



Skeeter Scanner

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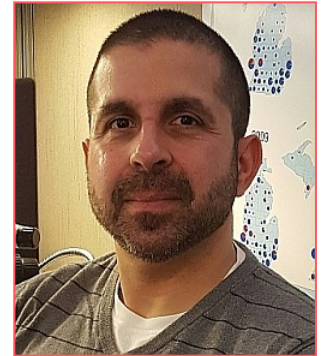
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INFORMATION
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www.mimosq.org

President's Message



Winter is waning and soon we will be experiencing the barrage of spring floodwater mosquitoes. The districts are preparing and executing their aerial programs, mosquito control professionals are preparing their equipment, and we are all wondering what Mother Nature has in store for us this year.

Mosquitoes are in the headlines a lot these days with the emergence of Zika virus in the Americas. The public is more concerned and more interested than ever in protecting against vector-borne disease, and the practice of mosquito control (more about that in a minute).

I am always impressed at the continued evolution of the MMCA and its members following advances in technological and ecological research. We possess a great ability to adapt to changing and emerging health threats. I am constantly learning from you all, my colleagues in the field. I believe that many in the public would be amazed at how much care and professionalism goes into carrying out Integrated Mosquito Management. This year's successful MMCA annual conference in Ann Arbor was a great example of that professionalism, and I would like to extend thanks to several groups. First, the conference organizing committee which always does a fantastic job with the venue and identifying presenters. Secondly, the presenters for preparing such great information in an engaging way. Lastly, and very importantly a special thanks to the vendors for their support of mosquito control and of the MMCA year after year.

Zika is the challenge of the day. Not only is the virus transmissible by *Aedes aegypti* and *Aedes albopictus* in the Americas, but it is also the first infectious disease in 50 years to be associated with birth defects, including microcephaly. Zika is also unique among mosquito-borne viruses in that it can also be transmitted sexually. This creates a scenario where both mosquitoes and the behaviors of their human hosts are amplifying outbreaks. We have not seen a vector-borne virus quite like this before, and the virus' potential impact on pregnancies is causing great anxiety in the public. Education will be key in not only preventing many cases of Zika, but also in educating the public about mosquito-bite prevention, and mosquito control in communities.

Continued on next page

Presidents Message continued:

A recent poll of 1,275 adults (including 105 who live in households where someone is pregnant or considering getting pregnant) by the Harvard T.H. Chan School of Public Health found substantial gaps in Zika awareness among the public. This included limited knowledge about symptoms, and mistaken beliefs that Zika can be transmitted through coughs and sneezes. On a positive note however, one of the interesting key findings was that two-thirds of the public (67%) say they routinely take personal precautions to avoid mosquito bites, including mosquito repellent (56%) or removing standing water around their home (55%). While these numbers can always be improved, they speak to the effect of education and messaging regarding mosquito prevention delivered by public health and mosquito control organizations. Lastly, the study also found that most people (81%) approve of ground “mosquito spraying,” and 66% of people would approve of “spraying” from the air, in response to cases of Zika virus where they live.

Zika is a serious concern for the U.S. and while we haven’t detected the mosquito vectors in the state, we still need to remain vigilant and prepared. Zika is providing us with an opportunity to reach out to our communities and partner agencies to enhance surveillance for *Ae. albopictus* and *Ae. aegypti*, and to educate them regarding Zika prevention. It is also providing us with an opportunity to highlight why mosquito control is still a very important public health function. So please continue what you do every day by advocating for, and professionally representing the mosquito control community.

I look forward to serving you as MMCA President.

Erik Foster

CDC Confirms Brain Damage Link

It’s official: Zika virus causes microcephaly and other birth defects.

A new analysis by the U.S. Centers for Disease Control and Prevention confirms what many earlier studies had suggested: The virus, typically passed via the bite of an infected mosquito, can travel from a pregnant woman to her fetus and wreak havoc in the brain.

