

THE SKEETER

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2023 Spring Newsletter



OFFICIAL NEWSLETTER OF THE VIRGINIA MOSQUITO CONTROL ASSOCIATION

President's Address

Thank you to everyone who attended the 2023 VMCA Annual Conference in Virginia Beach!

The meeting was a great success. I don't know about you, but I was really impressed with all the presentations! A big shout out to our virtual speakers for being flexible with scheduling. This meeting would not have been such a great success without all the speakers, sustaining members, and committees. Congratulations to our [student competition poster winners](#).

I would also like to congratulate and welcome our [new board members](#), President Elect- Karen Akaratvic, Vice President- Lauren Lochstampfor, and First Vice President- Addie Weddle! As you know we had a lot of spaces to fill on the board, thank you to these wonderful people for stepping up to the challenge! I know voting was a little different this year, so thank you to everyone who took the time to vote for your new board members! As always a big thanks to Jay Kiser as Secretary/ Treasurer, I don't know what we would do without him! A big thank you to Past President- Wes Robertson for all the hard work he did this past year! Also, please welcome Tim DuBois as our MAMCA Representative.

The board is currently working on getting an Industry Representative for the year, so stay turned for updates.

If you have any interest on being on the board, for next year, please contact Past President- [Wes Robertson](#).

Thank you to everyone who signed up to be on a committee. You can sign up for a committee at any time, just reach out to the committee chair of the committee you would like to join! [2023 Committee List](#)

Upcoming events include the [adult mosquito identification course](#) on May 8th and the 25th Annual [Washington Conference](#) May 15-17.

I hope everyone has a wonderful start to the mosquito season!



**Carla Cauulkins
2023 VMCA President**



ANNOUNCEMENTS

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DID YOU KNOW?

You can check our [news page](#) for more updates and renew your membership anytime [online!](#)

WHAT'S ON THE COVER

Mosquito specimens from the entomology collections at the Smithsonian National Museum of Natural History ([photo credit](#)); see more (including the Lepidoptera seen in the President's Message) in the [C&P article](#)

UPCOMING EVENTS

Earth Day

April 22, 2023; outreach opportunities! e.g. [Manassas City Farmers Market](#), [Suffolk Earth and Arts Festival](#), [York County Tire Recycling](#)

VMCA Adult Mosquito ID Course

May 8, 2023 Suffolk VA

AMCA 25th Annual Washington Conference

May 15-17, 2023 Washington DC

VMCA Executive Board Meeting

June 7, 2023; all members welcome; email virginiamosquito@gmail.com to register

National Mosquito Control Awareness Week

June 18-24, 2023

WHAT'S THAT?



Answer on [page 22](#)

VMCA ORGANIZATIONAL MAILING ADDRESS

Virginia Mosquito Control Association
Jay Kiser, Secretary/Treasurer
800 Carolina Road, Suffolk VA 23434
Tel: 757-514-7608
Email: VirginiaMosquito@gmail.com

Annual VMCA Conference Summary

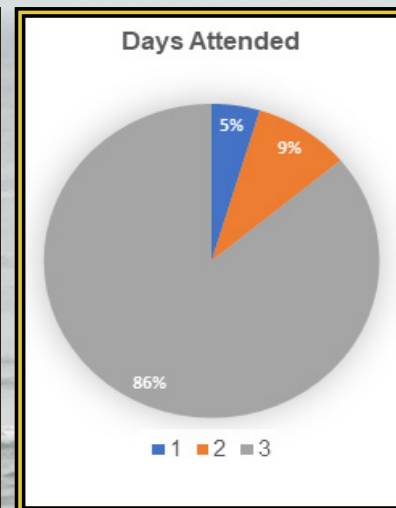
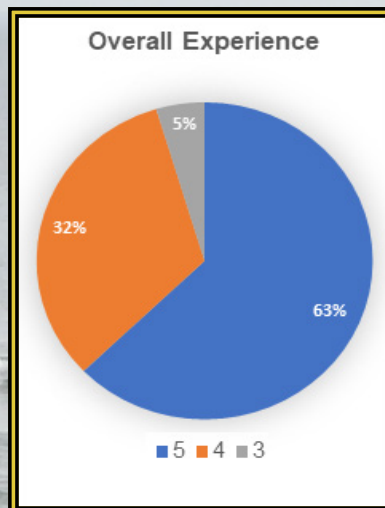


Virginia Mosquito Control Association's 76th Annual Conference took place February 14-16, 2023 at the Hilton Virginia Beach Oceanfront. There was a full program of presentations and over 100 attendees with 9 sustaining members. We had some beautiful pre-spring weather that made breaks quite enjoyable with many walking along the beach or dolphin-watching from the balconies. Conference information from committees and board members are in the pages that follow and you can check out select PDF presentations on our [website](#).



Annual Conference - Survey Results

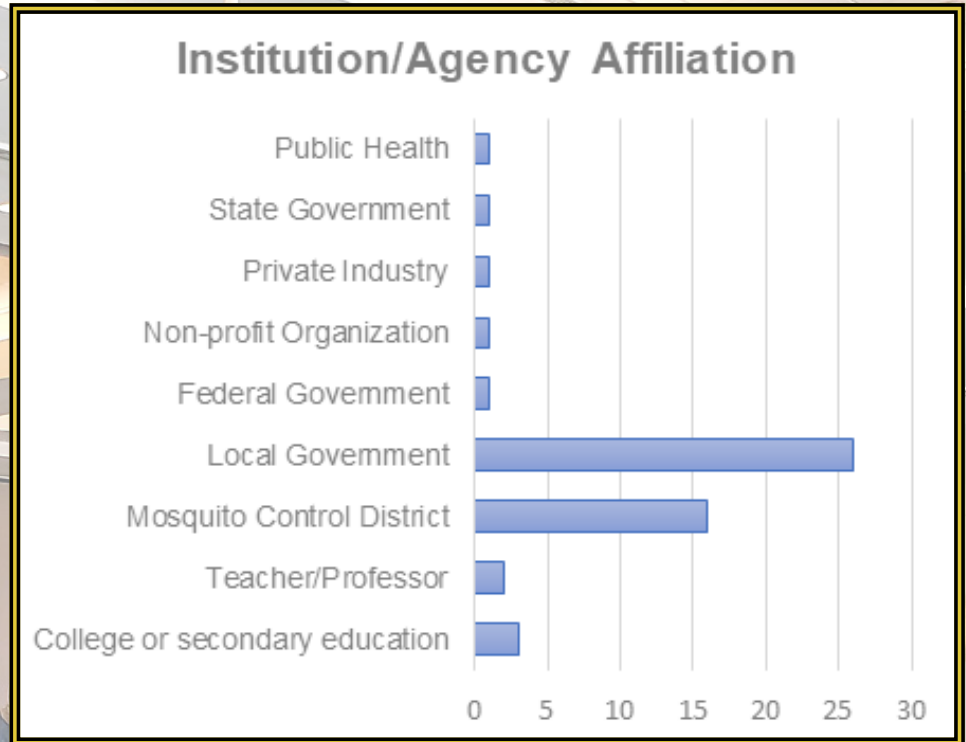
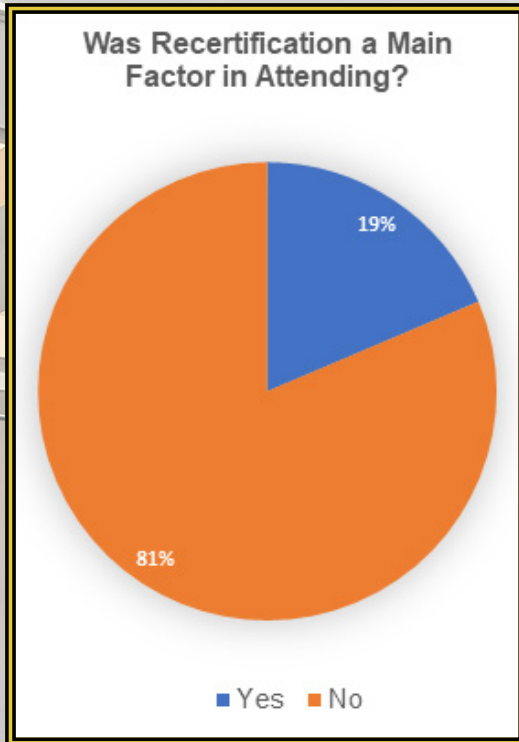
Thank you to everyone who took the time to survey for this year's VMCA conference. Survey responses help to improve the experience of future conferences. This year there were a total of 42 responses (37 virtual responses, and 6 paper responses). The feedback was overall positive. The first graph shown to the right shows a ranking of overall meeting experience on a scale from 1-5 (1 being poor, 5 being excellent). A majority of people rated their experience as excellent (63%), and nobody rated their experience as poor (2 or below). The second graph on the right shows the average attendance of attendees. Most attendees stayed the duration of the whole conference (86%).



continued next page

Annual Conference - Survey Results continued

As seen in the graph below (right), attendees came from all sorts of affiliations this year. Most of which being from local government, or a mosquito control district, 81% of people also indicated that recertification was not a main reason for attending (as seen in the graph below, left).



