

Breakfast is provided on Days 2 and 3; Lunch is provided on Day 2

Confirmation of conference registration will be emailed to you upon receipt.

If you have questions about your membership status, please check with Stephanie Richards (<u>richardss@ecu.edu</u>).

Registration	Registration deadline (preferred)	Late or Onsite Registration
	(Received on or before 10/22/24	(Received after 10/22/24)
NCMVCA Member (includes regular membership for 2025)	\$150	\$175
Non-Member (includes regular membership for 2025)	\$170	\$195
One Day Registration Only	\$100	\$125
Student (includes regular membership for 2025)	\$40	\$65
Lifetime Member	Free	Free
Vendor Sustaining Membership (for 2025)	\$350	\$400
Vendor Additional Sponsorship (optional)	\$	
		Total: \$
Name:		
mail Address:Phone Number:		
Employer:		
Mailing Address:		
Method of payment: Check (payable to NCMVCA) Invoice required Credit card (see link for online payment below)		
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Card number:	Expiration date	2:
Code on back of card:	Billing zip code:	
Mail or Email Completed Registration Form and Payment to:		
Dr. Stephanie Richards (NCMVCA)		
3403 Carol Belk Building, 300 Curry Court		
Greenville, NC 27858		
Email: richardss@ecu.edu; Phone: 252-328-2526		
<u>Click here to register for the NCMVCA conference</u> and pay online via Square		
More information is available at <u>www.ncmvca.org</u> (click the "Annual Conference" tab).		
Vendors requiring electrical connections should contact Stephanie Richards ( <u>richardss@ecu.edu</u> ; 252-328-2526).		

NCMVCA vendor liaison is Sydney Brogden (sbrogden@clarke.com).



### Mosquito Identification: Key Takeaways from the NCMVCA Identification

### Course

#### Brad Cooksey Environmental Health Technician/Vector Control Forsyth County Department of Public Health

As someone who is a newcomer to the vector control field, I came in with almost no knowledge of entomology, insect morphology, mosquito identification, or integrated mosquito management. In fact, I didn't even know that different species were implicated with certain diseases nor that each species has different ecological niches, breeding habitats, or feeding behaviors, i.e. life history traits. That's why I was ecstatic to have the opportunity to take NCMVCA's mosquito ID workshop with Dr. Brian Byrd, of Western Carolina.

First and foremost, Dr. Byrd's experience in the study of mosquitoes makes him one of the most esteemed entomologists in the state. Secondly, as an educator, his workshop provided an environment that nurtured and fostered the learning experience. The resources and pace of the workshop really helped me in learning how to identify species by genera first, and then to the species level with confidence. Using microscopes, the students were provided the opportunity to practice differentiating mosquito species based upon visual differences through the use of cladistic, key driven identification guides. Dr. Byrd emphasized and built a solid foundation in the students' understanding of the terminology and morphology of mosquito biology.

I appreciated the opportunity to deepen my understanding of mosquito trapping and identification, as it enhances my skills in my role. It allows me to be able to further consider the dynamic relationships between environmental conditions, species' abundance and distribution, and community compositions when making necessary decisions. I have had numerous opportunities since the workshop to utilize what I've learned, and I have become more confident in identifying species to better understand the IMM strategies that are utilized and needed to protect North Carolina's biodiversity and its citizens. PAGE 6



# <u>Save The Date:</u> MAMCA's 50<sup>th</sup> Annual Conference

Location: 740 Town Center Dr, Newport News, VA, 23606

The 50<sup>th</sup> MAMCA Annual Conference will be held in Newport News, Virginia at the Marriot from February 4<sup>th</sup> through the 6<sup>th</sup> of 2025. This is a joint conference with the 78<sup>th</sup> Virginia Mosquito Control Association (VMCA) Conference.

The conference will be held at the <u>Marriot at City Center</u>. Hotel rates will be available soon.

More information regarding the upcoming conference will be posted to the <u>website</u> as it becomes available.