“There is no longer any doubt that Zika causes microcephaly,” CDC director Tom Frieden said in a news briefing Wednesday. The findings, reported April 13 in the *New England Journal of Medicine*, follow a March 31 report from the World Health Organization that concluded nearly the same thing.

Because the connection between a mosquito-borne illness and such birth defects is so unprecedented, the CDC took time to carefully weigh the evidence, Frieden said. “Never before in history has there been a situation where a bite from a mosquito could result in a devastating malformation.”

In the *NEJM* analysis, researchers factored in molecular, epidemiological and clinical data, including recent reports of babies born with microcephaly in Colombia. The country has been suffering from a Zika outbreak for months, and thousands of pregnant women have been infected with the virus. Based on what scientists know about the virus, now is about the time they would have expected to see birth defects, said CDC public health researcher and study coauthor Sonja Rasmussen. WHO reports 50 cases of microcephaly in Colombia, seven of which have a confirmed link to Zika.

Researchers still can’t pin down the odds that an infection during pregnancy will lead to microcephaly, though. “What we don’t know right now is if the risk is somewhere in the range of 1 percent or in the range of 30 percent,” Rasmussen said.

Scientists do believe, however, that women who aren’t pregnant would probably clear a Zika infection within eight weeks, and not have problems with future pregnancies, Rasmussen said.

Dengue Vaccine Approved in Mexico, with Uncertain Pricing

French pharmaceutical giant Sanofi recently gained regulatory approval in Mexico for its widely anticipated dengue vaccine, Dengvaxia, which is the first of its kind geared towards combating the dangerous and potentially-deadly mosquito-borne virus.

The vaccine was tested in two large clinical trials involving over 40,000 children and adolescents, and it was shown to offer protection to roughly 66 percent of subjects tested, who were aged nine and older. The trials were conducted across Latin America and Asia.

The dengue virus, also known as “breakbone fever,” is transmitted by the *Aedes aegypti* mosquito. In those infected, the virus is known most for producing severe pain in the joints and muscles. Dengue has four distinct serotypes, or groupings, with the most fatal producing the Dengue Hemorrhagic Fever, which is characterized in part by tiny spots of blood on the skin and larger patches of blood under it.

Most notable about Dengvaxia is that it’s most effective in offering protection against this severe form of dengue, with results from clinical trials showing that it prevented 93 percent of cases. The vaccine was also shown to deliver an 80 percent decrease in hospitalizations.

The cost of the vaccine has yet to be determined. But since it’s likely Dengvaxia will initially be marketed in poorer countries, where the prevalence for dengue is greatest, this could pose a dilemma for Sanofi. A balance will need to be struck between turning a profit and providing such crucial healthcare to those who need it the most.

While once widely thought to be mainly a tropical disease, recent outbreaks in Florida and Hawaii have brought dengue closer to home here in the United States. According to the World Health Organization, only nine countries had experienced severe dengue epidemics before 1970. Today, however, the disease is endemic in more than 100 countries, ranging from regions in Africa, all three

Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific

Researchers Learning More About Zika Dangers

Researchers are learning more about Zika every day. For researchers like Dr. Ernesto Marques at the University of Pittsburgh School Of Public Health, working on Zika for the last year has meant playing catch up.

"It was thought it was a benign virus that wouldn't cause any significant harm to humans, and it turns out it causes all kinds of problems that we never imagined," he said.

The problems in newborns include microcephaly, an abnormally small brain at birth, and damage to nerve tissue in the eye.

But there is emerging evidence of neurological problems in adults, too -- including inflammation of the brain, and Guillain-Barre syndrome, a form of paralysis. And a week ago, a case of a 15-year-old girl with inflammation of the spinal cord.

These new reports of rare complications are surprising researchers. After a study of Zika infected patients in Brazil, the author concluded: "There is strong evidence that this epidemic has different neurological manifestations than those referred to in (existing) literature."

