



Skeeter Scanner

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President's Message



Since my last message, a lot has happened in the world of mosquitoes and mosquito-borne disease. Word from around the districts is that Aedes numbers are down due to the dry weather, but Cattail mosquito numbers are very high. The hot and dry weather is also concerning for West Nile virus (WNV). Recently, mosquitoes have tested positive in Saginaw County as well as Oakland County, and WNV positive birds have been detected broadly throughout the state. Our partners and colleagues in the region are seeing similar upward trends. The Michigan Department of Health and Human Services has also recently announced the first human case of WNV in Michigan for 2016. It's important for us to remember that emerging diseases (and I'm pointing the finger at you Zika) aren't the only ones we need to be concerned about. Our endemic arboviruses impact our citizens and communities every year, and the vigilance of those in the mosquito control profession helps to protect the public health.

The Zika virus, which has piqued the interest of policy makers and the public in regards to mosquito-control, continues to be a daily headline. This unprecedented, emerging arbovirus has been found to be not only mosquito-transmitted, but sexually transmitted, and potentially devastating to pregnancy outcomes. To date, we have eight counties in Michigan conducting some level of surveillance for the Aedes species that transmit Zika, and that number will soon increase to eleven. Because of the dry weather so far it's been a tough year for Aedes in Michigan, and no suspects have been found; but being vigilant is important as suspected mosquito-borne transmission of Zika has recently been reported in South Florida.

Mosquito control agencies and companies have also been concerned that the Zika virus may "jump" to a domestic species, causing concern for local transmission in Michigan. While it would be a huge task to do transmission studies for all of the human-biting species we have in Michigan, a recent publication sheds some light on two of those. Mathew T. Aliota and others¹ report that *Culex pipiens* (Northern house mosquito) and *Ochlerotatus triseriatus* (Eastern tree hole mosquito) mosquitoes were tested for their ability to become infected with Zika virus, and to transmit Zika virus. None of the *C. pipiens* tested became infected with Zika after feeding on infected mice, and none showed dissemination of virus to the salivary glands, which would be indicative of transmission potential. In regards to *Och. triseriatus*, few mosquitoes became infected, however none had virus that disseminated to the salivary glands. Thankfully, our primary West Nile virus and LaCrosse Encephalitis vectors are not likely to play a role in the Zika virus.

I also want to highlight an important recent activity by the MMCA organization. On July 19th, the MMCA board approved the publication of a white paper regarding precautions professional mosquito control organizations incorporate to help reduce the risk of control efforts to pollinators and other beneficial insects. This paper was forwarded to the head of the committee which is charged in updating Michigan's Pollinator Protection plan (MP3). This effort will be important in making sure that those making decisions regarding pesticide use regulations understand that the responsible use of adulticides for mosquito control to protect the public do not run counter to pollinator protection. Thank you to Dr. Carl Doud, Director of Midland County Mosquito Control, for all of his hard work in that endeavor!

It's always important for us to help the public and policy makers understand the science of mosquito control. From its benefit to public health, to its continued progress in environmental stewardship, it is a noble cause.

1. Aliota MT, Peinado SA, Osorio JE, Bartholomay LC. *Culex pipiens* and *Aedes triseriatus* mosquito susceptibility to Zika virus. Emerg Infect Dis. 2016 Oct [July 25, 2016]. <http://dx.doi.org/10.3201/eid2210.161082>

***Culex pipiens* and *Aedes triseriatus* Mosquito Susceptibility to Zika Virus**

The recent epidemic spread of Zika virus suggests that *Ae. aegypti* mosquitoes are the main vector; however, information about the role of other species in driving and maintaining Zika virus transmission is lacking. Of particular concern this summer (2016) is emergence and establishment of Zika virus in previously unaffected geographic areas; with the advent of mosquito season commencing in most of the continental United States, the likelihood of mosquito-borne transmission of Zika virus in states without populations of *Ae. aegypti* and *Ae. albopictus* mosquitoes remains unknown. To understand the potential risk for spread of Zika virus in temperate US states, we compared the relative abilities of *Culex pipiens* and *Ae. triseriatus* mosquitoes to transmit Zika virus in the laboratory. We used *Ae. aegypti* and *Ae. albopictus* mosquitoes as positive controls.