### **Registration is now open!**



The AMCA Annual Meeting is the premier education and networking event for educators, researchers, industry representatives, vector control professionals, and students in mosquito control. The upcoming annual meeting will be held March 3<sup>rd</sup>-7<sup>th</sup>, 2025 at the Sheraton Puerto Rico Hotel & Casino in San Juan, Puerto Rico.

A hotel group rate has been secured at Sheraton for \$249.00 per night, and at Aloft (overflow hotel) for \$189.00 per night. Reservation deadline for both hotels is **January 31**<sup>s1</sup>, **2025**.

For more information on registration fees, deadlines, agenda and program, click HERE.



### **Introducing WCU Student Competition Presenters!**



#### What's Biting? Using Antibody Responses to LACV Vectors to Estimate Biting Burden

Hannah Alexander is a biology graduate student who is developing antibody assays to better understand exposure risk from the three La Crosse virus vectors: *Aedes triseriatus, Aedes albopictus,* and *Aedes japonicus.* Additionally, Hannah has investigated methods to discriminate invasive *Aedes* species and performed La Crosse encephalitis case investigations. She will present her results comparing antibody levels in human samples from the mountains, piedmont, and coastal regions.



#### Beneath the Bark: Developing Tree Hole Cohorts to Study Interventions

Madeline Craig is a WCU biology undergraduate student who has completed two summers as an intern through the CDC funded Southeastern Center of Excellence in Vector-borne Disease. She has conducted a trap-type study, conducted mosquito surveillance, performed La Crosse encephalitis case investigations and is developing a cohort of active tree holes containing *Aedes triseriatus*. She will present her findings from the tree hole cohort study.



#### Rhododendron Refuge: Toward Understanding *Aedes triseriatus* Plant Interactions

Darla Lohwasser is a (returning) environmental science student who has been investigating how *Aedes triseriatus* may interact with rhododendron plants in western North Carolina. Dara previously graduated from WCU with degrees in Bachelor degrees in International Studies and Anthropology and minors in Studio Art and German. Although Darla has just recently joined the laboratory, she has made quite an impact. She will present the results of her field work and prior studies by WCU students.

# **Introducing WCU Student Competition Presenters!**



#### Like a Mosquito to an Interrupted Flame: Modifying the CDC Light Trap to Improve Capture Richness

**Mitch Mullin** is a biology graduate student who is studying how to modify the CDC-light trap to increase species richness (i.e., collect a broader range of species). Mitch worked as a summer vector technician in 2023 and started his graduate studies in the spring of 2024. He will present the results of his 2024 field studies using the "WAMO" Arduino modified CDC-light trap.



#### Probing the Palate: Unmasking LACV Vector Blood Meal Patterns

Jaslyn Stamey is a biology graduate student who is evaluating blood meal analysis techniques in order to better understand La Crosse virus vector feeding biology. In addition, Jaslyn has conducted Methoprene field trials and performed La Crosse encephalitis case investigations. In her talk, she will show the results of a time-course blood meal digestion study and present the results of her summer 2024 collections.

**Register for the NCMVCA 2024 Annual Conference** to hear more about the hard work these students

do!





Larry Reeves, Osceola National Forest, Columbia Co., Florida: June 2017, www.lawrencereeves.com/mosquitoes

### **Guess That Skeeter: Continued**

My name is *Aedes (Ochlerotatus) fulvus pallens*, the eastern yellow and black mosquito. I will readily bite
humans but will also feed on other mammals like deer and rodents.<sup>1</sup> Larry Reeves, who got my good side in the
photo above, reports that all of my relatives' blood meals he analyzed were from rabbits and armadillos.<sup>2</sup> I am mostly found in shaded woodlands and rarely in large numbers.<sup>1</sup>

My larvae are unusual because they are slow... meaning slow to emerge from their homes in small, muddy, isolated woodland pockets next to larger woodland pool systems. While most other species rush to emerge in 5-10 days after woodland pools are flooded, my offspring take their time and emerge after roughly 18-25 days. <sup>3</sup> Fashionably late to the woodland mosquito party, as I always say!