CDC Deputy Director Dr. Anne Schuchat says researchers are just starting to learn why the virus may be so dangerous.

"In animal studies of the Zika virus, it seems that the virus is attracted to nerve tissue or brain tissue and so we worry that in humans that this virus may destroy nerve tissue or attack brain cells," she said.

To keep this in perspective, most people who get Zika recover completely after a relatively mild illness.

Dr. Schuchat told CBS News the focus remains on preventing pregnant women from getting infected.

Wood Thrush and EEE

Scientists with the Center for Vector Biology & Zoonotic Diseases, at the Connecticut Agricultural Experiment Station have discovered that the common wood thrush, *Hylocichla mustelina*, plays a leading role in introduction and seasonal amplification of eastern equine encephalitis.

The findings published in PLoS Neglected Tropical Diseases further identified the blood feeding behavior of the primary mosquito vector, *Culiseta melanura*, as the single most important factor affecting local maintenance and build-up of the virus in freshwater woodland swamp habitats in Connecticut.

"In the past, human disease outbreaks in the northeastern US have occurred intermittently with no apparent pattern. However, during the last decade the region has witnessed recurring annual emergence and expansion into northern New England and southern Canada where the virus had been previously unknown." According to the CDC, 55 human cases have been documented in the northeast resulting in 23 fatalities since 2003. The underlying factors responsible for this sustained resurgence have eluded scientists and public health officials.

According to Dr Goudarz Molaei, lead author of the study, "in the northeastern US, EEE virus is maintained in an enzootic cycle involving a bird-biting mosquito, *Cs. melanura*, and wild perching birds in freshwater hardwood swamps. However,

the identity of key bird species that may serve as superspreaders of the virus in these swamps leading to spill over into humans and equines, has not been established."

The team tackled this issue by analyzing the blood meal contents of more than 1100 *Cs. melanura* mosquitoes collected from 4 EEE virus swamp foci in Connecticut using PCR-based molecular methods and direct sequencing of the mitochondrial cytochrome b gene. Bird abundance in the swamps was also estimated through the use of avian point count surveys that were conducted from April through October for 2 years. In cooperation with scientists at Oregon State University, they developed an empirically informed mathematical model for EEE virus transmission, the 1st of its kind, based on the proportion of mosquito blood meals identified from individual bird species in relation to their observed frequency in the swamp.

The authors found that in these swamps, mosquitoes were exposed to a diverse community of birds, feeding on no fewer than 65 different species throughout the course of the season. However, mosquitoes exhibited larger feeding indices on wood thrush and a few other virus competent species including: American robin, tufted titmouse, common grackle, chipping sparrow, black-capped chickadee, northern cardinal, and warbling vireo, thus demonstrating that these birds play prominent roles in supporting EEE virus amplification.

Ryan Miller

2015 Kenley Farrel 2nd Place Winner



Scenes from 2016 MMCA Conference

**Break Room
Vendor Displays**





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Zika virus: Information from the Michigan Mosquito Control Association

The Michigan Mosquito Control Association (MMCA) and its members are preparing for the possibility of Zika virus in the state. The MMCA is comprised of professionals from publically funded mosquito control districts, private mosquito control professionals, as well as public health, scientific experts and academics involved in vector-borne disease research and control.

Currently the risk of a mosquito-borne Zika outbreak in Michigan is considered low due to there being no evidence that Michigan mosquitoes can transmit the disease. However preparing to respond to the virus through surveillance, training, and education is important in protecting the public. The MMCA and its members have a long history of responding to mosquito-borne disease threats, including West Nile virus, using Integrated Mosquito Management (IMM). IMM utilizes science-based techniques to target mosquitoes in their habitats, and control them using the least harmful or invasive techniques for human and environmental health.

More about Zika virus:

Zika is a viral illness spread by the bite of two species of infected mosquitoes, and is an emerging disease in the western hemisphere. People who are bitten by a Zika virus infected mosquito often show only minor symptoms, if any. Major concerns of Zika, however, include the virus' documented impact on pregnancies and sexual transmission of the virus. Below are some frequently asked questions about Zika virus:

How does somebody get Zika virus?