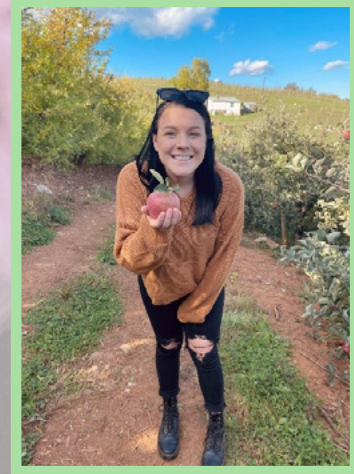
There was also space for additional comments to be made including helpful presentations, how the conference should be improved, and any additional feedback (both positive and negative). These prompts were optional, but several people chimed in with their opinions. **Some of the favorite presentations from the conference seemed to be the lightning round, VDACS update, and all of the student presentations-** along with positive praise for the rest of the presentations that took place.

There were several ideas thrown out about how the conference could be improved in the future. One suggestion that was brought up numerous times was the voting process. **It was expressed that voting should be encouraged more**, and in a more organized manner. An onsite voting booth was suggested, as well as "I voted" stickers to encourage more people to participate. Another point that was made several times was having a wider variety of vector control presentations, expanding from just local municipalities.

A couple of people addressed needing an additional short break during the longer days, and some also suggested that board members should introduce themselves at the beginning of the conference, and give a brief summary of the committees so that they feel more encouraged to reach out, ask questions, and participate.

In summary, the 2023 VMCA conference was an overall success, giving people the ability to connect, meet people, and share information! Thank you to everyone that attended and completed this year's survey. See you all next year at the 2024 VMCA conference!

Annual Conference - Election Results



The election for the Executive Board of the VMCA was a bit different for 2023 than we've seen in years past. The executive board experienced some departures in 2022 that left it with 3 vacant positions: First Vice President, Vice President, and President Elect. With the unusually large number of vacancies, the Executive Board made the decision to use a ranked voting system to determine how the candidates would be placed in each position. Members were asked to rank the candidates from 1-4 or 1-5 if they chose to use a write-in candidate. Once the ballots were collected, the candidates were awarded points based on the rankings they received. First place was 5 points, second place 4 points, third place 3 points, fourth place 2 points, and fifth place was 1 point. The candidate that received the most points was elected to President Elect, second place was awarded Vice president, and the 3rd highest score was elected to First Vice President. **The election committee would like to thank everyone who participated in the election.** It took a few extra steps and was a bit of a headscratcher to figure out. Although we would have liked more participation, we collected 26 ballots, the committee feels the ranked voting succeeded in filling the vacancies fittingly. Congratulations to Karen Akaratovic President Elect, Lauren Lochstampfor Vice President, and Addie Weddle First Vice President (left to right, above). We look forward to a rewarding and productive year with our new board members. We also look forward to returning to our online voting system in 2024.

Submitted by Elections Committee Chair Penelope Smelser

Annual Conference - Hospitality Room



This year's Hospitality Room was another good one. There was plenty of food, drink, and thanks to all the vendors that supplied the adult beverages, good times. Several folks showed up for shop talk, stories, and jokes.

This was my last time being the Hospitality Room Committee Chairperson (retiring 3/31/23) and I wanted to say a **big "Thank you" for all the years that friends, old and new, have stopped by for what I hoped was a good time of fellowship and fun.** Thanks to all the committee members that have helped over the years. Especially, Jay Kiser with his teamwork help make it a success.

It is not too late to sign for a committee, just go to the VMCA website.

**Submitted by Hospitality Room Chair Ann Herring
photography by Carla Caulkins**

Annual Conference - Merchandise Sales

The annual meeting provides a great opportunity for us to mingle with our colleagues, see old friends, hear exciting new ideas, and get motivated for the upcoming mosquito season. But most of all, it's the time to buy stuff with mosquitoes on it. **Surprisingly, mosquitoes have not made their way into mainstream fashion, but the VMCA is always there to fill that void.** This year, the committee had two new products to offer, a hooded sweatshirt and a stainless steel tumbler. Both items were popular and we only have a few sizes remaining in the hooded sweatshirt. The lesson learned, buy early! Don't wait or you may miss out on snagging the item you have your eye on.



Sweatshirts were popular with our student membership and it's a delight to picture our VMCA hoodies traversing the campuses of Virginia Tech, NC State, and ODU. The committee was also relieved to say goodbye to some oldies but goodies: keychains, portfolios, and t-shirts (more space to buy new stuff!). We're always happy to hear requests from the membership on what they would like to see in the future, one member asked if we planned to offer children's apparel again. If there's anything you'd like to see, don't hesitate to reach out, you don't have to be on the committee to have a great idea. Merchandise can be purchased at any time during the year, please contact me if there's anything you would like (penelope.smelser@norfolk.gov). We hope to see you at other VMCA sponsored events this year: Adult Mosquito ID course and the Tour De Skeeter. Thanks again to all who made purchases and represent the VMCA out in the world!

Submitted by Merchandise Committee Chair Penelope Smelser

Annual Conference - Awards

The VMCA is proud to announce this year's Special Award recipients. The ceremony presentation was held after the Conference Luncheon on February 15, 2023. This year's awards went to:

- Ann Herring – Honorary Membership Award
- Andy Lima – Dr. Bruce Harrison Mosquito Research Award
- Sommer Stephens – Dr. Jorge Arias Student Competition Award
- Ayobami Awe – VMCA Student Competition 2nd Place Award
- Pallavi Rai – VMCA Student Competition 3rd Place Award

Please enjoy the following write-ups the committee received for Ann and Andy.

Honorary Membership: Ann Herring, Suffolk Mosquito Control

Dear VMCA Executive Board,

I hope you will consider Ann Herring for the nomination of VMCA Honorary Member to be awarded at the 2023 VMCA Annual Conference. She is retiring in March 2023 and as most of you are aware, has devoted many hours of service to this association for over a decade. Please see the testimonials below from her coworkers, superintendent, and myself. It is for these following reasons we feel she is deserving of this award.

continued next page



Annual Conference - Awards continued

Testimonials for Honorary Member Ann Herring:

Very few people have dedicated as much time and effort to the Virginia Mosquito Control Association as Ann Herring. Ever since I have known her she has either been on a committee (or several) or offered assistance in some way to anyone who needed it. I don't think she has missed a single annual conference and she has commuted quite a distance to each one as well as paid out-of-pocket to stay overnight when necessary to help things flow smoothly. She has also volunteered to serve on the TMVCC board when others resigned and no one else was willing to step forward. When fundraising items are needed such as hotel stays, restaurant gift cards, or other event tickets, she is the one that persuades various businesses to donate. She is like a mother hen to this organization and I think you'd be hard-pressed to find an individual who didn't know her name or recognize her face. Even though retirement is in her near future (Congratulations!), I think it is quite likely she will continue to be actively involved and she deserves to enjoy the benefits of membership as a small thank-you for all the work done over the years. With all the testimonial provided below, I am happy to nominate Ann Herring for the 2023 VMCA Honorary Membership Award.

-Karen Akaratovic

Ann has always been a person to volunteer to help and then extend herself to go above and beyond to do even more than would be expected. Not only does she show a deep passion for what she does for the VMCA, she is always trying to get others more involved. She volunteers for several committees and then offers help with ones she's not even on. Every year at the conference, she is always there before it starts setting up, there the whole time,

and also one of the last to leave making sure everything is cleaned up. She is also known to donate her own time and money without expecting anything in return. Ann is the type of person that will probably want to continue to be part of the VMCA even after she retires, whether she has to pay for it or not.

-Junior Harrell

There are many obvious reasons Ann should be given an honorary membership – her long involvement with so many aspects of the VMCA, from the hospitality planning to fundraising to the various committees she's been on and positions she's held. But I've not been very involved in any of that, so I'd like to focus on the aspects of her I am more familiar with. I've known Ann for over a decade, and in that time she's been a constant positive presence in my life as a coworker, a supervisor, and as a friend. Her personal warmth, integrity, and most of all her intellectual curiosity are all things I value in her, and all traits I think it would be beneficial for her to continue to be able to bring to the VMCA as she moves in to the next phase of her life.

-Alex Riley

I am pleased to support the nomination of Ann Herring as a VMCA Honorary Member. Since becoming a member of the VMCA, Ann has always been there to lend a helping hand to the organization and as a member of several committees. For many years she has been the committee chair for the Hospitality Room. This post conference meeting place is an important element of the VMCA Annual Meeting and for her dedication to preparing, maintaining, and clean up of that room we thank her. I congratulate her in this nomination, wish her the best in her retirement, and hope she continues to support our organization in any way she can.