I am also a little unpredictable about when I make my entrance each year. Brunswick County, North Carolina used "NJ light traps" to trap my sisters from early May to Halloween, but over the years we have peaked on just about any week during those months. <sup>3</sup>

Why the long name? I don't mind controversy, as some say I was described by Ross in 1943 as *Aedes fulvus pallens*,
<sup>4</sup> other say I was described by Dyar in 1922 (as *Aedes bimaculatus*) <sup>5</sup> and just recently Harbach and Wilkenson in
2023 argued that *Aedes fulvus* and *Aedes pallens* are two different species! They argue that *Ae. fulvus* lives in southern Mexico, parts of the Caribbean and Brazil, while *Ae. pallens* live here in NC and most of the southeastern US. <sup>6</sup>
Whichever way it ends, I will always be the yellow star of the mosquito party!

<sup>&</sup>lt;sup>1</sup>Mosquitoes of the Southeastern United States, Nathan D. Buckett-Cardena (2013)

<sup>&</sup>lt;sup>2</sup>Dr. Lawrence Reeves, www.lawrencereeves.com/mosquitoes

<sup>&</sup>lt;sup>1</sup> <sup>3</sup>Rick Hickman and Jeff Brown, Brunswick County Vector Control, www.brunswickcountync.gov

<sup>&</sup>lt;sup>4</sup>Ross, E. S. 1943. The identity of Aedes bimaculatus (Coquillett) and a new subspecies of Aedes fulvus (Wiedemann) from the United States (Diptera, Culicidae). Proc. Entomol. Soc. Wash. 45(6): 143-151

<sup>&</sup>lt;sup>5</sup>mem.org.msstate.edu/Reasearchtaxapages/Mosquitoes/Introduction.html; Dyar, H. G. 1922. The mosquitoes of the United States. Proceedings of the U.S. Nathional Museum, Vol. 62, Art. 1, p 1-119

<sup>&</sup>lt;sup>6</sup>Ralph E. Harbach & Richard C. Wilkerson (2023); treatment.plazi.org/id/161B87CDBA120A74FF53FB89FA905910

# **Introducing UNC Student Competition Presenters!**



#### Peridomestic Predictors of Tick-borne Disease in North Carolina: Exploratory Data Analysis

#### **Mary Feser**

We conducted an exploratory data analysis to identify peridomestic and environmental characteristics — such as pest ownership, landscaping features, and land cover — that may play a role in tick-borne disease (TBD) incidence in North Carolina. We use survey data from 100+ participants in Dr. Ross Boyce's enhanced TBD surveillance project, small-scale land cover data from aerial photography and census data. The primary outcomes were confirmed probable TBD and self-reported tick exposure frequency.



#### Implementing a Summer Mosquito Surveillance Program in Orange County, NC

#### **Zoe Rothberg**

I designed and implemented a summer mosquito surveillance program in Orange County, NC. We used gravid traps and BG-Pro traps to target *Culex* and host seeking mosquitoes in the Chapel Hill area. These methods helped us develop a baseline for mosquito species presence and abundance in the area. We found primarily *Culex*, *Aedes albopictus*, *Aedes japonicus*, and *Anopheles* mosquitoes.

**Register for the NCMVCA 2024 Annual Conference** to hear more about the hard work these students do!



### **Legislative Committee Update**

#### **Meredith Spence Beaulieu**

#### **NCMVCA Legislative Chair**

When I last wrote a legislative update in March, we did not yet have Fiscal Year 2024 (FY24) appropriations at the federal level. Those appropriations are now complete and, as expected, it was not a great year for non-defense spending. However, in a bit of a silver lining, the Centers for Disease Control and Prevention (CDC) was one of the few increases seen in the FY24 budget.

