



# Skeeter Scanner

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## THIS ISSUE:

- NIH Funded Vaccine for West Nile virus
- Microsoft to Help Capture Mosquitoes to Prevent Disease
- Laser to Diagnose Malaria
- Human Antibody Blocks Dengue Virus in Mice
- EPA's New Restrictions to Mitigate Acute Impacts to Honeybees
- Detrimental Effects of Junk Science
- Around the Districts

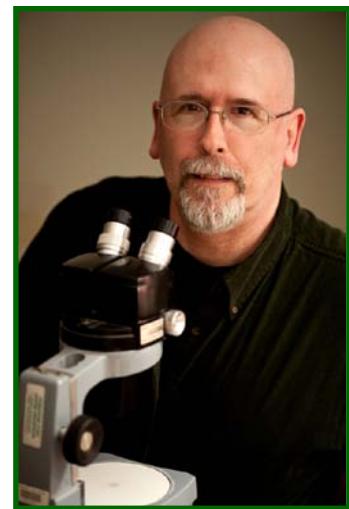
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## President's Message

Here we are stuck in the middle of a mosquito season, amidst phone calls, rain events, developing larvae and biting adults. This is the time of the year to take note of progress made and challenges encountered related to mosquitoes and mosquito control. These notes are the raw materials of talks and questions that we can look into during the off season to implement improvements for years to come. Summer is the time to realize the resource MMCA can be and how others are going through the same situations and may be able to help you with your situation.



MMCA takes a back seat to all of the daily activities we get involved in during the mosquito season. But MMCA is still here, a group of people working in a common business. Often in my lab we will have discussions on a certain species of mosquitoes then remind each other this information will earn us ridicule on Facebook or at the family dinner table. Although our friends and family love us they don't really care about the biological habits of *Aedes sticticus*. We in MMCA know it is their loss and we take our feelings of privilege and share them at our gatherings with other MMCA members. The reason belonging and serving in MMCA is rewarding, we understand each other.

The world of mosquito control is changing and it is up to us to stay current with the changes and be proactive in a positive manner. There is new technology in GIS, GPS and Social Media to learn and apply to our specific uses. Useful tools in our efforts to improve mosquito control for the customers and communities we serve.

One final thought, anyone looking to serve, we are still in need of a person to be the planning chair for 2017 MMCA Conference. Please consider volunteering your skills and talents.

Peace,

*Daylor Allen*

## NIH-Funded Vaccine for West Nile Virus Enters Human Clinical Trials

A clinical trial of a new investigational vaccine designed to protect against West Nile Virus infection will be sponsored by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health. The experimental vaccine was discovered and developed by scientists at the Oregon National Primate Research Center at Oregon Health & Science University (OHSU) in Portland. The scientists were funded with a \$7.2 million grant from NIAID, awarded in 2009. The new vaccine is being tested in a Phase 1 clinical trial at Duke University in Durham, North Carolina, one of NIAID's Vaccine and Treatment Evaluation Units (VTEUs).

"Since first appearing in the United States in 1999, West Nile Virus has emerged as an important health threat in this country. NIAID is committed to research efforts to advance a preventive vaccine that could protect people against West Nile Virus infection," said NIAID Director Anthony S. Fauci, M.D.

The OHSU research team, led by senior scientist Mark Slifka, Ph.D., created the investigational vaccine, called HydroVax-001, with a novel, hydrogen peroxide-based process that renders the virus inactive while still maintaining key immune-system triggering surface structures. The virus used to make the vaccine is inactivated and cannot cause WNV infection. Because it is inactivated, the experimental vaccine likely could be used in a diverse population, including immunologically vulnerable groups, such as the elderly.

In preclinical studies, the test vaccine was effective at protecting mice against a lethal dose of West Nile Virus. In mice, the vaccine elicited neutralizing antibody responses and CD8+ T cells, which bind to and kill infected cells.

The clinical trial will test the safety of the vaccine as well as its ability to produce an immune response. The trial will enroll 50 healthy men and women, ages 18 to 50 years. The volunteers will be randomly assigned to receive a low dose of the vaccine (one microgram), a higher dose (four micrograms), or a placebo. Forty volunteers will receive the investigational vaccine; 10 study

volunteers will receive the placebo. Each participant will receive an intramuscular injection twice: on day one and on day 29. Study participants will be followed for 14 months.

## Microsoft Wants to Help Capture Mosquitoes to Prevent Disease Outbreaks

Microsoft isn't renowned for its ability to prevent disease epidemics, but the computing giant is helping with some early-stage research that could do just that.