Laboratory colonies of mosquitoes used in this study were maintained at the University of Wisconsin–Madison, and vector competence for Zika virus was evaluated by using established procedures.

All samples from *Cx. pipiens* mosquitoes and all replicates were negative for Zika virus by plaque assay

([Table\(<http://wwwnc.cdc.gov/eid/article/22/10/16-1082-t1>\)](http://wwwnc.cdc.gov/eid/article/22/10/16-1082-t1)). In contrast, *Ae. triseriatus* mosquitoes were susceptible to infection when exposed to mice with the highest viremia concentrations ([Table\(<http://wwwnc.cdc.gov/eid/article/22/10/16-1082-t1>\)](http://wwwnc.cdc.gov/eid/article/22/10/16-1082-t1)). However, none of these infected mosquitoes disseminated virus and none were capable of transmitting the virus. Data from *Ae. albopictus* and *Ae. aegypti* mosquitoes that had been exposed to the same mice demonstrated that the viremia concentrations used could productively infect mosquitoes. Of note, *Ae. albopictus* mosquito infection rates were dose dependent (i.e., infection rates increased with blood meal titer). Furthermore, data generated from exposure to the same mice demonstrated productive mosquito infection with these viremia concentrations. It therefore seems likely that if Zika virus circulation in the United States occurs,

it will be driven by *Ae. albopictus* or *Ae. aegypti* mosquitoes (6). However, we cannot rule out that anthropophilic mosquitoes of other species in this country could be competent vectors.

These data argue for continued studies (experimental and epidemiologic) assessing interactions between differing mosquito–Zika virus combinations in the United States because of geographic variations that may exist in oral susceptibility of mosquitoes of the same or different species. The few vector competence studies conducted to date have focused primarily on *Ae. aegypti* and *Ae. albopictus* mosquitoes, but mosquitoes of other species may be vectors, depending on geographic location. We focused on *Cx. pipiens* mosquitoes because they are ubiquitous, they are considered one of the principal vectors of West Nile virus in the northern half of the United States, and a recent report from Brazil suggests *Cx. quinquefasciatus* mosquitoes as potential Zika virus vectors. We chose *Ae. triseriatus* mosquitoes because they are the natural vector and overwintering host of La Crosse virus, they are extremely tolerant to a range of temperatures, they are distributed from Florida to eastern Canada, and they have been implicated as potential enzootic vectors for West Nile virus. To determine the risk for Zika virus transmission in the United States, surveillance of different human-biting mosquito species will be paramount. Although we expected that *Cx. pipiens* and *Ae. triseriatus* mosquitoes would not be competent Zika virus vectors, our experimental verification helps exclude uncertainties surrounding the potential vectors of this emerging pathogen

Brazil: Dengue Down Big after Release of Friendly™ *Aedes* Genetically Engineered Mosquitoes in Piracicaba

Piracicaba's Epidemiologic Surveillance service released new data this week which showed a 91% reduction of dengue fever cases registered in the CECAP/Eldorado district, an area of 5,000 residents, in the 2015/2016 dengue-year as compared to the 2014/2015 period.

The incidence decreased to just 12 cases in 2015/2016, the first year in which Friendly™

Aedes, the genetically engineered mosquitoes that fight wild *Aedes aegypti*, were released there, versus 133 cases in the previous year. According to Epidemiologic Surveillance the rest of the municipality saw a 52% reduction in dengue fever incidence during the same period, from 3,487 cases in the 2014/2015 period to 1,676 cases in 2015/2016.

Additionally, the overall incidence rate in CECAP/Eldorado for the dengue-year 2014/2015 was 195% larger than the rate recorded for the rest of the municipality. In the dengue-year 2015/2016, the rate in CECAP/Eldorado was 45% lower than the rate in the rest of the municipality. The latest data roundup also reports zero cases of Zika and chikungunya in CECAP/Eldorado.

“Over the course of one year, we were able to bring the dengue fever incidence down by more than 50% in Piracicaba — the outcome of diligent work to eliminate still water spots, the breeding site of the mosquito,” says the city’s Secretary of Health, Pedro Mello. “In CECAP/Eldorado, where we had the Friendly™ *Aedes* project, the reduction was extraordinary, going over 90%.”