-Charles Abadam

Ann and I both became VMCA members in 2008. While I just enjoyed the conferences for the first couple years, she quickly found herself helping out and pitching in where needed. In 2010, she joined the TMVCC board, later roping in several of us Suffolk employees over the next few years. During her time on the TMVCC board, she helped implement lasting changes; not just a free lunch, but having an educational talk as well. Later in 2020, she was one of the few VMCA members willing to put forth the effort to keep TMVCC going. As the years went by, Ann became an integral part of the association and many of its committees. In 2012, she took over the VMCA hospitality room and kept up the legacy Joanne Beasley started. For over a decade, Ann has given us a fantastic hospitality room with food, drinks, and fun. This is one of my favorite parts of the conferences, and I can't thank her enough for all the effort she put in to making it happen. As I became a board member and working with committees, Ann has always been willing to help. When the student competition committee started in 2016, she was a member from the beginning. She helped form the guidelines and setup the program that we are still using today. She was always willing to jump in for SCC fundraising: selling 50/50 raffle tickets, spear heading the silent auction, and donating more items to be auctioned than anyone else. Hopefully she still wants to help out during her retirement. She will be difficult to replace. Thank you Ann for all your hard work. You will be missed. Board positions she has served on: MAMCA and TMVCC rep; Committees she has served on: Local arrangements, Hospitality room (chair), Membership, Audit, Special Awards, Education, Public Relations (chair), Merchandise, Student Competition, and TMVCC (President).

-Jay Kiser

Annual Conference - Awards continued

Dr. Bruce Harrison Mosquito Research Award: Andy Lima, Fairfax County Health Department

Since the creation of this award in 2019, one name surfaces to the top of the list of VMCA members deserving this award, and that is Andy Lima. Truly embodying the essence of Bruce Harrison's desire to learn, explore, and teach, his dedication has gone above and beyond the average vector control worker. For some of us, conducting research and teachings is just another part of our everyday employment. For the truly dedicated individual, this work continues even when they are not on the clock and satisfaction comes from the the work itself. Andy is that type of person. While on and off the clock, he has spent his time collecting bloodfed *Anopheles* on the banks of the Potomac River, discovering new distributions of *Aedes aegypti* in the center of Washington DC, and using music as a way to excite people about vector control. His passion for science continues as he takes the time to present his findings to colleagues both locally and nationally. His teachings take place not only in school classrooms, VMCA meetings, and through peer reviewed journals, but they also spread through social media in songs, images, and videos. With all his accomplishments and passion in the world of vector borne sciences, we would like to nominate Andrew Lima, AKA MC BuggZ, for this award.



List of publications and accomplishments:

Aedes aegypti in Washington DC

- » Lima A, Lovin DD, Hickner PV, and Severson DW. 2016. Evidence for an overwintering population of *Aedes aegypti* in Capitol Hill neighborhood, Washington, DC. *Am J Trop Med Hyg.* 94: 231-235.
- » Gloria-Soria A, Lima A, Lovin DD, Cunningham JM, Severson DW, and Powell JR. 2018. Origin of a high-latitude population of *Aedes aegypti* in Washington, DC. *AM J Trop Med Hyg.* 98: 445-452.

Teaching and training

- » Multiple conference presentations over the years: VMCA, AMCA, National Environmental Health Association
- » Outreach and teaching events: Various community presentations; Elementary school classroom presentations; Community outreach events
- » MC BuggZ songs: "Six legs don't stand a chance"; "Suburban Blood"; "Zika 101 (Vector Control)"; "Tick check 1,2"; "West Nile Story"

Thank you to everyone who took time to recognize their fellow members for their hard work and dedication to further our organization mission. Congratulations to this year's Special Award recipients!

See next page for student competition awards.

Submitted by Awards Committee Chair Jennifer Barritt



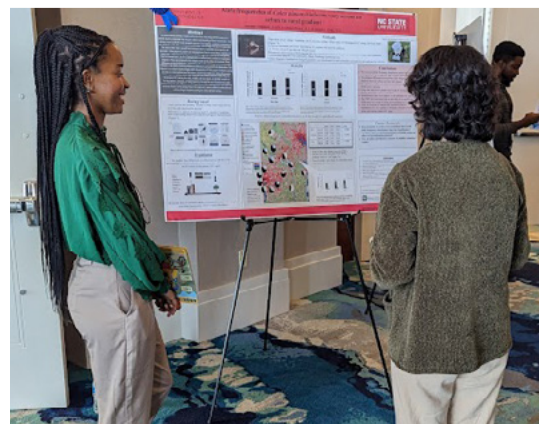
Annual Conference - Student Competition

During the 2023 VMCA annual conference, the Student Competition Committee (SCC) held its seventh annual student poster competition. During this year's competition, VMCA invited university students from not only Virginia but also Virginia's neighboring states: Kentucky, Maryland, North Carolina, Tennessee, Washington DC, and West Virginia. **Nine posters were submitted from seven universities in five of the states.** First place, recipient of the 2023 Dr. Jorge Arias Student Competition Award, and winner of the \$500 grand prize, went to Sommer Stephens from North Carolina State University (pictured below). Her poster was titled "Allele frequencies of *Culex pipiens* bioforms vary across an urban to rural gradient." Second place with a \$300 prize went to Ayobami Awe from Catholic University of America (pictured below). His poster was titled "Dengue vaccine design using bacteriophage T4 nanoparticle platform." Third place with a \$200 prize went to Pallavi Rai from Virginia Tech (pictured below). Her poster was titled "Insulin reduces alphavirus infection of *Aedes aegypti* mosquitoes by influencing vector immune pathways."



Above: receiving the 7th annual SCC awards during the 2023 VMCA conference. VMCA President, Wes Robertson is handing the plaques and checks to Sommer Stephens (left), Ayobami Awe (center), and Pallavi Rai (virtual, right).

During the 2023 conference, all nine posters were displayed in the foyer of the Hilton Virginia Beach Oceanfront Hotel. Several poster submitters and many VMCA members participated in a Q&A poster session on the second day of the conference. This session gave VMCA members a chance to talk one-on-one with the students and investigate each poster more thoroughly (pictures below). **The SCC appreciates the abundant level of participation from our membership this year** during the Q&A session and allowing the students to be fully engaged during the session.



Students explaining their posters to VMCA members during the Q&A session of the annual meeting.

continued next page

Annual Conference - Student Competition cont'd

During the 2023 VMCA Conference, the SCC held two successful fundraising events. Throughout the meeting, Kaitlyn Price and Addie Weddle were hard at work selling raffle tickets for the 50/50 raffle. Over \$300 worth of tickets were sold, with half of this amount going to the lucky winner, Carol Laliberte. With the help of the SCC, VMCA members, and sustaining members, the silent auction was a big success. The auction raised almost \$850. **All the money collected from these events will be used to fund future competitions that encourage research in fields of vector biology.** If anyone is interested in donating items to next year's auction, please contact me at jkiser@suffolkva.us.



VMCA members looking at items on the silent auction tables.

I would like to thank all the students that participated in the poster competition this year. Your participation shows us that the competition is still needed in Virginia and its neighboring states. It encourages us to keep moving forward and continue holding this event. I would also like to thank everyone that contributed to the silent auction and 50/50 raffle this year. Without your donations this program would not have the success it has seen over the last three years and hopefully will see in the years to come. Last but not least, I would like to thank the members of the SCC (including judges). A lot of hard work has gone into this committee over the last three years and I appreciate everything you have done. Looking forward to seeing you next year.

Submitted by Student Competition Committee Chair Jay Kiser with photography by Josh Smith and Janice Pulver

Bits and Bites



Do you know the ASL sign for "mosquito"?
 What makes an orb web sticky?
 Are you an arthropod poopologist?
 Can you spot all 5 mosquitoes on that frog?



These are just a few fun finds from Virginia Tech's **Virtual Hokie BugFest**. Explore the world of entomology with videos, photo galleries, online and printable activities, and so much more.

Annual Conference - Sustaining Members

At this year's VMCA meeting, the vendors came out to enlighten us with their knowledge as well as exhibit and explain all the products that the localities will soon be needing with mosquito season around the corner. Vendors not pictured below include Chad Minter with Frontier Precision and Zachary Cohen with Summit Chemical.

A big THANK-YOU goes out to all the vendors for everything they do!