Looking to FY25, the House has approved all of their appropriations bills. These bills are extremely partisan and constrained, including a 7% cut to the Department of Health and Human Services (DHHS) and a proposed cut of 22% to the CDC specifically. The National Center for Emerging and Zoonotic Infectious Diseases is the only group slated for an increase within the CDC in the House bill, but it includes flat funding for the Epidemiology and Laboratory Capacity, Lyme, and vector-borne disease programs. These House numbers represent an extreme starting point for FY25 budget negotiations. In the other chamber, the Senate has now approved the majority of its appropriations bills. The Senate's version of the DHHS appropriations would support an increase of about 1.9% over FY24 levels for the CDC. The House and the Senate still have to reconcile their very disparate bills prior to appropriations being finalized. With the fiscal year ending on September 30th and the election just around the corner, it is very likely that we will be operating under a continuing resolution until at least mid-November.

In the last few months, NCMVCA signed on to multiple letters to legislators led by allied professional societies. These letters included: 1) an American Mosquito Control Association-led letter supporting appropriations for various vector control provisions and an amendment to allow public health agencies reasonable accommodations when using drones, 2) an American Public Health Association-led letter supporting sustained funding for the CDC and reauthorization of the Pandemic and All-Hazards Preparedness Act, and 3) an Association of Public Health Laboratories-led letter supporting public health data modernization. All of these letters are aimed at increasing funding and infrastructure for public health, including vector-borne disease control.

In non-funding news, one notable development is the Supreme Court's 6-3 decision in June to overturn the socalled "Chevron deference." Established in a 1984 Supreme Court ruling, the Chevron deference required federal courts to defer to agencies to interpret ambiguous statutes, so long as their interpretations were reasonable. This enabled career scientists with appropriate expertise to fulfill vague policy prescriptions which are routinely used in legislation, such as "ensuring the rule is in the public interest." The Chevron deference has been about this issue and its potential importance for mosquito control in a Policy Corner article that I wrote for the Entomological Society of America (ESA)'s Medical, Urban and Veterinary Entomology Section newsletter (starting on page 5, here), but the upshot is that it will make it more difficult for agencies to use evidence-based science in their activities and it will make it more difficult for legislation to be passed because it will need to be more specific.

At the risk of sounding like a broken record — since I'm confident I say this in nearly all of these legislative updates — it has never been more important to advocate for vector control. This does not have to be an intimidating task! At its core, this entails talking with legislators and other policymakers about the work that you do day-in and day-out and why it matters. If you are interested in learning more about the advocacy process, please reach out to me at meredithspence@gmail.com. I am always searching for atlarge members for the Legislative Committee and I would love to get you connected with your legislators and help you share your story.

I also wanted to share with you a potentially helpful resource on "Pesticides and the Endangered Species Act: What You Need to Know." Created by the Weed Science Society of America, the American Phytopathological Society, and ESA, this new one-page guide is designed to help extension specialists and applicators understand changes to compliance requirements for pesticide use under the Endangered Species Act. Feel free to share with others.

Let me know if you have any questions about any of these topics, or if you are aware of other legislative or regulatory issues that I should be monitoring.



#### PAGE 14

# Applications Open for Intern Placement for Spring 2025

#### NCMVCA Members,

Applications are now open for intern placement for the <u>2025 Spring session of the National</u> Environmental Public Health Internship Program (NEPHIP).

Participants of the paid internship program have saved programs time and resources, assisted local programs to conduct environmental needs assessments, create GIS maps, conduct community engagement, create story maps, resources, and more.

Why host an intern?

- Environmental Health Focus: Interns are specifically studying environmental health at EHAC-accredited schools
- 400 Hours: Interns are paid by NEHA to provide 400 hours of their time
- Paid: Interns are supported with a health stiped so they can focus on their internship
- Support package: Support Packages are available to help offset intern-related costs
- Matched: NEHA matches interns and host sited to make the experience useful and meaningful
- Give Back: Staff get to provide firsthand perspectives, connections, and excitement to the next generation.

Priority applications for the spring session are due by October 14<sup>th</sup>.



