



The Skeeter



Newsletter of the Virginia Mosquito Control Association

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August, 2014

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President's Message



Jennifer Pierce
VMCA President 2014

Hello fellow VMCA members. It doesn't seem possible for it to be August already. Where has this year gone? This question makes me think about my dad. He told me when I turned 18 years old that "Time just flies by the older you get" and he was so correct with that statement.

I hope this message finds everyone doing well. It is definitely everyone's extremely busy time of the year, so I will keep this message short.

The VMCA education committee put together another wonderful identification course in May (see page 3). Thank you to all who took their time to setup, organize and teach at the course. This was a great opportunity for new people in mosquito control to get a crash course on mosquitoes. Thank you to all on the education committee for another successful event.

Please be sure to mark your calendars for the upcoming 2015 VMCA annual meeting. It is February 4-6 at the Suffolk Hilton Garden Inn. You will be receiving an email soon for a call for presentations from President Elect Jay Kiser. Please keep this in mind and consider gathering information to share at this upcoming meeting.

Enjoy the rest of the summer.

Jennifer Pierce, VMCA President



Cassowary chicks, like those that died following Eastern Equine Encephalitis virus infections in July. Photo by Alex Zelazo-Kessler. News story at wvec.com.

Announcements

Upcoming meetings

Entomological Society of America Annual

Meeting November
16-19, 2014 Portland,
OR

Mid-Atlantic Mosquito Control Association Annual Conference

January 13-15, 2015
Savannah, GA

Virginia Mosquito Control Association Annual

Meeting

February 4-6, 2015
Suffolk, VA

American Mosquito Control Association Annual

Meeting

March 29-April 2,
2015 New Orleans, LA



**Have information on meeting that may be of interest to VMCA members?
Attend a meeting and want to submit a summary?
Send it to the editor (see page 13)!**

What's that?



Answer on Page 9.

VMCA organizational mailing address

**Make sure you send all forms to the
proper address.**

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Penelope Smelser, Secretary/Treasurer
2800 Tarrant Street
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Phone (757) 683-8662

Email Penelope.smelser@norfolk.gov

2014 Mosquito ID Course Recap

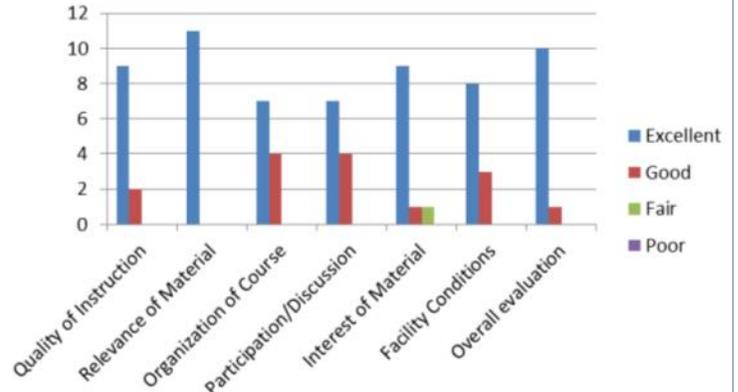
The VMCA sponsored a free adult mosquito identification course held May 14 and 15. Sixteen students attended the 2 day course. The course was taught by the combined efforts of several mosquito district biologists that included; Tim DuBois, Jay Kiser, Karen Akaratovic, Charles Abadam, Lisa Wagenbrenner, Dreda Symonds and Jennifer Pierce. Their expertise and time were greatly appreciated.

The VMCA would also like to thank Chesapeake Mosquito Control Commission for the use of their facility located at 900 Hollowell Lane.

Surveys were provided to the participants and 11 were returned. Each parameter received a total count of 11 (consisting of # of votes for excellent, good, fair, and poor).

General comments:

- Simplifies the learning process
- Great introductory course
- Fun and learned a lot of useful information
- Lays a solid foundation
- Great tips for quick identification
- Demonstration of various traps helpful



Survey results from the adult mosquito ID course, 2014.



Above: Students studying their mosquitoes.



Above right: Lisa Wagenbrenner and Jennifer Pierce demonstrate trap setting.

Right: Participants and instructors in the ID course.



Submitted by Lisa Wagenbrenner.