Zika is primarily spread through the bite of an infected *Aedes* species mosquito:

- *Aedes aegypti* and *Aedes albopictus* are common in South & Central America, Mexico, the Caribbean, and some parts of the U.S.. They have not been detected in the state of Michigan.

For updated information about areas with Zika, go to www.cdc.gov/geo/index.html

Zika is also transmitted through sexual contact:

- Zika can be passed from an infected man during sex. The man gets infected by a mosquito bite and spreads it to his partner through unprotected sex. This is preventable by using condoms, the right way, every time during all types of sex.

For up-to-date recommendations regarding the prevention of sexually transmitted Zika, see: www.cdc.gov/zika

You cannot get Zika virus from coughing and sneezing.

What are the symptoms of Zika virus?

- Most people infected with Zika will not show symptoms and don't even know they have it. People usually don't get sick enough to go to the hospital, and they very rarely die of Zika.
- Zika symptoms may include: fever, headache, rash, reddened eyes, joint and/or muscle pain.

What are the concerns for pregnant women?

- If a pregnant woman is infected with Zika, she can pass the virus to her fetus. Zika has been linked to cases of microcephaly. Microcephaly is a birth defect where a baby's head is smaller than expected when compared to babies of the same sex and age.
- Pregnant women or women planning to get pregnant are advised to avoid, or postpone travel to areas with ongoing Zika virus transmission.

For information about birth defects related to Zika virus, see: www.cdc.gov/zika

For updated information about areas with Zika, go to www.cdc.gov/geo/index.html

How can I prevent mosquito bites while traveling to areas with Zika virus?

- The mosquitoes that transmit Zika bite during the day and night.
- It's important to wear EPA registered insect repellents when in areas with current Zika virus activity. Loose fitting, long sleeved shirts and pants can also be protective in these areas.
- Try to stay in locations with window and door screens and air conditioning.

Will Zika be a health threat in the U.S.?

- Zika may spread through mosquito bites in some states later this spring and summer. Based on US experiences with similar viruses (dengue and chikungunya), states like Florida, Hawaii, and Texas, may have cases or small clusters of diseases that are spread by infected mosquitoes. Additional states may also be at risk.
- To date, the species that transmit Zika virus have not been found in the State of Michigan.
- Some health departments and areas with mosquito control districts are actively monitoring for the presence of these mosquitoes in the state.

For up-to-date maps of the distribution of these mosquito species, see: www.cdc.gov/zika

How can I prevent mosquito bites around my home?

- Wear EPA registered insect repellents when working or recreating outside during peak mosquito activity periods.
- Eliminate small containers of water such as buckets, tires, and planters. Also cover rain barrels with mesh so that mosquitoes cannot develop in them.
- Make sure window and door screens are in good repair.

Not all Michigan communities practice mosquito control. The best way to protect communities from disease carrying mosquitoes is through proactive control measures. For questions about mosquito control in your community, contact your local mosquito control district or your city, township, or county government.

How Misinformation Spreads on the Internet

A team of researchers have conducted a five-year-long study on a wide range of Facebook users in a quest to find out how misinformation blossoms online. In their paper, published in the Proceedings of the National Academy of Sciences, they note that it may be due to the nature of so-called “echo chambers,” spaces that allow people to amplify their own belief systems without obstruction.

In this sense, **echo chambers** describe certain areas of the media, particularly the Internet, wherein information or beliefs are reinforced by repetitive transmission inside an enclosed virtual space. These spaces, which also serve to keep contrasting views at bay, may explain why there are so many groups of people online – particularly on Facebook – that steadfastly believe information that is demonstrably nonsensical.