# **Introducing ECU Student Competition Presenters!**



Wind Tunnel Exposure to Water-and Oil-Based Formulated Products

#### Will Murray

My MS Environmental Health thesis project involves the evaluation of oil-based and water-based insecticide formulated products (FP) in mosquitoes using a novel compact wind tunnel (patent pending). *Aedes albopictus* and *Culex pipiens/ quinquefasciatus* mosquitoes were exposed to aerosolized FP for 10 seconds in the wind tunnel, and mortality was assessed at 2, 24, and 48 hours post-exposure. The purpose of this project is to evaluate different types of FP in the wind tunnel, as well as to assess potential variations in mosquito mortality between oil- and water-based FP with the same active ingredients.



#### Comparison of Field Trial and Wind Tunnel Exposure to Biomist®and Duet®

#### Emma Rush

My research project involves the comparison of different exposure methods to assess efficacy of formulated adulticide products used in mosquito control. The methods I have been comparing are the traditional field trial exposure method and a newly developed laboratory wind tunnel exposure method. Results from field and laboratory experiments will be evaluated for these two exposure methods and are expected to provide additional options to mosquito control operators. This summer I have assisted with propagating multiple field and laboratory mosquito colonies for these trials. I have also helped assemble and evaluate a new wind tunnel model with droplet sizes comparable to those found in field trials. I have enjoyed working with such amazing people and learning about how aerosol science impacts insecticide efficacy testing.

# **Introducing ECU Student Competition Presenters!**



#### Droplet Characterization of Formulated Products on Mosquitoes Exposed Via Wind Tunnel

#### **Raven Slade**

In my MS Environmental Health thesis project, I am evaluating droplet distribution of an adulticide formulated product (FP) on different mosquito body parts and how that impacts mortality rate. To accomplish this, I am using a wind tunnel to apply an oil-based FP, fluorescent dye(s), and an oil-based diluent to different mosquito populations. We have completed a preliminary study evaluating methods for visualizing different fluorescent dyes and further experiments are planned later this year to evaluate this process on a variety of FP.

I am learning about the mechanics of ultra-low volume sprayer applications that are used to control mosquitoes. Mosquitoes can become resistant to active ingredients found in FP when exposed to sublethal doses. It is important to conduct routine testing to understand the efficacy of active ingredients/FP for specific mosquito populations so the appropriate adjustments can be made to mosquito control plans. This surveillance-based control minimizes insecticide resistance and protects public health.

Throughout these laboratory experiments and my experience with a field trial this summer, I have learned more about how droplet distribution on mosquitoes is affected by various factors (e.g., type of diluent, wind speed, temperature, humidity).

# **Introducing ECU Student Competition Presenters!**



#### Staying Safe: Results From an Occupational Hazards Survey Among Mosquito Control Personnel

#### Naina Sharma Bastakoti

The emergence of vector-borne diseases associated with mosquitoes is a public health issue. Many species of mosquitoes can transmit pathogens leading to debilitating and/or deadly illnesses such as West Nile, dengue, and Eastern equine encephalitis. Current mosquito control methods implemented in the United States involve Integrated Mosquito Management including habitat reduction, surveillance, and tactics that target mosquito larvae and adults. Outdoor mosquito control personnel play a significant role in protecting public health by managing mosquito populations. These workers may face various occupational health and safety hazards, including exposure to pesticides, physical strain, heat stress, UV radiation exposure, and the risk of mosquito-borne infections. My MS Environmental Health Thesis Project involves assessing occupational health and safety hazards for mosquito control personnel. Understanding these potential risks is essential for safeguarding the health of those on the frontlines of disease prevention.

#### **Register for the NCMVCA 2024 Annual Conference** to hear more about the hard work these students







# Member Spotlight: Anne Harrison

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

I am the currently the Program Specialist for Mosquito Control in Beaufort County. I have worked in public health for 17 years now after completing my Environmental Health degree from Ecu. My husband and I still live in the Greenville area with our daughter who is 3 years old. My original focus was on Food and Lodging and has evolved to many different areas of public health over the years.