How mosquitoes interact with hot temperatures, humidity levels, and drought: What mosquito-control personnel need to know

By Dr. Bruce A. Harrison

In 2011 this article was featured in the “Biting Times,” the N. C. Mosquito and Vector Control Association (NCMVCA) newsletter, but it focused on NC. Recently, our Mid-Atlantic Regional Director for the AMCA, Dennis Salmen, suggested that it might need to be submitted again. This time I have added additional information and modified the article so that it is not specific to NC. With El Ninos and La Ninas we never know what our weather will be like during late spring, summer, and early fall mosquito seasons. If this year we experience droughts and hot temperatures again like in past El Nino years, the article will be appropriate. If we have a wet year and cool temperatures like last year just be patient and wait for the next period of drought.

It is almost a “given” that mosquitoes prefer warm weather and that rainfall usually causes more mosquitoes. However, in the “boots on the ground” world of mosquito control things are not that simple because all of the weather factors interact differently. Also, because mosquitoes function as species and not varieties of one organism they interact independently with the weather variables. Thus, what happened last time may not happen the next time. However, there are enough generalities to provide some known interactions and species examples that occur among mosquitoes and high temperatures, humidity levels, and finally as a separate issue, drought. Everyone should understand that I will only be touching the surface with some of the bullets provided below. Nearly all of the known interactions listed below impact you and your mosquito control program, and thus you can use this information to help target where your next problems will come from and how to deal with them.

- Adult mosquitoes live longer in temperatures (°F) between 70 to the low 90s. If the temperatures become too high evaporation increases the loss of body fluids and shortens their life span.
- Mosquitoes also live longer in humidity levels of 70 to 90 percent. That way they are less affected by evaporation. Higher than that and their life is impaired when combined with high temperatures. Thus, the hot temperatures with “muggy” humidity period that we experience during the summer and early fall usually prolongs the life spans of mosquitoes, because they find resting sites that are optimum for their longevity. Prolonging the life span of mosquitoes means more mosquito eggs in habitats that the females find that are suitable for the development of their immature stages when heavy rains come in late summer and early fall. Prolonging the life span also enhances the ability of females of vector species to develop virus infections more quickly and become infectious with virus in their salivary glands. That way they serve as more efficient vectors of those viruses to humans and domestic animals.
- As mentioned above, adult mosquitoes do not normally remain active in direct sunlight and temperatures over 93 °F. because of water loss. Thus, most day-biting mosquitoes are more active (seeking a blood source) early in the morning or late afternoon just before dark and into the first hour of darkness. This is reflected in the known bimodal activity curves of day biting (= diurnal) females of *Aedes aegypti*, *Ae. albopictus*, *Ochlerotatus japonicus*, and *Oc. triseriatus*. Such bimodal curves reflect the killing heat and lower humidity of midday. Another advantage for the mosquitoes in having these bimodal curves is the potential blood

Mosquito-environment interactions, continued

hosts they are searching for are also more active outdoors during the cooler and more humid early morning and late afternoon/early evening temperatures.

- Night-biting (= nocturnal) mosquitoes hunker down in cool forests or vegetation under heavy shade during the hot and humid days. During the day they can be found resting in hollow logs, hollow trees, along creek banks, under bridges, in burrows, and other places that are damp to avoid the searing sun and low day time humidity levels. These species also take advantage of higher humidity levels in the evenings and before dawn to search for their blood hosts. It is likely that one reason many night biting species can fly longer distances in search of blood hosts is they utilize the higher night time humidity levels and lose less body fluids. In Asia one of the current successful malaria vector control methods is to apply a pesticide barrier spray on the underside of low vegetation that is between villages and nearby forests and fruit orchards. During the late afternoon/dusk period the *Anopheles* malaria vectors disperse toward the village from inside the forests or fruit orchards and land and rest on the underside of the vegetation that was sprayed near the homes. After resting for another 20 or so minutes (darkness comes fast in the tropics) they would normally fly across the bare areas to the homes in search of a blood meal, but many are killed by the pesticides. Such barriers can successfully reduce population levels of vector mosquitoes and at the same time dramatically reduce malaria transmission to humans. In the US, species in the *An. quadrimaculatus* complex and members of the *An. crucians* complex have similar behavior patterns to those described above in Asia and can be effectively controlled by barrier sprays.
- High air temperatures also increase the temperatures of water in containers, ground pools and permanent water larval habitats and speed up the developmental times of immatures (larvae and pupae). Thus, a species that occurs from spring to late fall will develop and become adults more rapidly during the hot months. The average difference in time from egg to adult may be shortened as much as 3-5 days during the hot season. This increases mosquito population levels more rapidly. Species like *Ae. albopictus* that normally take about 11-12 days from egg to adult in May, may only take 7-8 days during a hot mid-summer period. Species like *Psorophora columbiae* that are typically found in open sunlight in shallow temporary grassy pools or even muddy pools on gravel roads, can develop from egg to adult in about 4-6 days during the hottest period of summer. However, in such scenarios high temperatures can also have a negative effect on mosquito populations. Hot temperatures increase evaporation of temporary pool habitats and although the larval development rates speed up the pools often dry out before the adults can emerge. So if you are in the middle of an exceptionally hot period and you receive a 1-2 inch rain, don't sweat the small stuff because small shallow pools that were created by the rain will generally dry up before the adults emerge. You need to focus on the deeper pools that you know last longer because more eggs will hatch from the rainfall and increase mosquito numbers in those pools.
- Hot temperatures usually do not have a major impact on species in tree holes that receive water through plant systemic water circulation. Water temperatures in such tree holes are usually maintained at cooler temperatures throughout the year and the larvae, e.g., *Oc. triseriatus*, *Oc. japonicus*, and *Orthopodomyia signifera*, will develop at approximately the same rate, except during the coldest months of the year. However, those same species will