In order to investigate how effective these echo chambers were, 67 public Facebook pages – 32 regarding conspiracy theories and 35 related to science news – were comprehensively analyzed each and every time a post appeared, including how the followers interacted with it, from 2010 to 2014. Conspiracy theory sites include those that reject the overwhelming consensus on contemporary **climate change**, and those that believe that **Jade Helm 15** – a series of military training exercises that occurred across the U.S. last year – were actually interpreted as signs of an impending civil war.

A third group consisting of two **trolling pages**, those that intentionally disseminate sarcastic, false information for potentially humorous effect, was also taken into account. These trolling websites acted as the experiment’s control group.

The researchers found that the way posts are initially distributed are the same for the science and conspiracy theory posts. Within the first two hours, and again after 20 hours of being posted, a post is shared most frequently, regardless of topic or validity – mostly with those that agree with their views.

However, a difference is noted in the long term. Science news is spread relatively quickly across the web, before sharing and discussion of the post drops off. Conversely, conspiracy theories **build momentum** more slowly before being shared and discussed increasingly for a longer period of time. This also means that conspiracy theories that gradually gain traction can eventually persist online, regardless of their limited factual basis.

Most significantly, however, is that the long-term online behavior of any type of group user both constructs and strengthens their own echo chambers. Individual people, publications or news organizations whose posts you click on or comment on more frequently will appear in your News Feed more often as a result; those you ignore will fade into near-complete obscurity.

This in itself is an echo chamber, one where the information fed back to you is reinforced by your **online interactions**. Eventually, therefore, a user’s Facebook space may exclusively include information that they believe in, and people that only agree with them.

A claim, whether it is substantiated or not, is given credence in the mind of an individual if the surrounding society deems it acceptable. This is known as **confirmation bias**, and this study shows that the phenomenon is just as prevalent in online communities as it is in physical ones. In the case of misinformation, this is incredibly dangerous – so much so that the **World Economic Forum** has declared its online spread, a form of “digital wildfire,” one of the main threats to global society.

H. Don Newson
Distinguished
Service Award
Recipient
Joyce R. McLaughlin





News From Around The Districts

Interviews for seasonal employment were completed in February and early March with our annual training session being held on April 8th-9th. We have again increased our hourly pay rate as minimum wage continues its “stepped” increase. We were very pleased by our applicant pool, and feel we have selected some great additions to our seasonal workforce. Our first substantial influx of seasonal employees is scheduled to report to work on Monday, May 2nd.

This spring has been confusing (the new normal), with above average precipitation and temperatures ranging from the 60’s down into the teens; as I’m writing (April 4th) there is snow flying and a forecast for 15°F tonight. This has slowed the spring larvae in the woodlots, which began hatching in much warmer weather on March 12th, which is about week earlier than normal. The recent cold temperatures will likely push aerial operations into mid-April. The woodlot pool, breeding habitat is above average due to all the rain and now snow. It is our hope the high water hatches all the spring mosquitoes and then recedes, concentrating the mosquito larvae resulting in better aerial larviciding control. Again, Mother Nature plays by her own rules.

SAGINAW

Our Education Coordinator has already scheduled 182 classroom presentations at 47 schools. This year’s Mosquito Abatement Challenge is a Short Story Contest with the theme being “The Instar Wars”. All Saginaw County 3rd, 4th, and 5th grade students are eligible to participate. Winners will receive their awards and recognition at the May Saginaw County Board of Commissioner’s meeting.

This summer we will be incorporating DeltaGard into our adulticiding operations within the Saginaw Metro Area. The targeted use of this deltamethrin product is part of our Resistance Management Program. We will also be investigating the use of two Natular (spinosad) larvicide formulations in our battle with floodwater mosquitoes. SCMAC will be using Bti and Bs WDG formulations in catch basins as a solution for the loss of temephos. The Biology department will incorporate the BG-Sentinel traps in our efforts to detect Aedes albopictus, which has not been found in Michigan, yet. This species has been tied to recent Zika concerns and is known as a voracious nuisance that loves backyard habitats. It is anticipated to arrive in Michigan in the coming years; it has been found in our neighboring states, Indiana and Ohio.