“We are delighted with the result achieved so far by Friendly™ *Aedes* which shows the potential of our approach. We hope to see this effect on a larger scale beyond the limited area of CECAP/Eldorado with our expansion into Piracicaba’s downtown city,” says Glen Slade, Oxitec do Brasil director.

Oxitec has been working in *Aedes aegypti* control for more than a decade. It is a pioneer in the use of a biological method to suppress wild populations of this dangerous mosquito species through the release of Friendly™ *Aedes* males, which don’t bite and don’t transmit disease. When released, these males search for wild females to mate, and their offspring inherit a self-limiting gene that makes them die before reaching functional adulthood.

NIH Funds Zika Virus Study Involving U.S. Olympic Team

Researchers supported by the National Institutes of Health will monitor potential Zika virus exposure among a subset of athletes, coaches and

other U.S. Olympic Committee (USOC) staff attending the 2016 Summer Olympics and Paralympics in Brazil. The study, funded by NIH’s Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) and led by Carrie L. Byington, M.D., from the University of Utah, Salt Lake City, aims to improve understanding of how the virus persists in the body and to identify potential factors that influence the course of infection.

“Zika virus infection poses many unknown risks, especially to those of reproductive age,” said Catherine Y. Spong, M.D., acting director of NICHD. “Monitoring the health and reproductive outcomes of members of the U.S. Olympic team offers a unique opportunity to answer important questions and help address an ongoing public health emergency.”

USOC established an Infectious Disease Advisory Group (IDAG), chaired by Dr. Byington, to help prepare the U.S. Olympic team for travel to Brazil, which is the epicenter of the Zika virus outbreak in the Americas. Dr. Byington proposed the project, which aims to enroll at least 1,000 men and women, in response to an [NIH announcement](#) designed to expedite review and funding for Zika-related research projects.

“We partnered with the USOC to improve knowledge of the dynamics of Zika infection, so that we can better protect the health of athletes and staff who will participate in the 2016 Games,” said Dr. Byington. “This ongoing relationship also opens avenues for long-term research that

Area	Dengue Year**	
	2014/2015	2015/2016
Piracicaba*		
Cases of Dengue	3,487	1,676
Population	386,449	386,449
Incidence	0.902%	0.437%
CECAP/Eldorado		
Cases of Dengue	133	12
Population	5,000	5,000
Incidence	2.66%	0.24%

* Data excludes CECAP/Eldorado

** Dengue year in Brazil starts in 27th week of the calendar year and ends in 26th week of following calendar year

promises to benefit not only the Americas, but also other regions facing the emergence of the virus.”

The current study seeks to determine the incidence of Zika virus infection, identify potential risk factors for infection, detect where the virus persists in the body (blood, semen, vaginal secretions or saliva), evaluate how long the virus remains in these fluids, and study the reproductive outcomes of Zika-infected participants for up to one year.

To prepare, USOC and the University of Utah conducted a pilot study in March and April 2016. The study was fully enrolled in two days and included 150 participants. Notably, one-third of the pilot group indicated that they or their partner planned to become pregnant within 12 months of the Olympic Games.

Participants in the current study will complete health surveys and provide samples of bodily fluids for the detection of Zika and similar flaviviruses, such as dengue. Zika virus infection typically does not cause symptoms in adults, so routine sampling will detect asymptomatic infections and help shed light on symptomatic versus asymptomatic infections. Zika virus testing kits and training on how to use the tests will be provided by the U.S. Centers for Disease Control and Prevention.

Before traveling to Brazil, all USOC staff, including athletes and coaches, will be briefed on a number of items, including the Zika outbreak. IDAG will provide educational materials to athletes and staff and answer questions. During this time, the NIH-funded researchers will present the study and enroll as well as consent USOC staff who are interested in participating. Approximately 3,000 USOC staff members are expected to travel to Brazil. In addition, spouses or sexual partners who are traveling to Brazil may be eligible to participate.

The 2016 Summer Olympics will take place in Rio de Janeiro, from Aug. 5-21, 2016, and the Paralympic Games are scheduled for Sept. 7-18, 2016.

What the Hell is Going on Here?