Mosquito-environment interactions, continued

develop faster in the summer if the immature stages develop in warmer water in artificial containers like tires, black gutter extensions, buckets, trash cans, etc., that are exposed to sunlight.

The following interactions address situations with high temperatures, low humidity, and little or no rain (= drought). During the hottest months when drought conditions may develop the following mosquito species scenarios may apply to your area.

- During severe droughts mosquito species that utilize temporary ground water pools will usually become uncommon (except possibly *Aedes vexans*). Many *Ochlerotatus* and *Psorophora* species fall into this category. At the same time the permanent ground water *Anopheles* and *Culex* species will become dominant in light traps in more rural areas, while species like *Culiseta melanura* in more shallow semi-permanent water habitats may decline dramatically, and thus reduce the enzootic activity of the eastern equine encephalitis (EEE) virus cycle. Peridomestic species that utilize containers around residences like, *Ae. albopictus*, *Cx. pipiens* complex, *Oc. japonicus*, and *Oc. triseriatus*, may remain abundant during droughts. Why? Because humans inadvertently introduce water into such containers when watering their yards, watering flower pots, bird baths, etc., and thus these species may not experience a drought. It should be noted that most of the viruses causing disease in humans in the Mid-Atlantic Region will be transmitted by the more abundant container species mentioned above and not the temporary ground pool *Aedes*, *Ochlerotatus* and *Psorophora* species. So, even in drought conditions the dangerous vector species are out there and need to be controlled.
- Hot temperatures and little rain also has a very real impact on the *Cx. pipiens* complex, the primary enzootic vectors of West Nile (WN) virus in many areas of the continental U.S. , because the water in stagnant pools, containers, and ditches where these species occur in the larval stage becomes warmer and more concentrated and organic pollution levels increase. This actually attracts the adult females to lay eggs in those sites because they have high levels of phyto- and zooplankton and bacteria which are a primary food sources for the larvae. Thus, during droughts and hot weather members of the *Cx. pipiens* complex become more abundant and an increased threat for spreading West Nile virus in the bird populations and to humans. This in turn increases the risk of a bridge vectors like *Cx. salinarius* or *Cx. erraticus* (that utilize more permanent water) biting an infected bird, becoming infected and infective, and then transmitting this virus to humans. If large numbers of mosquito pools begin testing positive for WN or EEE viruses in coastal Georgia, this means the enzootic cycles of these viruses are very active, and they may spread north into South Carolina, North Carolina, and southeastern Virginia with continued hot dry weather. Remember that late August into October is the primary time for human WN encephalitis cases. In this regard, *Cx. pipiens* populations are an indicator species and can be impacted by larval control, but the more dangerous species that transmit to humans are bridge vectors like *Cx.*



Mosquito-environment interactions, continued

salinarius, *Cx. erraticus*, *Ae. vexans*, *Ae. albopictus*, and several other species that are more difficult to control.