[Project Premonition](#) was showcased publicly at an event in Washington, D.C., where the company's research arm will focus on a feasibility study carried out in Grenada earlier this year.

Microsoft researchers are teaming up with academics from a number of institutions for the initiative, including Johns Hopkins Bloomberg School of Public Health and the University of Pittsburgh, to build a system which collects mosquitoes and analyzes them to identify whether diseases are spreading and take action before an outbreak such as dengue fever or avian flu occurs.

Microsoft researcher Ethan Jackson, who will be heading up the project, refers to mosquitoes as "nature's drones." But part of the project involves real drones, too.

To test mosquitoes, you must first catch them. Traps that are often used today have barely changed from designs dating back several decades, and they have inherent problems.

Not only are the traps laden with heavy batteries, but they also capture other insects — ones that are of no real use to scientists — and it can be a time-consuming process sifting through the bug graveyard. Also, the baiting systems are often crude, because dry ice — the preferred method of attracting mosquitoes — can be difficult to procure

in many regions. So Microsoft has developed a smarter trap that solves some of these headaches.

Project Premonition's trap consumes less energy, has lighter batteries, adopts a new baiting system, and actually has a sensor that sorts the mozzies from the other beasties. Ultimately, it's designed to offer a cheaper and more effective way of working. Armed with a bagful of (hopefully) disease-ridden mosquitoes, the next challenge is transporting them out of the (remote) area — and to do this, Microsoft is developing semi-autonomous drones, ones that don't require "ground control" to manage the process. Microsoft says it's working with the Federal Aviation Administration ([FAA](#)) on this.

While this certainly hints at a broader vision Microsoft and many others companies may hold — building safe, "cyber-physical" systems such as autonomous cars — the core focus of the project is to streamline the transportation of dead mosquitoes into laboratories.

The final part of the puzzle is in identifying diseases, and using recent developments in molecular biology and genetic sequencing, scientists will create cloud-based databases (powered by Microsoft, of course) of their findings.

Microsoft isn't the only computing titan looking to the medical realm to advance and showcase its technologies. Back in March, we reported on how Google is hoping to use big data and machine-learning to aid drug discovery. Working with Stanford University, Google introduced a paper that looked at how using data from different sources can better determine which chemical compounds will serve as "effective drug treatments for a variety of diseases."

Though Project Premonition is still very early stage, the ramifications are significant, because outbreaks are usually only really identifiable once communities of people are actually ill. By the time adequate systems are in place to deal with the epidemic, it's either much more difficult to control or too late. In short, the current system is less about preventing diseases than it is about stopping them from spreading. This project aims to head off epidemics before they can take hold.

## Laser Device can Diagnose Malaria in 20 Seconds

Despite being a preventable and curable disease, a child dies in Africa every minute from malaria, contributing to a worldwide death toll of a staggering half a million individuals. But scientists are on the case, working on new control measures, treatments that tackle resistant parasites and even vaccines. And we may have another invaluable addition to the anti-malaria arsenal on the horizon, as researchers have just developed a rapid diagnostic test that doesn't require even a single drop of blood.

That is not to suggest that having to take blood is the main reason that existing malaria tests aren't ideal for developing regions, where the majority of cases occur. But the blood samples need analyzing, which requires a trained technician, chemical reagents and lab equipment, such as microscopes. Furthermore, it can take around an hour for the diagnosis to be made through traditional microscopy techniques.

Some rapid finger prick tests are already in existence that don't require trained personnel, but a major drawback is that all are known to sometimes give false results. Additionally, they can be costly, have a limited shelf life and poor stability in heat, which isn't ideal for tropical countries ravaged by the disease.

Impressively, the new device claims to overcome all of these problems, and it's the first completely non-invasive test developed so far, which is amazing considering the organism that causes malaria, *Plasmodium falciparum*, is a blood-borne pathogen.

As described in [Emerging Infectious Diseases](#), it works by using low-cost lasers to deliver harmless pulses of energy to blood vessels through the skin, which subsequently get absorbed by crystalline waste pigments produced when the malaria parasite digests blood, or more specifically hemoglobin. Upon absorption, heat is created in the local area that evaporates the liquid surrounding the nanocrystals, creating a tiny, transient bubble inside the parasite. When the bubbles collapse, or pop, they can be detected using an acoustic sensor that is integrated into the probe.