Submitted by Ann Herring



Ted Bean, Azelis



Chuck Berg, Co-Diagnostics



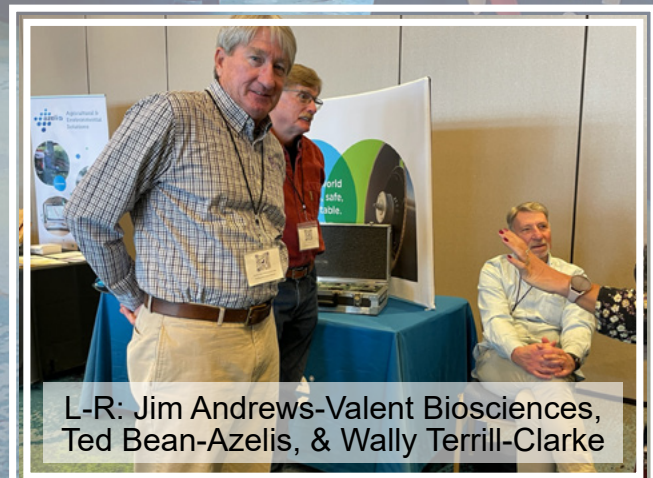
Jeff O'Neill, Central Life Sciences



Steve Molnar, Target Specialty Products



Brock Verworn, Veseris



L-R: Jim Andrews-Valent Biosciences, Ted Bean-Azelis, & Wally Terrill-Clarke

Find all of our sustaining members' contact info on [page 26](#)

2023 Adult Mosquito Identification Course

Virginia Mosquito Control Association is holding its annual Adult Mosquito Identification Course on **Monday, May 8, 2023** at Suffolk Mosquito Control, 800 Carolina Road, Suffolk, Virginia 23434 in the administration building, training room 128. This will be a one-day event that begins at 7:00 am. The class will be conducted by VMCA's Education Committee and taught by local Virginia mosquito control biologists.

While we aim to be as current and informative about our local (mainly Tidewater area) species as time allows, this class will not be strict taxonomy, but more of a practical training geared toward seasonal interns, summer part-time biology positions, or mosquito biologists new to the area. Class size is limited to 30; attendees should have mosquito surveillance and/or identification in their job description and duties. New participants will take precedence over returning individuals; if space is available then others will be accepted. **Sign-up is on a first-come basis so please sign up early!**

A light breakfast and lunch will be provided by the VMCA. If you have dietary restrictions and/or would like to bring your own food, a refrigerator/freezer and microwave are available.

Please contact VMCA Education Committee Chair, Katherine Reutt via email at kreutt@cityofchesapeake.net in order to register for the course.

2023 VMCA Adult Mosquito Identification Course Agenda

7:00 – 7:30	Equipment set-up and light refreshments (provided by VMCA) – donuts, granola bars, coffee, water
7:30 – 7:35	Welcome & Opening Remarks – VMCA Board Member
7:35 – 8:15	General Mosquito Biology, Traps, Diseases – Tim DuBois, Portsmouth Mosquito Control
8:15 – 8:30	Dichotomous keys, flash cards, & other ID tools – Kaitlyn Price, Virginia Beach Mosquito Control
8:30 – 8:40	<i>Culex</i> genus – Karen Akaratovic, Suffolk Mosquito Control
8:40 – 8:55	<i>Anopheles</i> genus – Lisa Wagenbrenner, Chesapeake Mosquito Control
8:55 – 9:10	“Minor” genera (<i>Culiseta</i> , <i>Coquillettidia</i> , <i>Orthopodomyia</i> , <i>Uranotaenia</i>) – Janice Pulver, York County Mosquito Control
9:10 – 11:30	Identify <i>Anopheles</i> , <i>Culex</i> , and Minor genera using microscopes and keys
11:30 – 12:00	LUNCH (provided by VMCA) – Pizza
12:00 – 12:20	<i>Aedes</i> genus – Addie Weddle, Portsmouth Mosquito Control
12:20 – 12:30	<i>Psorophora</i> genus – Penelope Smelser, Norfolk Vector Control
12:30 – 3:00	Identify <i>Aedes</i> and <i>Psorophora</i> genera using microscopes and keys
3:00 – 3:30	Break down of equipment and return room back to original order

Submitted by Education Committee Chair Katherine Reutt

Historical Committee Flashback

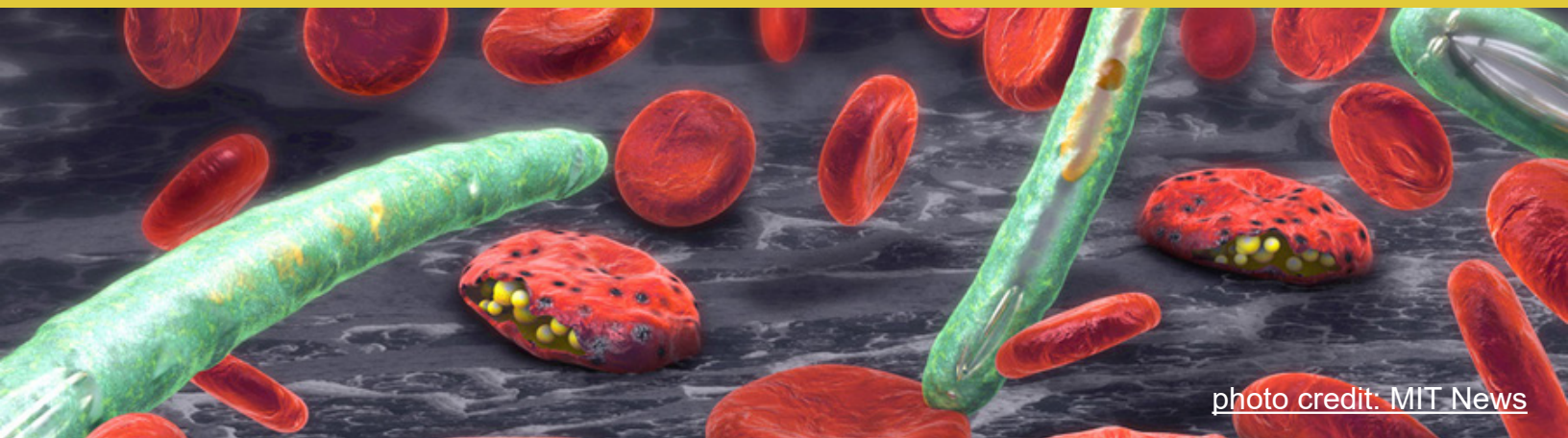


photo credit: MIT News

In the May 26, 1945 edition of *The Skeeter*, they posted a quiz on Malaria and Mosquitoes. I thought it would be fun to share this quiz!

What do you know about Malaria & Mosquitoes?

The following are six questions on Malaria & Mosquitoes. Read them over. If you can give the correct answer to each, you know your stuff. If your average is less than four, you should study up. (*Remember this is from 1945*)

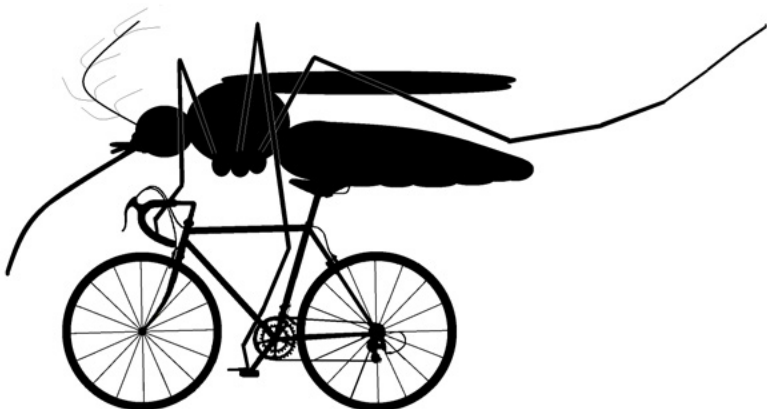
Questions:

1. What is Malaria?
2. Do all mosquitoes bite?
3. What three things are necessary to spread Malaria?
4. Can Malaria be carried by food, by water or by the air from a swampy place?
5. How can you tell male mosquitoes from female mosquitoes?
6. What is one way of telling the Malaria mosquito?

Answers on [page 17](#)

Submitted by Carla Caulkins, Historical Committee

Bits and Bites



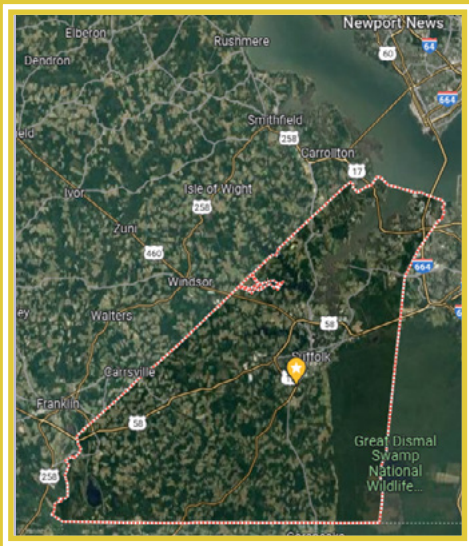
You have all summer to make sure your spandex and bicycle jerseys still fit.

Tour de Skeeter 2023

will be taking place during the cool fall temperatures of October. Be on the lookout in the Summer *Skeeter* for dates, signup links, and more details. I hope to see you all there.

-SCC Chair Jay Kiser

Suffolk in the Spotlight



On the southern border sits the largest city in Virginia by land area and as of the 2020 census, the 10th most populous. Just south of its urban downtown area, approximately two miles west of the Great Dismal Swamp National Wildlife Refuge, you'll find one of the smallest mosquito control programs in Virginia, City of Suffolk Mosquito Control (SMC). Current full-time staff includes Superintendent Charles Abadam, Biologists Karen Akaratovic and Jay Kiser, Technician Crew Leader Alex Riley, and Mosquito Control Technician Junior Harrell. We are in the process of hiring two more full-time technicians as well as several part-time seasonal staff.