- *Aedes vexans* is a temporary water mosquito, yet drought seems to have an unexpected positive and more dangerous public health effect on this species. Apparently, *Ae. vexans* is able to rest (=estivate) for long periods of time during high temperature/drought situations due to a buildup of a fatty substance in the abdomen. During the drought of 2002 in North Carolina, surveillance for West Nile virus in mosquitoes in Charlotte revealed that *Ae. vexans* was the most abundant species in light traps, followed by *Cx. pipiens* complex, and *Ae. albopictus*. During the same year High Rock Lake in the Piedmont of North Carolina shrunk down to the lowest level since the 1920s. This lake of 55,000 surface acres lost 33,000 of those acres and huge areas were exposed and grew up in sedge grasses 3-5 ft. tall. Light trap surveillance revealed an extremely high population of *Ae. vexans*, yet temporary pools could not be found. After concerted efforts Parker Whitt (previously with NC PHPM) found abundant *Ae. vexans* larvae in water in cracks in the dried mud that were 3 to 4 feet deep (see photos below). Thus, we found a temporary freshwater species in the Piedmont in cracks in the mud just like larvae of *Ochlerotatus sollicitans* and *Oc. taeniorhynchus* are found on dried coastal dredge spoil islands. Of particular interest during that summer, *Oc. taeniorhynchus* specimens were collected in two counties adjacent to High Rock Lake, which is nearly 200 miles from the coast.



Left: A water-containing crack in the mud

The above scenarios are intended to assist you in dealing with extreme weather and mosquitoes that are present in drought situations. These scenarios could change quickly and dramatically if a tropical depression or hurricane hits coastal areas of the southern and eastern U.S. during the summer or fall. Hopefully you have saved your records from previous tropical depressions, hurricanes, and frog choking heavy rains. Be prepared and *Good Luck!*

Longtime York Mosquito Guru, Creator of 911 Center Retires

This story by Gregory Connolly ran in the [Williamsburg Yorktown Daily](#). Used with permission.

When Thomas Gallagher began working for York County in 1985, there was no 911 service, no stormwater division and a mosquito control program in dire need of overhaul.

He retired from county service earlier this year, leaving behind a legacy that includes the 911 center he started, a stormwater division based off a program he began and a mosquito control program that has received a National Association of Counties award for its work raising awareness of mosquito prevention in third-grade students across the county.

Before starting work with York County, Gallagher spent 25 years in the U.S. Air Force working in telecommunications. That job took him across Europe — including to England, where he met his wife — before landing him an assignment at Langley Air Force Base. He then retired from the Air Force in York County, where he began his second career in municipal work.

Gallagher said when he was hired to create the 911 center, people with emergencies had to call the regular number to the York-Poquoson Sheriff's Office or York County Division of Fire and Life Safety. He led county staff to Newport News and Richmond to observe the 911 centers in those cities, picking up information from those operations to use at York County's center.

His telecommunications work in the Air Force and his creation of the 911 center did not give Gallagher a chance to use his biology and physical science degree, so when an opening popped up in the county's mosquito program, he decided to apply. He landed the job as superintendent of mosquito control.

York County is an especially attractive target to mosquitoes, as there are numerous freshwater environments where they can breed. Because of the hillier topography in the upper part of the county, they are more prevalent in the lower part of the county where most of the county's population lives.

"It was like starting from ground zero," Gallagher said of his first days on the job. "The program needed an about face."

Prior to Gallagher's arrival, the mosquito-control employees went out and sprayed every night, which is not environmentally friendly nor the right thing to do, he said.

"Timing is everything," Gallagher said. "We always made sure that when we were spraying, there was a need to do so. It wasn't because it was time to do it."

So he retooled the program to emphasize awareness and prevention over control activities.



Tom Gallagher (left) received recognition for his service to York County from York County Board of Supervisors Chairman Don Wiggins at a recent meeting. (Photo courtesy York County)

Tom Gallagher's Retirement, continued

"It begins with making the customer aware of what we do and how we do it," Gallagher said. "They pay the taxes, and we want to make sure they're getting their biggest bang for the buck."

He established a hotline for citizens to report mosquito issues and took to Citizen News, the county's news program on its cable channel, to let people know how to make their property less attractive to mosquitoes looking for a place to breed. These initiatives also won a NACO award.

His department also sent out letters to homeowners associations and created a NACO-award winning mosquito monitoring program where citizens can volunteer to install a trap on their property and then provide daily reports on the trap to the mosquito control program.

To cut down on mosquito breeding in stagnant water, Gallagher and his employees began placing fish that eat mosquito larvae into abandoned swimming pools and other waters. He also began making appearances in the county's elementary schools, where he spoke to third-graders about how they can prevent mosquitoes from appearing around their homes.