Amazingly, the device can detect infections in just 20 seconds, and it doesn't require any reagents, which are estimated to cost around \$100 million each year. It's also battery powered and thus doesn't need electricity, and tests don't require trained personnel. Although each device is estimated to come with a \$15,000 price tag, a single unit should be able to test 200,000 people, which works out at around 8 cents per test.

So far, the prototype has only been tested on six individuals, where it was able to successfully spot the one infected individual out of the group. The next phase of testing will involve field trials in Africa, which should hopefully reveal whether the device is able to detect infections in those with a low parasite load. The team also has some improvements to make – currently, darker skin tones with more melanin generate background readings that could be misconstrued as a positive result. But the researchers think that employing a different wavelength of light could alleviate this issue, which currently represents a major hurdle for its use in many countries.

### **EPA's New Restrictions to Mitigate Acute Adverse Impacts to Honeybees from Certain Pesticides used During Contracted Pollination Services:**

The EPA is proposing a plan to restrict exposure of honeybees to currently 76 acutely toxic pesticides during the time when these domestic honeybees have been contracted for use in pollinating various crops (refer to "EPA's Proposal to Mitigate Exposures to Bees from Acutely Toxic Pesticide Products"). Among EPA's list of 76 active ingredients of concern are most of our frontline mosquito control adulticides - naled, malathion, permethrin, resmethrin, phenothrin (sumithrin), prallethrin, pyrethrin, etofenprox, and most all popular residual barrier treatment products.

The proposed regulation has an exception that reads,

"The mitigation measures proposed for when bees are present under contract pollination would not apply to applications made in support of public health such as use for wide-area mosquito control.

EPA recognizes that a wide area mosquito control application can impact large numbers of bees if the application co-occurs in areas with pollinator-attractive plants; however, such applications utilizing products classified as acutely toxic to bees are used to protect public health through mosquito abatement."

*The public comment period is currently scheduled to close on July 29.* Please visit the regulatory docket for the proposal to protect bees from acutely toxic pesticides, EPA-HQ-OPP-2014-0818, to read the plan and submit comments. AMCA will be submitting comments. If you wish to contribute, please contact Angela Beehler [angela@mosquitocontrol.org](mailto:angela@mosquitocontrol.org). Learn more about the proposal and other EPA Actions to Protect Pollinators, visit: <http://www2.epa.gov/pollinator-protection/epa-actions-protect-pollinators>

### **Human Antibody Blocks Dengue Virus in Mice**

Researchers have discovered that a human antibody specific to dengue virus serotype 2, called 2D22, protects mice from a lethal form of the virus -- and they suggest that the site where 2D22 binds to the virus could represent a potential vaccine target.

Recent phase 3 clinical trials of a potential vaccine candidate showed poor efficacy, especially against dengue virus serotype 2. Guntur Fibriansah and colleagues found that 2D22 protects mice against dengue virus serotype 2, regardless of whether it's administered before or after the rodents are inoculated with the virus. This finding suggests that the antibody may act as both a preventative and a therapeutic agent.

To learn more, the researchers analyzed cryo-electron microscopy (cryo-EM) structures of 2D22 in complex with two different strains of viral serotype 2 -- the dengue serotype with the most dynamic surface -- at 6.5 and 7.0 angstroms.

These cryo-EM structures reveal that 2D22 binds to viral envelope proteins, locking about two-thirds of them in place on the viral surface and preventing them from reorganizing into the orientations required to enter host cells.

## The Detrimental Effects of Junk Science

An informative *Washington Examiner* article (<http://www.washingtonexaminer.com/junk-science-garbage-policy/article/2567516>)

by T. Becket Adams hits the nail on the head in explaining the major problem plaguing science: junk studies, and the sloppy media coverage that ensues.

The article begins by referencing the now infamous chocolate “health study” that was deliberately faked to test if scientists and reporters would detect that it was total junk – no one did. Even reputable publications didn’t catch on. Dr. Johannes Bohannon, the scientist behind the study, said that what drove him to conduct such an experiment was a personal experience – his mother suffered kidney damage after being duped by a scientifically questionable fad diet.

Adams explains why this is a serious concern: “The consequences of junk science include more than just the spread of bad information or embarrassment for media outlets. Members of the public who absorb news reports disseminating bad science can suffer ill health effects, like Bohannon’s mother. There are other consequences. One is the adoption of bad policies.”