The program has gone through many changes over the past 10+ years, including a majorly upgraded facility. In 2015, SMC moved from a 500 square foot trailer to an actual building with three times the space, improved equipment, and other amenities. These upgrades allow us to more effectively serve our citizens by expanding possibilities for our Integrated Pest Management (IPM) practices.

One major component of our IPM is adult mosquito surveillance, which is conducted throughout the city primarily April -October. Approximately 60 traps are set weekly consisting of BG-Sentinels, gravids, and CDC light traps depending on habitat and target mosquito species. We collect on average 300,000 adult female mosquitoes per year (2012-2021, 10-year avg). However, 2022 was the lowest since 2008 with just under 80,000 total collected. Most surprising were the **extremely low populations of *Culiseta melanura*, our primary enzootic EEEV vector. This species usually composes over 50% of the total, yet only reached 11.8% in 2022.** Many other woodland and floodwater species also experienced low population levels. Below average precipitation the last two years ([NOAA](#)) coupled with rising temperatures – resulting in increased evaporation rates and soil moisture loss – may be contributing factors.

***Aedes albopictus* and *Culex pipiens/restuans* on the other hand, have been thriving** and in the last five years we have seen their highest populations. In 2022, with *Cs. melanura* populations at an all-time low, *Ae. albopictus* and *Cx. pipiens/restuans* attained 37% and 32% of total collections compared to historical averages of 8% and 5%, respectively.

This increase in primary and bridge vectors for WNV has led the larval surveillance portion of our IPM through some changes. Thousands of chronic sources are monitored and treated with larvicides on a regular basis,

including catch basins, ditches, woodland pools, field depressions, etc. However, in recent years, cold-knocks (speaking with and educating residents) and subsequent home inspections have increased to identify and treat/prevent the habitats of these opportunistic, container-breeding species, especially in areas of dense human population faced with elevated arboviral transmission risk.

These activities link another major practice of our IPM, source reduction, which involves technicians removing items from the environment that could serve as oviposition habitat. This primarily includes the **removal of thousands of tires and several hundred pounds of trash annually** (below), the latter



of which has only recently been incorporated over the last few years as the city's Refuse and Litter Control Divisions cannot keep up with illegal dumping activities.

When larvaciding and source reduction do not show a decrease in adult mosquito populations via trapping surveillance data, various adulticiding methods are utilized including barrier sprays, ULV-handheld, and ULV-ground applications.

continued next page

Suffolk in the Spotlight continued

Adulticides are used to combat nuisance mosquitoes when warranted but of principal concern is controlling arboviral vector species, especially if virus is known to be circulating.

Therefore, another part of our IPM is the testing of mosquitoes during peak arboviral transmission season, June – October. We test pools of *Cs. melanura* for EEEV and *Cx. pipiens/restuans* for WNV using Vector Test, an antigen assay, which gives us same-day results and thus the ability to quickly make operational decisions. At the end of the testing season, all positive samples are sent for PCR confirmation.



Biologist Jay Kiser adds a tray of *Aedes albopictus* egg papers to the incubator behind him.

Additionally, in our new facility, SMC has been able to add pesticide resistance testing to our IPM with annual evaluations of various chemicals on *Ae. albopictus* and *Cx. pipiens* taking place since 2018. We have developed this part of the program over the years and recently purchased incubators (above) which has resulted in more efficient rearing of larvae and better physiological health of adults. We primarily test in-house using the CDC bottle bioassay protocol; however, in 2021 and 2022 we sent *Cx. pipiens* to the Northeast Regional Center for Excellence in Vector-Borne Diseases via Cornell University for enhanced testing with

inhibitors to determine potential mechanisms of resistance.

Over the past 10-15 years, biologists have conducted many experiments to improve the program at SMC. Through multi-year studies using rotator traps, we were able to learn peak activity times for several species in our city. These results can help make adulticide efforts more efficient by focusing treatments during peak hours. Host-blood analysis projects on *Ae. albopictus*, *Cs. melanura*, and *Cx. pipiens* resulted in findings that highlight the importance of these vectors and support ongoing surveillance and research. We have also tested several gravid water formulations, compared carbon dioxide sources/generators, evaluated new trap types, and evaluated several different pesticide applications in field settings.

These and other experiments lead to the final component of our IPM, education and outreach. This includes a mosquito dunk handout program, social media postings, press releases, local news

interviews, newspaper articles, and attending various events (utilizing displays, handouts, and interactive games), among other methods with the aim to educate



Part of display with educational video on loop and poster with species found in Suffolk made by past biology assistants Amber Rymer and Ashley Byers

the public on not only what we are doing but how they can help protect themselves from mosquito bites and arboviral diseases. For SMC, this component also includes collaborating with other programs and researchers to publish our findings in scientific journals with the hopes of shared knowledge helping other mosquito control and research programs.

All this to say, we may be a small staff covering the largest city in the state, but we try to the best of our abilities to protect the citizens of Suffolk through a variety of strategies. Over the past 11 years, I've had the opportunity to work with several great team members, many of whom have stayed in the local mosquito control community and now run programs of their own. **To all the past and present SMC employees, thank you for your contributions to our program.** I'd also like to recognize our recently departed Technician Crew Leader Ann Herring and wish her a very happy retirement!



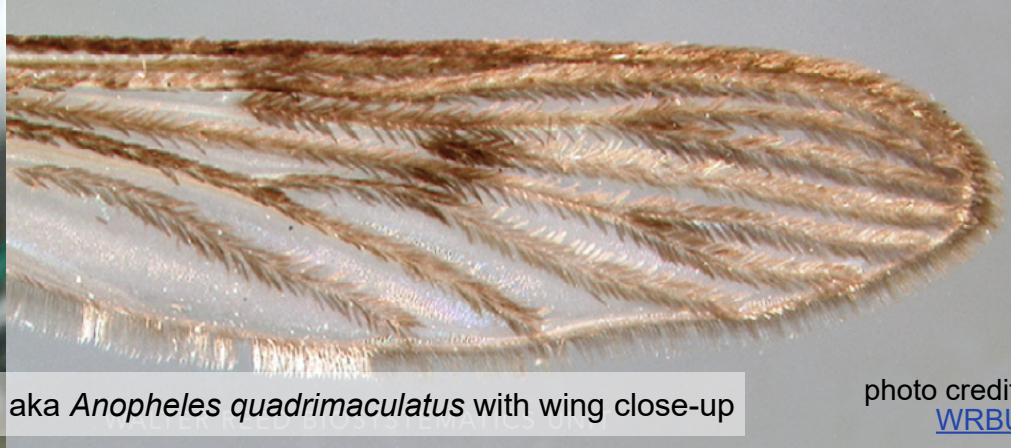
Some of our popular interactive displays- Top: Diorama of mosquito habitat made by past biology assistants, Cassidy McKelvie and Kaitlyn Price; Bottom: game with a prize!

Submitted by
Karen Akaratovic, Biologist
Suffolk Mosquito Control

Historical Flashback Continued



photo credit:
[Sean McCann](#)



"Malaria mosquito" aka *Anopheles quadrimaculatus* with wing close-up

photo credit:
[WRBU](#)

Answers:

1. It is a disease that causes a chill followed by high fever that leaves the patient after a few hours. It may return every two or three days.
2. Only the females bite.
3. (a) There must be persons who have the Malaria parasite in the blood, (b) female *Anopheles* to suck up these parasites, and (c) other people into whom the mosquitoes can put the parasite.
4. No, it is caused only by the parasite conveyed by the bite of a certain kind of mosquito.
5. The antennae of the male are long and have horns on them which look like plumes. The antennae on female mosquitoes are short and have few horns.
6. The wings have four spots on them.

Submitted by Carla Caulkins, Historical Committee

Editor's note: While this article refers to our local eastern US vector, *Anopheles quadrimaculatus*, for more information on malaria and the ~70 *Anopheles* vector species globally check out: [NIH](#), [WHO](#), and the [Malaria Atlas Project](#)

Bits and Bites

Nerodia erythrogaster, commonly known as the plain-bellied watersnake (actually a misnomer since the venter (belly) is an orange to red color) is found in many of the habitats we go hunting for mosquito larvae. This species is not venomous and loves low-lying wet areas including swamps, ditches, and freshwater marshes. They are typically active late-May through mid-September; however, this one was found on a warm day in early April (the start of mating season) in a Suffolk roadway suffering from an injury. Check out [page 21](#) for one of its potential prey!



"Reeling" from COVID Impacts on In-Person Outreach? Social Media to the Rescue

Social media is a powerful tool that Henrico County Standing Water (SWI) has employed since 2016. Facebook was selected as the primary application because research suggested it would have the broadest reach among Henrico County residents. Additionally, Facebook offered substantial variability in features which has since increased our departmental outreach and promotional capabilities. These capabilities allow for information sharing, graphic and data presentation, video embedding, and the use of other features that allow for the construction of department-specific content.