(Editorial by Josh Bloom, acsh.org)

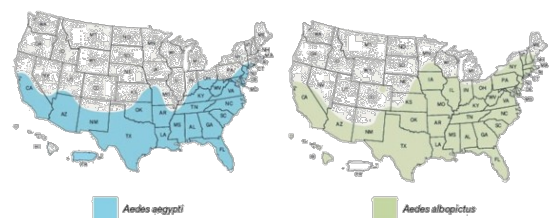
Given the advances in molecular biology and monitoring over the past 35 years, one might expect that getting the answers about another “new” pathogen, Zika, would be quick and easy. But, not in this case. Zika keeps throwing curveballs at us, and every time we think we know what is going on, the virus sticks its tongue out at us.

The female to male transmission is especially puzzling, because in some ways, Zika is acting a bit like HIV.

It is very difficult for HIV-negative men to become infected, even if they have unprotected sex with HIV-positive women. The [risk per sexual event](#) is estimated to be between one in 1,000 and one in 2,000—less than one-tenth of one percent. Even when the infected woman has late-stage disease, and the number of viruses in her body are at their highest, the chances of transmission are less than one percent.

Zika is still characterized as a mosquito-borne infection, and that could be mostly true. But we at the Council have been questioning this all along. As my colleague Julianna LeMieux [recently wrote](#), the sexual transmission component of the infection may be far more important than is commonly believed. And, Hank Campbell recently reviewed earlier evidence that raised some doubts about the importance of mosquitoes as a vector.

Recent [data](#) from the CDC are puzzling as well. As of July 13th, there have been 1,306 reported cases of Zika in the US. One case was the result of a lab accident. The other 1,305 were all travel-related or sexually transmitted. There have been *zero* ⁽¹⁾ cases of mosquito-transmitted Zika in the US. How can this be? The maps below are the projected ranges of *Aedes albopictus* and *Aedes aegypti*, the two mosquitoes that are known to carry the virus.



These projections were made prior to mosquito season, so scientists have been waiting for the answer to the big question: What is going to happen once it *is* mosquito season? For example, **now**

The entire country is now in the middle of mosquito season, yet there is not a single case of Zika ⁽¹⁾ from a mosquito? Why?

It certainly is not because we are too far away from the nearest hotspot—Puerto Rico.

The only plausible explanation that I can come up with (and it's pretty lame) is that we have fewer infected mosquitoes in the US, either because of better control methods, or because we do not have a reservoir of infected bugs that is large enough to start an epidemic. But, zero cases? ⁽¹⁾ I don't get it.

At this point, there are far more questions than answers. Here are a few others:

1. Zika belongs to the Flaviviridae family of viruses. Others in this family include hepatitis C and yellow fever. Flaviviruses are not known to form reservoirs like HIV does. They are cleared and do not return. When hepatitis C is cured, it does not come back. How long will it take for the virus to clear the body? When can a woman who has been infected safely become pregnant?
2. Are we facing a possible epidemic in the US? If so, why has it not started?
3. Zika virus has been found in at least four body fluids. Are there others? Can it spread by air?
4. Will antiviral drugs (or failed drugs) that inhibited hepatitis C also inhibit Zika (I doubt it, but there are many thousands of compounds that inhibited HCV, but were unsuitable as drugs for any number of reasons.) If people aren't working on this already, I'll eat my shoes.

Hang in there folks. This is a mess, and is unlikely to be sorted out soon. There is SO much that isn't known.

The only thing we know for sure is that the butler didn't do it.

⁽¹⁾Florida health officials said they are investigating a second possible case of Zika spread locally.

The two Florida cases — [one in Miami-Dade county](#) and another in Broward county — both appear to have no connections to travel to Zika-affected areas, and neither appears to have had sexual contact with a Zika-infected patient, but Florida officials are still checking both possibilities.

AMCA Washington Conference

MMCA supported Carl Doud of Midland County Mosquito Control's attendance of the AMCA Washington Conference on 9-11 May 2016. The Washington Conference is an opportunity for attendees to hear of current issues affecting the mosquito control industry and allows for participants to meet with their congressional representatives to raise awareness and request support.

Dr. Doud visited directly with Senator Peters, a Legislative aide (LA) for Senator Stabenow, Representative Moolenaar, and LAs for Representatives Kildee, Benishek and Miller. These congressional members cover all four county mosquito districts. As you can expect, Zika virus was a major topic of concern on the Hill. Dr. Doud provided a MMCA fact sheet that Erik Foster had developed to communicate the risk of Zika to Michigan residents. In addition to Zika risk, Carl requested support with NPDES relief and offered to assist if there were questions on pollinator protection or mosquito control/insecticides in general. All seemed very supportive and understanding of our concerns, particularly with NPDES.