For example: A class of highly effective pesticide known as neonicotinoids (“neonics”). The European Commission voted to ban these pesticides in 2013, following media coverage of a European Food Safety Authority Report on the purported risk to bees. But there were serious problems with the media coverage of the lengthy report and its press release: The press release claimed that the study found evidence that three chemicals posed risks to bees. For thiamethoxam, this wasn’t true. For the other two chemicals, clothianidin and imidacloprid, it was an overstatement.

“Reporters focused more on the press release’s mischaracterization of the study than on what the document said. The press also ignored the crucial point that the risk assessment lacked the necessary data to come to a conclusion, data which later undermined a scientific case for a ban.”

Still, the hype spread, and the ban was put into place – although serious economic consequences

were likely to ensue. It is estimated that if the ban is left in place over a five-year period, it could cost the EU up to \$19 billion.

Another major problem highlighted in the article is loose policies for publishing of scientific studies: University of California – Berkeley professor Tyrone Hayes was allowed to choose a friend and colleague Prof. David Wake to peer review his 2002 and 2010 studies that linked the pesticide Atrazine to sex changes in frogs.

While peer review is meant to protect the integrity of the studies, Wake “functionally hand-walked Hayes’ work around the peer-review process,” said Hank Campbell, President of the American Council on Science and Health. He explains: “There’s no data. Hayes’ work has never been replicated... But it was published in the National Academy of Sciences, so of course it’s soon picked up by The New York Times, The New Yorker and so on. The EPA is even told it must conduct an investigation because this product is supposedly harmful.”

So what needs to change? For one, the checks and balances that are meant to maintain transparency need to be more firmly established: Adams writes: “No more of this in-house business. No more asking friends to peer-review projects. The scientific community should also address the issue of reproducibility.”

Greg Conko, American Council on Science and Health Scientific Advisor, calls for journalists to hold themselves to a higher standard:

“Journalists hold themselves up as being the people who are trying to bring truth to news consumers. And I would say they have an obligation, an ethical obligation, to be better at what they do,” he said. “They owe their readers a duty to be more vigilant, to ask the right questions, to not fall into these biases of thinking that just because it’s exciting, it’s worth reporting on.”

**Benton Mosquito Control - West Richland, WA - Twitter feed stated:**

*“Spraying near Prosser and Grandview will continue until the mosquitoes surrender”*



# News From Around The Districts

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A drier than normal spring along with very effective spring aerial treatment has resulted in below normal mosquito nuisance this spring. Regretfully, this lack of nuisance did not last.

In mid-late June, Saginaw experienced substantial mosquito nuisance around the Saginaw Metro Area and those townships around and adjacent to the Shiawassee National Wildlife Refuge and State Game Area. Rain events from the 12<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup> amounted to 3 to 3.5 inches in those areas producing substantial floodwater habitat. Larviciding efforts were levied for the 10 days following the rainfall, and then adults emerged and the adulticiding response began. Unfortunately, there were mosquitoes for the Fourth of July.

**SAGINAW**

Our mosquito borne disease monitoring program is ongoing with no arbovirus detected to date. The variable weather, cool one day, hot the next along with rainfall is likely inhibiting West Nile virus amplification; the aforementioned rainfall event led to our roadside catch basins' *Culex* population being "flushed". Our annual West Nile virus testing of dead corvids is underway, and trap collected disease vectoring mosquitoes are once again being tested at Michigan State University for a variety of arboviruses. This surveillance along with our urban/suburban larviciding of catch basins and abandoned swimming pools continues to promote Saginaw County's public health.

Summer activities for our Education Department will include participation at Camp Kazoo (Arrowwood School); Step by Step Summer Day Care; Birds, Bugs, Butterflies (Children's Zoo); Friday Night Live; Consumers' Fun Day; Play Date Bugs (Imerman Park); and Family Fun Day (Haithco). We are continuously looking for additional opportunities to engage the community.

We had our first week-long household scrap tire drive the week of June 22nd and have our final tire drive scheduled for the week of July 21-25. Our source reduction efforts have collected approximately 3000 tires as of mid-June. For details of daily locations or for more information about us, please visit our website at [www.scmac.org](http://www.scmac.org) or follow us on Facebook.

**TUSCOLA**

Tuscola County Mosquito Abatement (TCMA) technicians returned to work on March 23<sup>rd</sup>, marking the beginning of our woodland treatment program. On March 31<sup>st</sup> however, Tuscola County received 5 inches of snow. Due to heavy snow and cold temperatures near the end of March and middle of April, mosquito larvae activity was reduced. We were able to get a solid jump on the treatment of our flooded woodlots with our 24 technicians. One of our main priorities this spring was to complete all the flooded woodlots in Vassar Township, and we were able to accomplish that.