MIDLAND

Our seasonal technicians started on April 4th. Unlike last year, we started training with all positions filled and as an added bonus, all new technicians successfully passed the applicator registration exam.

It has been a particularly wet spring so we will have plenty of habitat to treat when the aerial and foot crew campaigns begin. We have our aerial program split between two types of liquid and granule Bti products, Vectobac and Aquabac. This will keep Doug and his crew busy setting up more test pools than normal to assess the four products.

Still waiting on word from the Michigan DNR regarding our combined request to the Forest Stewardship Council to apply permethrin for adult mosquitoes in the state forest. The last word on this was that the FSC had solicited feedback on the request from FSC-USA stakeholders. Two comments were passed to us, one was very supportive and the other equally opposed. The FSC provided us the opportunity to respond to the concerns from the negative response. Any day now we expect to hear the FSC final decision.

Under the Michigan NPDES permit, use of temephos (Abate) can no longer be used in environments such as ditches and catch basins that connect to “waters of the United States”. Abate was used by MCMC for years as a pretreatment for dry ditches. We will be evaluating this season two alternatives for this purpose, Natular and MetaLarv. We hope to have some results to share at next year’s meeting.

Happy spring to all!

The hiring of seasonal staff took place in February. Review and testing for our new hires and those recertifying was done on March 14th and 15th.

We have been busy over the last few weeks moving into our new facility and finishing up the renovation of the old garage into a locker room.

Foremen reported early to help with the move and to begin placing signs on the many new organic fields in the County.

Route maps have been updated to reflect the new no spray areas.

Technicians have returned and the treatment of flooded woodlots is in progress.

We will again this season be scheduling multiple tire collections throughout the County.

The biology staff are looking at adding some additional sites for trapping this season.

We will continue to keep residents informed using our facebook page as needed.

Though the calendar says “Spring”, we’re patiently awaiting the end to winter and a return to woodlot patrol. We officially found first instar larvae on March 15 as we checked some of the woodlots that historically produce mosquitoes. Water levels were average or slightly above-average at that time. Looks like, at this point, spring treat will begin in early-April compared to the historical mid-April start date.

Since announcing that applications were being accepted for seasonal employment in mid-January, we have lined up interviews beginning in mid-March and most positions are full. About half of last year’s employees plan to return.

After holding two scrap tire drives in 2015 that were sponsored by the Michigan DEQ’s Scrap Tire Cleanup Grant, we received the \$4200 reimbursement in January. We’re hoping to hear soon if we have been awarded another grant for the current season.

The 2016 Program Plan was compiled in January while February had us attending the MMCA 30th Annual Conference in Ann Arbor at Weber’s Inn. BCMC hosted the Mid-Michigan Technical Advisory Committee meeting on March 9. The comprehensive community outreach program plan was submitted to MDARD, and we’ve been working on other community outreach documents as we gear up for the season. A narrated Power point was paired with a live interview on Bay 3-TV to discuss the 2015 season; this was broadcast to Bay County citizens.

Control material bids were opened in January with prices seeing nominal changes compared to 2015.

Staff continue to update training materials, tune into various webinars (recently many have provided updated information on the Zika virus), revamp presentations that will soon be broadcast on our local Bay 3-TV, order supplies, continue with maintenance projects and monthly storm water inspections, gather supplies for seasonal technicians, and send announcements to media and government offices in preparation for the upcoming season. Office staff is busy sending and receiving no spray, medical, and long-driveway notices as well as myriad other duties.

We’ve also been focusing on meetings with county administrators regarding our upcoming millage that will be on the November general election ballot. Looking forward to a successful 2016 season.

Lechel Memorial Scholarship Presentation Winner

Legacy Effects of Emerald Ash Borer, *Agrilus planipennis* on Stream Ecosystem Function

Courtney E. Larson
Michigan State University



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

Spring