Since the conference, the NPDES bill has once again passed the House (with support of three of the four above-mentioned Representatives), but has not been up for vote in the Senate. While many in AMCA were hopeful that 2016 would be the year that the burden of NPDES would finally be eliminated, as the year progresses and elections draw near, it now seems less likely to occur.

Photo Salon Winners from 2016 MMCA Conference



Habitat



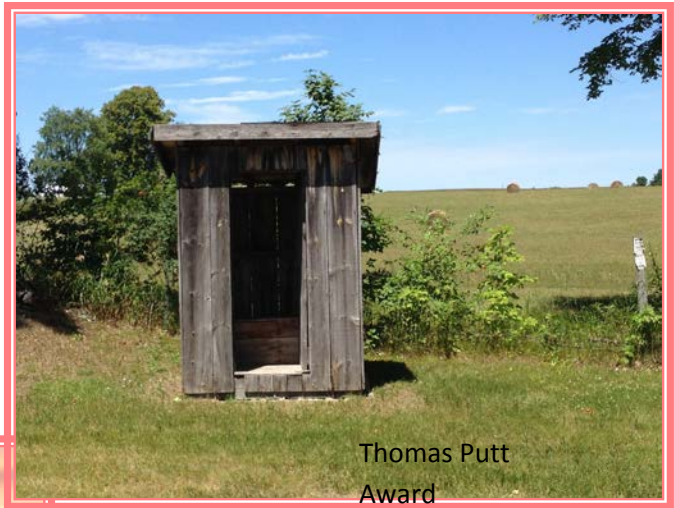
Mosquitoes



Nature



Surveillance



Thomas Putt Award



Operations



A walk down *perturbans* lane.

Most Amusing Title

Viruses Hijack the Body's Response to Mosquito Bites

When immune cells rush to the site of a mosquito bite, viruses hijack the cells and turn them into viral factories—in mice, at least. Christopher Intagliata reports.

Chances are, you've had the opportunity to study firsthand the swollen, itchy welt left by a mosquito bite. And now—scientists have too.

"Well, we haven't studied itching yet in our laboratory studies" said Clive McKimmie, an immunologist at the University of Leeds, in England. "What we've shown is the inflammation associated with bites is not good for you as a host, and it gives a virus an advantage."

To understand why, let's back up. To mosquito spit. "Now I know it's a little disgusting to think about, but when a mosquito bites you, they're spitting out quite a bit of saliva into your skin." That saliva can contain viruses, like zika or chikungunya. And viruses—and the tissue damage from the bite—are a rallying cry for the immune system.

McKimmie and his colleagues studied that immune response in mice. And they found that when immune cells show up at the bite the viruses infect them, and turn those immune cells into factories for further virus replication.

"Your own immune system, which is meant to help your body defend itself against infection, seems to be inadvertently promoting an aspect of a virus infection."

Overall, the inflammation resulted in 10 times more virus in the mice, compared to being inoculated with the virus without a bite. The study is in the journal *Immunity*. [Marieke Pingen et al., Host Inflammatory Response to Mosquito Bites Enhances the Severity of Arbovirus Infection]

More viruses means a higher chance they'll infect your organs—and other mosquitoes too. So McKimmie says it might be worth testing a cheap anti-inflammatory—like a topical ibuprofen

cream—to see if it cuts virus numbers. "You've got to remember that these infections tend to be present in parts of the world that are economically deprived. And so we can't come up with an expensive new medication, because it's unlikely to be appropriate for that situation."

The real beauty of this topical treatment approach, though—if it works—is its versatility: it zeroes in not on a specific disease, but that one thing they all have in common: the bite.

Call for Papers

Dear MMCA Members,

The Planning committee is looking for speakers for the 31st Annual Conference. The Conference will be held February 1-2, 2017, at the Double Tree in Port Huron.

If you have been working on something interesting this summer such as equipment, control techniques, mosquito biology, surveillance, GIS/GPS, regulations, new product trials, public relations, etc., and are interested in presenting, please submit an abstract before October 31, 2016 for consideration.