The main difficulty with social media management and promotion has been staying on top of scientific trends and keeping public exposure, and the responses it generates, within the boundaries of creditably sourced information. SWI has accomplished this by introducing a series of regularly scheduled and researched posts. In other words, developing consistency. Since the influence of COVID, SWI has consistently guided information regarding mosquito and insect behaviors, current and emerging arthropod-borne viruses (arboviral) updates, pesticide and treatment postings, and promotional features aimed at resident education and empowerment.

In combination with implementing a policy of consistency, SWI has seen substantial growth in reach goals from year-to-year after efforts were made to singularize posting and site management responsibilities, learn and adjust to Facebook's algorithms, and incorporate more video "reels". As you see the proof below, SWI believes this new model of development can easily be adopted to help improve any sister municipal mosquito social media outreach platform.

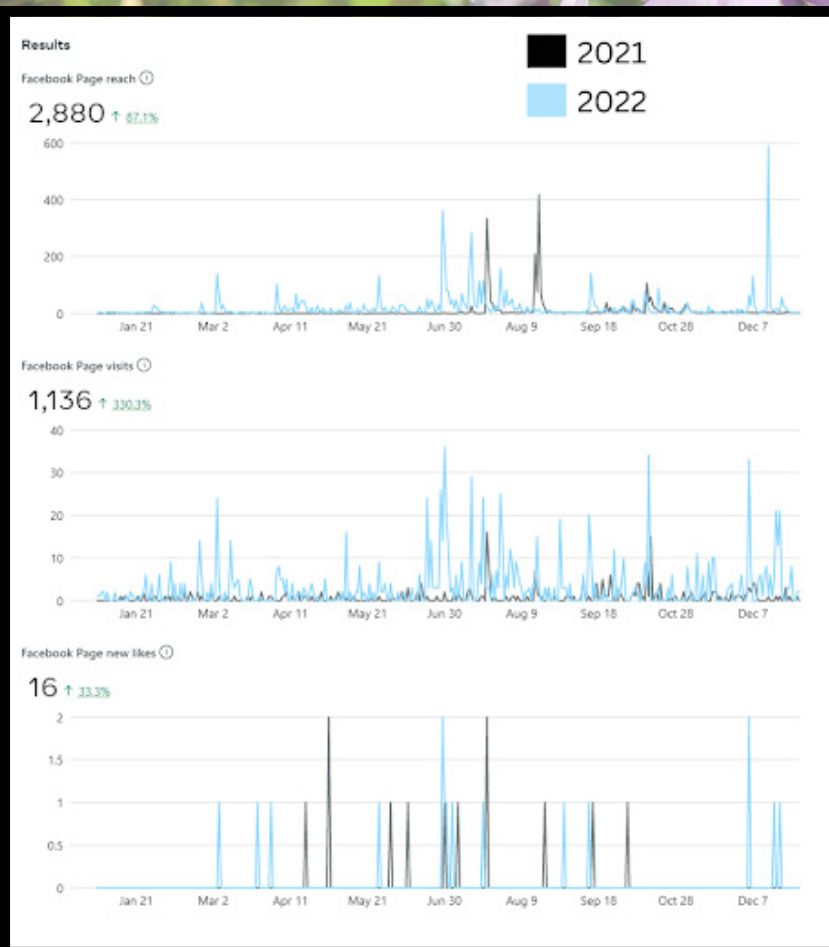


Figure 1. Henrico County's Facebook Interaction Data exported from Facebook's Meta Business Suite. The Data compares page views and interactions from 2021 to 2022. The graph indicates an 87.1% increase in overall attention from the public.

**Submitted by
Wes Robertson
and
Samantha Nadal**

48th MAMCA & 44th GMCA Joint Meeting Recap



The Mid-Atlantic Mosquito Control Association and the Georgia Mosquito Control Association held a joint meeting from January 9-11, 2023, in Savannah, GA.

On top of these two great associations combining their annual meetings, the Florida Mosquito Control Association also joined in the experience by bringing their annual Fly-In to Savannah to finish out the week. The logistics behind combining all three of these association's meetings together at one time and in a non-conventional location were challenging to say the least.

The meeting was held at Chatham County Mosquito Control's facility with presentations occurring in the helicopter hangar. There were many issues to overcome when it came to attendees being able to see and hear presentations in a space as large as an aircraft hangar. Presenters did a great job despite having a huge 20' x 30' white tarp as a screen and helicopters at times landing just outside of where they were presenting. Besides the great talks, having gorgeous weather and delicious food trucks on-site for lunch really capped off the week.

Attendance was one of the highest ever for MAMCA with 125 attendees and 15 Sustaining Members registering. A Big Thanks goes out to the Sustaining Members for being available to share their expertise, discuss products, and support the associations.

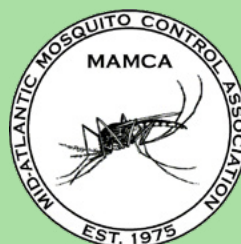
In a return to previous MAMCA agendas was the addition of a panel discussion, which was moderated by MAMCA President Tom Moran. The representatives on the panel were from Pennsylvania, Maryland, South Carolina, Georgia, and Florida who discussed the vast difference in methods and procedures in mosquito control in the member states.

During the MAMCA Business Meeting, Ture Carlson

(GA) was elected President, Brian Prendergast (MD) was confirmed Vice President, and Jeff Hottenstein (VA) was elected Vice President Elect for 2023 – 2024. According to the State Director rotation, the following will join the MAMCA Board for the 2023-2024 term: Jeanne Zastrow (MD) with "Tiffany" Thuy-Vi Thi Nguyen (GA) and Christian Boyer (PA) serving another three-year term.

Tom Moran (DE) was presented a plaque for his service and term as MAMCA President. Arielle Arsenault-Benoit, University of Maryland, was presented with the Dr. Bruce A. Harrison Outstanding Student Award. Rosmarie Kelly, PhD, was the recipient of the Rowland E. Dorer Award for her exceptional contributions to mosquito control in the Mid-Atlantic region. **Congratulations to all the award recipients for their service and contributions.**

MAMCA is looking forward to the 49th Annual Meeting scheduled for January 2024 in Annapolis, Maryland. More information about that meeting will be coming out shortly on the MAMCA website, www.mamca.org. In addition, **the 50th Annual Meeting in 2025 is in its planning stages. It will be held in Virginia with MAMCA and VMCA likely joining forces for a joint meeting.** Given that it will be the 50th anniversary of MAMCA and occurring in one of the founding member states, everyone should look forward to a memorable meeting!



**Submitted by Ture Carlson
2023 MAMCA President**

C&P Committee Call for Culicidae



Specimens from the entomology collections at the Smithsonian National Museum of Natural History - Left: *Anopheles* mosquitoes.; Right: A variety of Lepidoptera species; photos from [SNMNH-Facebook](#)

The Curations and Preservation (C&P) Committee is just getting started and **we'd like your help!** Spring is a great time to collect many mosquito species, some that may not be easily caught later in the "mosquito season." The committee will have some formal storage and display protocols but for the purposes of establishing a teaching collection, basic methods follow.

4th Instar Larvae

Heat-kill individual larvae in well plates:

1. Remove as much sample water as possible from the well
2. Heat a mug of water to ~140°F (use a thermometer!)
3. Add hot water to wells with mosquitoes and wait for them to stop twitching
4. Add heat-killed larvae to vials* of 70-80% EtOH (ethyl alcohol; ethanol); depending on specimen/vial size, usually 10-25 per vial



*screw cap
micro tubes
preferred

**See next page for spring
species and associated
larval habitats!**

Adults

Rear from larval collection or save from adult trapping

1. Kill in freezer or via kill-jar with ethyl acetate
2. Store dry specimens in vials*

Label all collections

1. Collector name
2. Collection date
3. Location (Lat/Long)
4. Larval habitat/trap type
5. Genus and species

C&P Culicidae Call Continued

All collections welcome but be especially on the lookout for the following spring species:

Species	Primary Habitat Type
<i>Ae. aurifer</i>	FW swamp, acidic soil, woodland pools
<i>Ae. canadensis</i>	Woodland pools
<i>Ae. cantator</i>	Salt marsh
<i>Ae. cinereus</i>	Woodland pools
<i>Ae. grossbecki</i>	Woodland pools
<i>Ae. sticticus</i>	River floodplain
<i>Ae. stimulans</i>	Woodland pools, heavy leaf litter
<i>Ae. thibaulti</i>	Cryptic; rot holes under fallen trees
<i>Ae. triseriatus/hendersoni</i>	Treeholes (lower/higher, respectively), tires
<i>Ae. trivittatus</i>	Woodland pools
<i>An. barberi</i>	Treeholes
<i>An. punctipennis</i>	Small sunlit FW with abundant vegetation, namely algae
<i>Cx. restuans</i>	Ditches, woodland pools, artificial containers; easiest to collect rafts from gravid pans!
<i>Cx. salinarius</i>	Open fresh or brackish waters
<i>Cs. inornata</i>	Small, polluted, temporary water- puddles, ground pools, ditches
<i>Cs. melanura</i>	Cryptic- acidic FW, swamp and ground pools, underground crypts, rotted stumps
<i>Tx. rutilus septentrionalis</i>	Treeholes, tires

Contact C&P Committee Chair, [Wes Robertson](#) to coordinate collections, request materials, or if you have any questions. Happy mosquito hunting!