Gallagher made the program for third-graders interactive, using an in-class game and school division-wide poster contest to get kids interested in mosquito prevention.

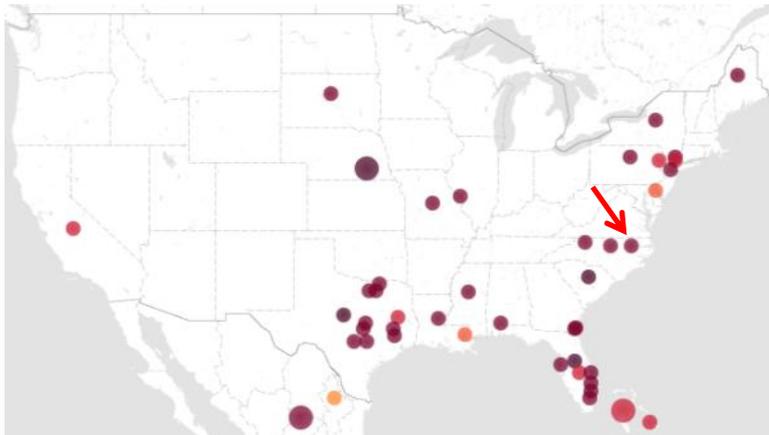
"We made it fun as a learning event," he said. "That was the most interesting thing I did — working with children. They ask good questions and they really absorb what you're telling them."

When Gallagher began work with the mosquito program, the stormwater program was nothing more than a group of people who went to clear out ditches. He brought order to that process, breaking workers into teams and dividing the work up by election district to better manage the work. The program has grown to install and oversee drainage equipment in the county. It also examines plans for proposed buildings and lots to ensure the area will drain correctly.

Now that he's completed a 53-year career between the Air Force and the county, Gallagher plans on sticking around York County with his wife and enjoying retirement.

What's That? Answer

That (the red dot at arrow) is the location of Pitt County, NC, which recently reported its first case of imported chikungunya virus infection. That's close to Virginia! The picture was taken from healthmap.org, while a short story on the infection may be found [here](#).



At left is a map of the United States, again from healthmap.org, showing locations that have reported chikungunya virus infections in the month preceding August 27.

[Healthmap.org](#) provides a searchable map of recent disease outbreaks and related news stories.

Chicken Round-Up 2014

On Monday 6/2/2014, area cities' (Suffolk, Norfolk, Chesapeake and Virginia Beach) Mosquito Control Divisions came together for the annual chicken round-up of sentinel chickens. It took place out in Isle of Wight County at the farm of Melvin Atkinson (at right).

Sentinel chickens are used for testing of West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) viruses and are placed at different sites in their perspective cities.

A baseline blood test is taken and sent to DCLS (Virginia Division of Consolidated Laboratory Services) for confirmation of virus-free status at the time of testing; if a chicken does come back positive, the chicken is then changed for another one. Mosquito Control localities have extra chickens at the farm in case this happens. Most cities donate their chickens to a sentinel chicken sanctuary when this happens and at the end of mosquito season. After the chickens are found to be free of viruses, blood is drawn and tested weekly or bi-weekly for the duration of the mosquito season.

These tests inform the mosquito-control departments of areas that need focusing on for extra coverage when a blood test comes back positive.



Submitted by Ann Herring



1



2



3

1 & 2: Suffolk Mosquito Control Crew: Biologists Jay Kiser and Karen Akaratovic; Intern Amy Johnson.

3: Norfolk Mosquito Control Crew: Biologist Penny Smelser and Environmental Health Assistant Lindsay Dierks (not pictured).

4 & 5: Chesapeake Mosquito Control Commission Crew: Biologist Lisa Wagenbrenner, Biology Technician Connie Gregg, Interns Sadye Steale and Marina Vallad.



4



5

VMCA Membership Application and Renewal Form

Virginia Mosquito Control Association New Membership & Member Renewal Application

MEMBERSHIP TYPE: () RENEWAL () NEW
 Mark an "X" in the appropriate box

Membership payment is by calendar year

| | | |
|---------------|--|--|
| NAME: | Regular \$ 15.00 | |
| PHONE: | Associate \$ 10.00 | |
| ADDRESS: | Student: *Enclose proof of student status \$ 10.00 | |
| E-MAIL: | | |
| ORGANIZATION: | | |
| | TOTAL SUBMITTED | |

Please "X" here if you cannot receive the newsletter by email

Questions or comments can be directed to Penelope Smelser, Secretary-Treasurer, 757-683-8662 or mail to: Penelope.smelser@norfolk.gov

Send payment (made payable to **VMCA**) and mail/fax this form to Secretary/Treasurer –or- fill out the form, save and submit by email.