Abstracts can be e-mailed to Tami Seago at apmts@earthlink.net



News From Around The Districts

SAGINAW

What a difference a year makes. After several cool, wet mosquito seasons, we finally have a dry, warm summer. I believe this is our first since 2012. With the dryer weather the summer floodwater nuisance, which dominated the past few years, is absent in most of Saginaw County. This does however not mean the job is complete. We have been experiencing rather robust, localized cattail mosquito nuisance in those areas with substantial cattail habitat. The cattail mosquitoes along with the recent emergence of Anopheles mosquitoes are keeping our nightly spray operations engaged. Larviciding and community efforts have been active, geared towards summer Culex habitats; catch basins, neglected swimming pools, tires, sewage lagoons, backyard clutter, etc. This summer we are again employing our “Search and Inform” Program. The Program entails technicians going door to door in neighborhoods educating homeowners and eliminating backyard mosquito breeding habitat. This is a great program in that it controls vector and nuisance mosquito populations immediately through elimination of container breeding habitat through dumping as well as, future breeding through homeowner education. It is important that we place our control operations where needed, based on mosquitoes, arbovirus, and the environmental conditions. This is the core premise of integrated mosquito management.

With the dry, hot weather, conditions are ideal for West Nile virus (WNV) transmission which is primarily tied to Culex mosquito populations. Mosquito borne disease surveillance is ongoing and has yielded two WNV positive mosquito samples to date. Both samples were Culex collected in the first part of June. We are however, expecting additional positives as we move into the month of August, which has historically yields the most WNV positives of any month. Our annual West Nile virus testing of dead corvids and trap collected disease vectors, are once again being tested at Michigan State University for a variety of arboviruses. Arbovirus surveillance along with targeted urban/suburban larviciding, adulticiding, and education continues to promote Saginaw County’s public health.

Summer activities for our Education Department will include participation at Camp Kazoo; Boy Scouts; Step by Step Summer Day Care, Birds, Bugs, Butterflies (Children’s Zoo); Friday Nights Live; Party on McCarty; Play Date Bugs, and Children’s Fun Day (Saginaw County Parks); and the Saginaw County Fair. We are continuously looking for additional opportunities to engage the community.

Scrap tire collection, our major source reduction effort, continues with just under 4,000 tires collected to date. We held two week long tire drives with one held in June and the other in July. They are well received by our residents and eliminate a substantial amount of mosquito breeding habitat. Scrap tire collection efforts will conclude August 31st of this year. Further information on this program and any other program we utilize please visit our website at www.scmac.org or follow us on Facebook.

We held our annual review and testing days this year on March 14th and 15th. We began treating spring flooded woodlots during the month of April. Cold temperatures set in for much of May hindering our efforts to begin roadside fogging.

Towards the end of May, temperatures jumped, however, and we were faced with our first major hatch of the season. With these warmer temperatures we were finally able to begin our regular season routines such as roadside ditch treatment along with nighttime adulticiding.

This year we have been conducting trials with Suspend Polyzone barrier treatment. We have had very positive results to date. Using our CDC traps, we were able to see just how effective the product was. We will test this product into the summer and are hopeful that the results continue to impress.

As in recent years we will be sending pools down to Michigan State University to be tested. We will be testing birds in house for West Nile Virus.

To help with reducing habitat for mosquitoes, Tuscola County will be holding 8 satellite tire drives in various townships. It has been a very successful way to remove breeding habitat throughout the county.

We are pleased to announce Lisa Ozbat in her third season with TCMA was promoted to full- time Administrative Assistant.

TUSCOLA

This dry summer has been quite a contrast with the drenching we received during 2015. As a result, we have had very few issues with summer floodwater species such as *Aedes vexans*. The crews have therefore been focusing on habitats such as retention ponds, large cross country ditches and catch basins. Permanent water species, particularly *Coquillettidia perturbans*, are present in good supply and provide ample targets for nighttime fogging.

Regarding catch basins, this was the first season to use the bike to treat residential catch basins (CB). We started with just one bike to see how it would work. Jessica Fetterman was persistent in requesting the bike, so it was suitable that she spearhead the pilot project. It has worked well as a treatment means for those areas where there is not a lot of traffic. It increases efficiency and reduces wear on the trucks avoiding the frequent stop/start in/out inherent with CB treatment in neighborhoods. Due to the good results we have experienced, we plan on getting another bike and having two pedaling around Midland next year.