**Submitted by Karen Akaratovic
Curations and Preservation Committee**

Bits and Bites

While you're out hunting for mosquito larvae, keep an eye out for *Plethodon cinereus*!

This little guy is an eastern red-backed salamander, which can occur in two different color phases. The top picture is photographed this month by Tim DuBois in Windsor and displays the red-back phase with a wide orange to red stripe down the length of body; the bottom photo (from [MD DNR](#)) shows both phases with the lead-back phase on the top which is characterized by a consistent gray to black color.

While common in the area, these salamanders can be tricky to find as they prefer dark and damp habitats. This is due to their lack of lungs, so they need the moisture to breathe. Typically found in or under logs, moss, or other moist leafy areas, they eat a variety of small invertebrates found in that habitat.

Submitted by Tim DuBois



What's That Answer



That is a 3D-printed mosquito wearing a gas mask! It is part of a custom bookend project that was a retirement gift for Ann Herring of Suffolk Mosquito Control. Coworkers came up with the idea, split the cost of materials, and Alex Riley and her brother brought it to life! Alex's description of the process follows:

Design by Alex Riley, 3D modeling by Eric Riley;
assembly and painting by both

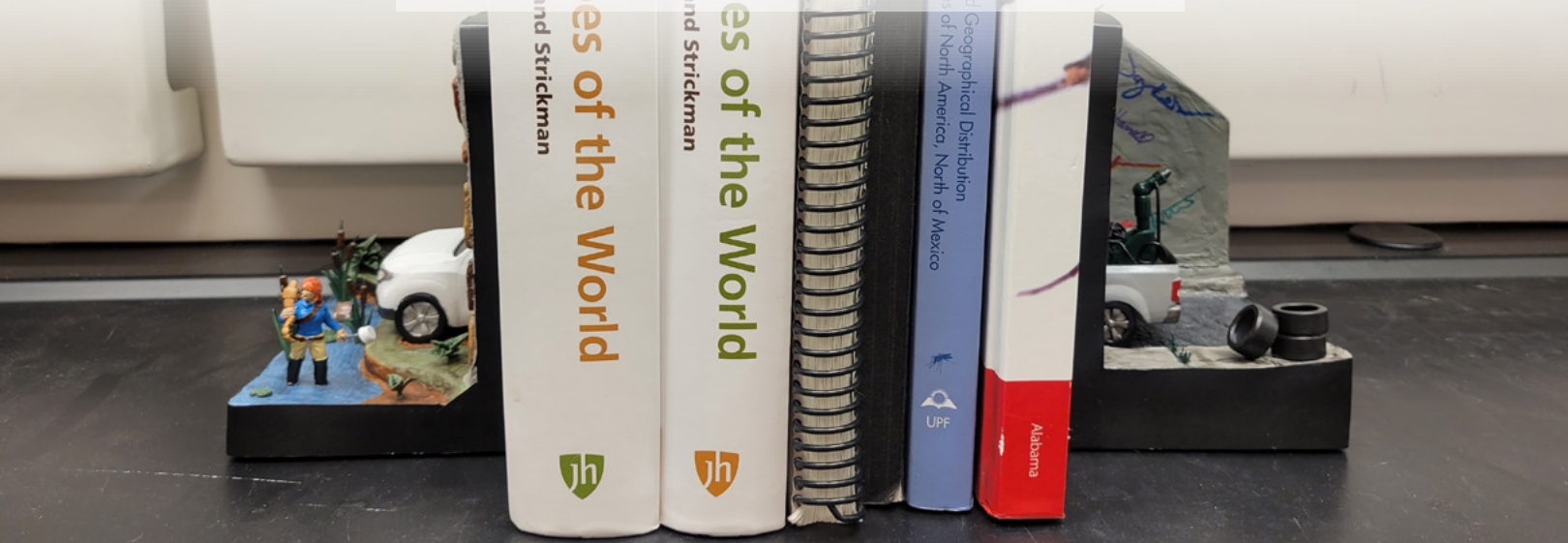


Top: mosquito is poised to attack as the spray truck enters the tunnel; Bottom: close-up of the Cougar ULV sprayer



Autodesk 3DS Max was used to model the adult, larva, pupa, truck, dipper and sprayer based on conceptual sketches and reference photos. These were then sliced for printing on Chitubox and then printed in gray resin using an Elegoo Mars 2 3D printer. Hero Forge was used to design the technician model along with the frog and sparrows, and models of vegetation were purchased from the Cults marketplace; all of these were also printed on the Elegoo Mars 2. Office Depot 5" steel bookends were used for the base. The terrain is hand-sculpted modeling clay over a core of florist's foam; everything was painted in acrylics and sealed with a matte acrylic sealer.

Top: pupa lurks in the water behind "Ann" (below) picking up a giant larva

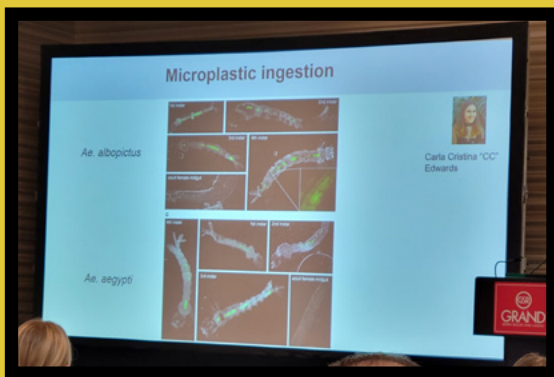


AMCA Annual Conference Summary

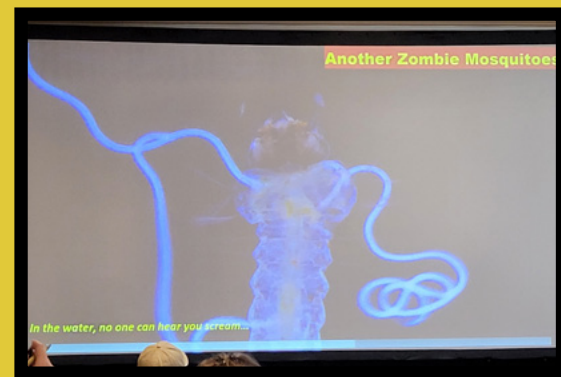
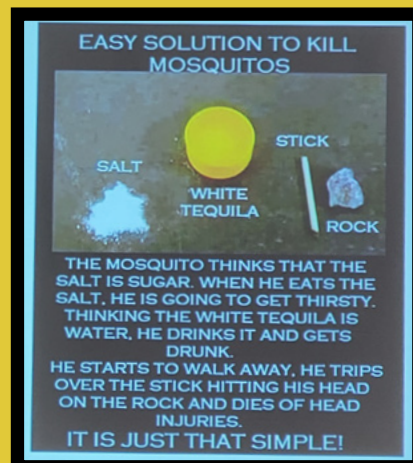


The 89th annual conference of the American Mosquito Control Association was held February 27 – March 3, 2023 at the Grand Sierra Resort and Casino in Reno, Nevada. With gorgeous views of the snow-covered Sierra Nevada and Virginia Range mountains (as shown above, view from hotel room), this location was my favorite of the three national meetings I have been able to attend. Although the winter weather affected many attendees, causing delayed arrivals of vendors, missing posters, and several cancelled presentations, there still seemed to be a sizeable crowd with most meeting rooms filled and standing room only in some.

If you have not been to an AMCA meeting, they are much busier than our state gatherings. With 4-5 rooms of sessions occurring simultaneously, it is impossible to see all 300+ presentations, so you must prioritize and choose those which you most want to see. Tuesday, Wednesday, and Thursday were full 8-hour days of engrossing information. There were new ideas and developments on all the usual topics like insecticide resistance testing, trapping, pesticide treatments, and education/outreach strategies. And then there were the unexpected topics with surprising findings, novel biological control potentials, and of course a fair amount of entertainment and humor.



Potential implications of mosquitoes ingesting microplastics

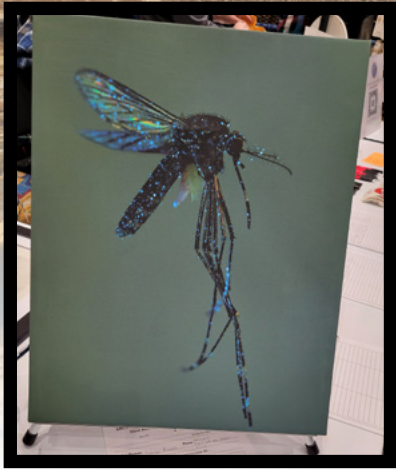


Biological control possibilities using mermithid nematodes!