Penelope Smelser
 VMCA Secretary-Treasurer
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 Norfolk, VA 23509
 757-683-8662 office phone
 757-683-2500 office fax

Regular Member - VMCA Newsletter, hold office, serve on committees, propose motions, vote, and participate in business meetings.

Associate Member - VMCA Newsletter, participate in business meetings.

Student Member - VMCA Newsletter, serve on committees and participate in business meetings.

(Student must be enrolled at least 1/2 time in an accredited college or university and produce valid College/University ID Card.)

2014 Sustaining Members

The VMCA gratefully acknowledges the support of the following sustaining members for 2014. 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!

| | |
|--|---|
| <p style="text-align: right;">Ted Bean (814) 671-6516 tbean@myadapco.com</p>  | <p style="text-align: right;">Peter Connelly (772) 563-0606 peterc@amvac.net</p>  |
| <p style="text-align: right;">Jeff Hottenstein (703) 498-9362 jhottenstein@clarke.com</p>  | <p style="text-align: right;">Steven Sullivan ssullivan@central.com</p>  |
| <p style="text-align: right;">TK Rosolina (540) 447-6738 Mrosolina@dynamicaviation.com</p>  | <p style="text-align: right;">Joe Andrews (888) 603-1008 joea@allprovector.com</p>  |
| <p style="text-align: right;">Doug Hill (800) 570-4277 Dhill@morrellonline.com</p>  | <p style="text-align: right;">Gordon Morrison (919) 452-7145 Gordon.morrison@bayer.com</p>  |
| <p style="text-align: right;">John Singletary john.singletary@univarusa.com</p>  | <p style="text-align: right;">Jim Andrews (910) 547-8070 j.andrews@valent.com</p>  |

Virginia Mosquito Control Organizations & Other Resources

As a result of revisions to the VMCA By-Laws, the organizational member category was eliminated. In order to facilitate communication among mosquito control districts, those that have traditionally been organizational members are listed below along with their websites. If there are other sites that should be listed, please submit them to the editor.

Virginia Mosquito Control Organizations

[Alexandria Health Department](#)

Boykins, Town of

[Chesapeake Mosquito Control Commission](#)

Emporia, City of

[Fairfax County Health Department](#)

Fort Eustis

[Gloucester County](#)

[Hampton, City of](#)

Henrico County

[Newport News, City of](#)

[Norfolk, City of](#)

[Portsmouth, City of](#)

[Prince William County Mosquito & Forest Pest Management](#)

Richmond, City of

[Suffolk, City of](#)

US Air Force / Langley Air Force Base

[Virginia Beach Mosquito Control](#)

[York County](#)

Health Information

[Virginia Department of Health](#)

[Centers for Disease Control & Prevention](#)

Other Mosquito Control Organizations

[Mid-Atlantic Mosquito Control Association](#)

[American Mosquito Control Association](#)

[AMCA/Fairfax County Education and Outreach Materials](#)

Submissions wanted!

Have something you'd like to include in the next issue of *The Skeeter*? We are looking for organizational updates, operational news, education and other outreach activities, pictures, stories, or other vaguely vector-related items to include in an upcoming newsletter.

Please send all items to Justin Anderson at janderson152@radford.edu.

The deadline for inclusion in the next issue is: **September 30, 2014.**

The Skeeter
Newsletter of
The Virginia Mosquito Control Association

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www.mosquito-va.org



Take the time to volunteer on a committee. An active membership makes for a stronger organization.
Contact anyone on the Board to participate.

2014 Virginia Mosquito Control Association Officers

| | |
|---|---|
| President: Jennifer Pierce | (757) 426-5420 JPierce@vbgov.com |
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| Secretary / Treasurer: Penelope Smelser | (757) 683-8662 Penelope.smelser@norfolk.gov |
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| *Non-voting member of the Board | |

The Skeeter is the official publication of the Virginia Mosquito Control Association.

The VMCA membership is encouraged to submit articles, reviews, and any other interesting facts or tidbits for publication. Submissions can be sent to Justin Anderson at skeeter@radford.edu.

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Distribution: Penelope Smelser, Norfolk

Editorial review: All the members of the board.

Production advisor: George Wojcik, City of Portsmouth