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

I have always found some interest in the vector control aspect of public health. About 2 years ago I was moved to the Mosquito Control Program, which has been quite a learning curve.

# • Where do you see yourself in 5 years? What advice would you most like to impart on the next generation of mosquito and vector control professionals?

In the next few years, I hope to continue to gain more knowledge in the field. Still being new to this, I am thankful for the wealth of knowledge peers are willing to share with one another.

#### • What is your favorite tool used for your job and why?

I feel as though larvicides are one of the most important tools we can use, as they will aid in controlling the mosquito population before it becomes a nuisance. Its typically easy to drop some in areas of standing water while you are out doing surveillance.

# Hurricane Helene Disaster Relief

#### NCMVCA Members,

As we all know, Western North Carolina was devastated by Hurricane Helene and many areas are struggling to recover. We would like to take this opportunity to share with our members how to help during this time.

According to the North Carolina Department of Public Safety (NCDPS), one of the best ways to donate is through the North Carolina Disaster Relief Fund which is managed by the United Way of North Carolina. Donations to this fund can be made **here** and are being used to provide grants to nonprofits working directly with impacted communities.

Additionally, other charities and organizations are accepting donations for Hurricane Helene Relief. It is recommended by the NCDPS that donations should be made to **North Carolina Volunteer Organizations Active in Disaster** (**VOADS**). VOADS are trustworthy and registered disaster relief nonprofit organizations that work cooperatively with various state and federal agencies to aid residents of North Carolina. A list of the current VOADS of North Carolina, including; The American Red Cross, North Carolina Emergency Management, and The Salvation Army, can be found **here**.



# **Call for Submissions!**

**I Dear NCMVCA Members,** 

I hope everyone is well, and successfully gearing up for the mosquito season ahead! As the current NCMVCA Secretary, I am excited and honored to step into the position of Editor-in-Chief for The Biting Times.

Our annual conference provides a great opportunity to gather, share ideas and practices, and discuss the latest advancements in our field. While a lot of information is shared, we understand that not all important presentations and insights are included due to the time frame of the conference. Your input is valuable to us! We encourage all of our members to contribute to the upcoming editions of the newsletter by contacting me at amanda.morrison@pittcountync.gov. A few examples of articles/items to submit include workshop and event announcements, research findings, or new practices your program is implementing.

Please feel free to contact me with submissions or questions!

Thank you,

Amanda Morrison NCMVCA Secretary, Editor-in-Chief



Editor-in-Chief: Amanda Morrison

**Contributors:** David Cooksey, Meredith Spence Beaulieu, Michael Doyle, Stephanie L. Richards, AMCA, MAMCA, NEHA, NCDPS, Hannah Alexander, Madeline Craig, Darla Lohwasswer, Mitch Mullin, Jaslyn Stamey, Mary Feser, Zoe Rothberg, Will Murray, Emma Rush, Raven Slade, Naina Sharma Bastakoti, Anne Harrison, Amanda Morrison

Images: David Weisenbeck, Larry Reeves, AMCA, NCMVCA, MAMCA, NEHA, Hannah Alexander, Madeline Craig, Darla Lohwasswer, Mitch Mullin, Jaslyn Stamey, Mary Feser, Zoe Rothberg, Will Murray, Emma Rush, Raven Slade, Naina Sharma Bastakoti, Anne Harrison

# **2024 Sustaining Members**



ENVIRONMENTAL TECHNOLOGIES

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- PLOS One
- The Southeast Asian Journal of Tropical Medicine and Public Health
- Journal of the American Mosquito Control Association
- Proceeding and Papers of the Eighty-first Annual Conference of the Mosquito and Vector Control Association of California
- United States Department of Health and Human Services/Centers for Disease Control and Prevention

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- Malaysia
- Mexico
- = Singapore
- = Spain
- Thailand
- United States



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