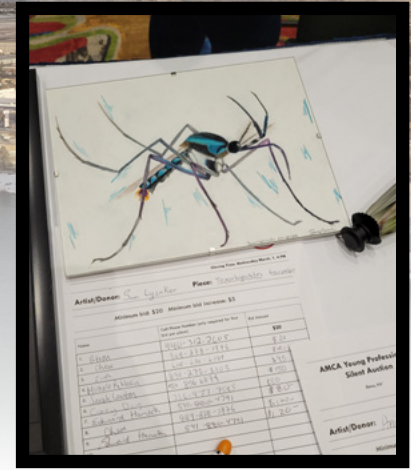
In-between presentations and at the end of each day, you could find most people in the exhibit hall perusing vendor booths, viewing student posters, and chatting with colleagues. There were almost 50 exhibitors this year; some of my favorites were Azelis, AMCA Young Professionals (YP), Biogents, Leading Edge, and North Carolina State University. The AMCA YP Booth is always great because they typically have some sort of silent auction and neat mosquito swag you can purchase or win. **If you have less than 8 years of experience in mosquito-related work and less than 5 years in AMCA, you can join the YP group for free** and get access to learning and networking opportunities throughout the year ([more here](#)).

continued next page

AMCA Summary Continued



L&R: silent auction items; Center: mosquito wing earrings purchased from YP and playing card freebies from Azelis



Azelis, Biogents, and Leading Edge all had products on display that gave us ideas for our program and NC State was showing new research from the Wilson College of Textiles on a pesticide-free proboscis-proof material for military uniforms ([see article here](#)). There were over 20 posters on a variety of topics including mosquito biology, surveillance, resistance, treatment methods and even investigating the relationship between mosquito control and fireflies.

The conference ended on Thursday evening with the banquet which is a great networking opportunity and a chance for all to relax after the week's activities. The AMCA President and Board of Directors are seated on stage where they present awards to student competition and poster winners. Although Virginia had low representation this year with only Suffolk Mosquito Control (Charles Abadam and Karen Akaratovic) attending, we ran into many familiar faces and made some new acquaintances that all resulted in good times and engaging conversations. **I cannot recommend the AMCA annual conference enough to everyone in mosquito control and related industries. It really is the best event of the year to stay current, network, and get ideas for your program.** I feel very fortunate to have had the opportunity to attend this year and I look forward to putting the knowledge and relationships gained to good use. Fingers crossed for Puerto Rico, 2025!

Submitted by Karen Akaratovic

**Don't miss AMCA's
25th Annual Washington Conference**

May 15-17, 2023

The Hilton Alexandria Old Town
Washington, DC

Online registration is available
until May 10th

[Register here](#)



**And check out AMCA's Community
Calendar for upcoming events like...**

University of Idaho IHHE Biology of
Vector-borne Diseases 6-day class
Anastasia Mosquito Control District
SIT Mass Rearing Facility Open House
North American Black Fly Association
Meeting & Taxonomic Short Course

[Community Calendar](#)

Jurisdictions, Organizations, and Resources

Virginia mosquito control jurisdictions

- [Alexandria Health Department](#)
- [Boykins, Town of](#)
- [Chesapeake Mosquito Control Commission](#)
- [Chincoteague Mosquito Control](#)
- [Fairfax County Health Department](#)
- [Gloucester County Mosquito Control](#)
- [Hampton Environmental Services](#)
- [Henrico County](#)
- [Joint Base Langley-Eustis](#)
- [Newport News Vector Control](#)
- [Norfolk Vector Control](#)
- [Poquoson Mosquito and Drainage](#)
- [Portsmouth Mosquito Control](#)
- [Prince William County Mosquito & Forest Pest Management](#)
- [Suffolk Mosquito Control](#)
- [Virginia Beach Mosquito Control](#)
- [Williamsburg Public Works](#)
- [York County Mosquito Control](#)

Know of another jurisdiction, organization, or resource to add? Please submit them to the [Editor](#).

Neighboring, regional, & national mosquito control organizations

- [American Mosquito Control Association](#)
- [Mid-Atlantic Mosquito Control Association](#)
- [Delaware Department of Natural Resources and Environmental Control](#)
- [Maryland Department of Agriculture](#)
- [New Jersey Mosquito Control Association](#)
- [North Carolina Mosquito and Vector Control Association](#)
- [Northeastern Mosquito Control Association](#)
- [South Carolina Mosquito Control Association](#)
- [Georgia Mosquito Control Association](#)
- [Florida Mosquito Control Association](#)

Other resources

- [Virginia Department of Health](#)
- [Centers for Disease Control & Prevention](#)
- [Fairfax County Education and Outreach Materials](#)
- [Northeast Regional Center for Excellence in Vector-borne Diseases](#)
- [VMCA Employment Opportunities](#)
- [AMCA Career Center](#)

SUBMISSIONS WANTED!

Do you have photos of mosquitoes or other insects, arachnids, maybe their related predators/prey?

Do you have any information you'd like to share with membership?



We'll take whatever you're willing to share!

- » organizational updates
- » operational news
- » experimental findings
- » education/outreach
- » photography

Please email *The Skeeter* Editor, Karen Akaratovic at kakaratovic@suffolkva.us or you can [submit online](#).

2023 Sustaining Members

The VMCA gratefully acknowledges the support of the following sustaining members for 2023. Without their generous contributions, much of what we do would not be possible. Please do not hesitate to contact them. They are here to help you!



Agricultural &
Environmental
Solutions

Azelis

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Veseris

Brock Verworn
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2023 VMCA Committees

COMMITTEE NAME	CHAIRPERSON	CURRENT MEMBERS
Annual Meeting (Hospitality Room)	Carol LaLiberte carolynlaliberte@gmail.com	
Annual Meeting (Local Arrangements)	Charles Abadam cabadam@suffolkva.us	Tim DuBois, Jay Kiser, Carol LaLiberte, Katherine Reutt, Josh Smith, Joshua Snyder
Annual Meeting (Program/Agenda)	Karen Akaratovic kakaratovic@suffolkva.us	Tim DuBois, Jay Kiser, Katherine Reutt, Josh Smith
Annual Meeting (Vendor Planning)	TBA	
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Bylaws	Jay Kiser jkiser@suffolkva.us	Charles Abadam, Josh Smith, George Wojcik
Curations & Preservation	Wes Robertson rob106@henrico.us	Karen Akaratovic, Andy Lima, Lauren Lochstampfor
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Elections	Carla Caulkins ccaulkins@cityofchesapeake.net	Andy Lima, Penelope Smelser
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Information	Karen Akaratovic	Tim DuBois, Jay Kiser, Andy Lima, Kaitlyn Price, Katherine Reutt, Gina Serge
Legislative	Randy Buchanan buc06@henrico.us	Katherine Reutt
Membership	Jay Kiser	Karen Akaratovic
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Nominating	Wes Robertson	
Photography	TJ Carner carner@nnva.gov	Melissa Allard, Curtis James, Taik Phillips, Joanna Reinhold, Janice Pulver, Gina Serge, Penelope Smelser
Public Relations	Penelope Smelser	
Special Awards	Jennifer Barritt jbarritt@vbgov.com	Lindsey Faw
Student Competition	Jay Kiser	Karen Akaratovic, Alexandra Cumbie, Tim DuBois, Ann Herring, Kaitlyn Price, Wes Robertson
Technical Support	Charles Abadam	Janice Pulver
Website	Karen Akaratovic	Alexandra Cumbie, Lindsey Faw, Wes Robertson

Take the time to volunteer on a committee! An active membership makes for a stronger organization. Contact the chairperson of any committee that interests you or any member of the [VMCA Executive Board](#) to participate. Read about the committees in the [VMCA Book of Guidelines](#).

2023 VMCA Executive Board

THE SKEETER

OFFICIAL NEWSLETTER
OF THE
[VIRGINIA MOSQUITO
CONTROL ASSOCIATION](#)

Skeeter Production Team

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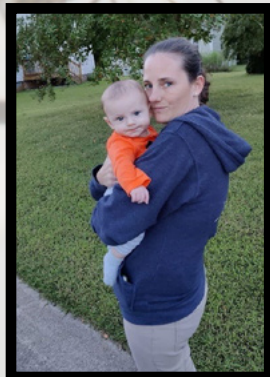
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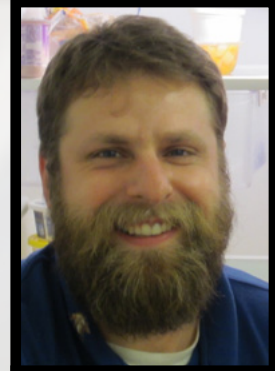
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The Skeeter is the official publication of the Virginia Mosquito Control Association. The VMCA membership is encouraged to submit articles, reviews, photography, and any other interesting facts or tidbits for publication. Submissions can be sent to Karen Akaratovic: kakaratovic@suffolkva.us