As previously mentioned, Abate (temephos) can no longer be used except in habitats such as containers and sewage lagoons. Therefore, we look to replacement products that can be applied as a pre-flood to areas such as ditches and fields. Our plan remains to test MetaLarv[®] S-PT and Natular[™] G30. We have identified a test site in the county managed by the city of Midland. In the past, it served as the city nursery where ornamentals were grown and transplanted to areas throughout the city. It makes for a great *Ae. vexans* sight because the ground was intentionally tiered to retain water. As such, it floods with sufficient rain and produces a lot of *vexans*. We have identified a number of areas and have the materials weighed out and ready to apply – if we get a good downpour. In addition to testing the control products, we look to use this sight for ecological studies of *vexans*, which will hopefully lead to better understanding of various life history parameters of the species.

The four year special millage for Midland County Mosquito Control will be decided by voters during the primary on August 2nd. Fingers crossed. Have a great summer!

The annual spring woodland-pool treatment program marked the beginning of BCMC's mosquito control season, beginning on April 12. Control efforts included aerial larviciding (48,567 acres) using three fixed-wing aircraft (Earl's Spraying Service, Inc.), with the focus on areas near cities, towns and large developments. Based on successful past trials, woodlots were treated this year at a 3 lb/acre dosage with an overall average mortality of 91.4%. Spring mosquito species emerged as adults by May 15, but were not much of a problem except for untreated areas in the northernmost portions of the county.

Most areas of the county have seen below-average rainfall for the months of April, May and June. In fact, Bay County has received an average of less than 4 inches during that 3-month period when the historical average is closer to 9 inches of rain. Our largest rain event came in mid-June with a 2-2.5" rainfall that created a hatch of *Aedes vexans* mosquitoes especially in roadside ditches. Due to the dry conditions, we only saw a small rise in adult mosquitoes due to that rainfall, with many ditches drying up before mosquitoes could complete their life cycle. As of the Independence Day holiday, we have been battling pockets of *Anopheles* and *Coquillettidia perturbans* mosquitoes especially along the Saginaw Bay from Hampton Township north to Pinconning Township. Thankfully, the *Cq. perturbans* mosquitoes typically run their course by the end of July. Usually the bulk of our mosquitoes at this time of year are comprised of *Aedes vexans*, the floodwater mosquito, but little rain has given us a reprieve from this nuisance species (at least until the next heavy thunderstorm drops an inch or more of rain).

Field technicians have treated tires, roadside ditches and catch basins and are now onto the search and destroy sheets where they're spending days searching for mosquitoes in a variety of breeding habitats - mostly cross country drains, artificial containers, and ponds. They are mostly reporting that conditions are quite dry and that they're not finding many larvae. Throughout the warm weather months, BCMC will continue to treat larval or adult mosquitoes originating from woodlots, floodplains, freshwater wetlands, grassy fields, wet meadows, roadside ditches, ponds, catch basins, as well as containers.

Two training sessions were held for both new and returning seasonal staff members to prepare them to test with the MDARD as certified technicians. A full staff meeting was held in early July to keep technicians up-to-date with the goings-on of all mosquito control divisions. Public education efforts continued with information distributed regarding artificial containers and basic homeowner control techniques. A new Zika Virus rack card (developed as a joint effort with the Bay County Health Department) is being printed for distribution and presentations were recently given at Auburn Elementary School.

We continue to monitor for West Nile virus this season by testing American Crows and Blue Jays using the Vector Test kit and by submitting mosquitoes to MSU. Through July 7, we have tested two crows and one blue jay that were negative. One hundred thirty-nine mosquito pools containing nearly 5,000 adult females were also submitted to MSU; results are pending.

A scrap tire drive was held June 4 with 1,733 tires collected. The cost of holding the scrap tire drive will be off-set by a MDEQ Scrap Tire Grant.



**MMCA
Conference -
Photo Salon**

“Best of Show”

**Remember to be taking pictures
for the 2017
MMCA Photo Salon**



**Michigan Mosquito
Control Association
P.O. Box 366
Bay City, MI 48707**

Summer