As our season has progressed, mosquito activity has been rather moderate. The number of mosquitoes have been down in our traps compared to recent years. The numbers are beginning to increase, but with the dry months approaching, we are hopeful that we can continue to keep the mosquito populations down. The weather has been cooperating other than a few nights that we've received heavy rain and strong winds. Hopefully that will continue to be the case as we move forward with this season.

TCMA's roadside ditch treatment program is underway, along with the treatment of our lagoons. We began treatment of ditches and lagoons on June 15<sup>th</sup>. Managing the larvae in catch basins will begin very shortly as well.

As in recent years, our biology department will be sending in pools to Michigan State University to be tested. We will be testing birds in house as usual.

We currently have six satellite tire drives scheduled in various townships throughout the County with more being planned later in the summer.

Construction has begun on the new facility; it is exciting to see each new phase. We are hopeful to have the project complete sometime in September.

A noteworthy observation for 2015 was the abundance of spring *Aedes* species. Despite the aerial program and dedication of our footcrews to treat larval habitat, there were still a large population of adults throughout the county. In June we received a few significant rains, which triggered the emergence of *Ae. vexans*. We ran 10 hour day shifts for a couple of weeks treating *vexans* habitat. Since, we focused on the truck-mounted fogging routes and thermal fogging of woodlots to control those out biting. As expected, the greatest mosquito burden in the county is occurring in the townships that received the most rain. The trouble calls have confirmed this!

However, due to focused efforts in Midland, we had good control for the fireworks display in downtown on the 4<sup>th</sup>. Three employees were in separate areas there and reported no problems – at least not from mosquitoes.

For the remainder of the season we will respond to rain patterns and tend to other operations such as catch basins, pretreatment of ditches, cross country drains and coming up with new ways to blame Midland mosquitoes on Bay County.

Hoping for a slow end to a busy season!

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The annual spring woodland-pool treatment program marked the beginning of BCMC's mosquito control season, beginning on April 14. Control efforts included aerial larviciding (44,649 acres) using 2 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 94.6%. 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. We'd like to extend a sincere thank you to Clarke's Chris Novak who visited in May to help with ULV droplet analysis. That always makes our job so much easier!

Most areas of the county have seen above-average rainfall for the month of June. Heavy rains fell between June 12-15, with 3.5-4.5" of rain recorded which led to a spike in floodwater mosquitoes. We had pockets of *Anopheles* surges along the Saginaw Bay and *Coquillettidia perturbans* numbers are rising as we near the Independence Day holiday. We actually had our first *Cq. perturbans* trapped at the end of May this year with numbers steadily rising. Thankfully, they typically fade out by the end of July, but maybe their early arrival will mean they will dwindle sooner.

Field technicians have been working overtime for a few weeks now to larvicide flooded areas and now to adulticide the ever-increasing adult mosquito numbers. 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. We've treated ditches in townships that have received enough rain to trigger a mosquito hatch and been back in woodlots and floodplains treating larvae.

Two training sessions were held for both new and returning seasonal staff members to prepare them to test with the MDARD as certified technicians. Three full staff meetings have also been held in May and June 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 and presentations were given at Auburn Elementary, Kolb Elementary, and MacGregor Elementary Schools.

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 June 30, we have tested 1 crow that was negative. Ninety-eight mosquito pools containing 2,435 adult females were also submitted to MSU; the first 33 were negative and the rest are pending.

A scrap tire drive was held May 30 with 1,414 tires collected. The cost of holding the scrap tire drive will be off-set by a MDEQ Scrap Tire Grant.

We are delighted to welcome Kristy Brandt as our new adulticiding supervisor, effective April 1. We look forward to the new ideas and positive leadership she will add to our program.

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## Welcome Kristy

Please join in welcoming Bay County Mosquito Control's new adulticiding shift supervisor, Kristy Brandt. Kristy is filling the position long held by Tom Van Paris who retired in February. Since beginning her position in April, Kristy has been working on methods to improve efficiency and safety while maintaining a positive work environment.



Kristy is a 2014 graduate of Central Michigan University majoring in Biology. She was previously employed as a seasonal employee at Bay County and has experience in both larviciding and adulticiding. Prior to joining Mosquito Control, she was employed at The Andersons, formerly Auburn Bean & Grain, where she worked in agronomy.

Kristy is also actively involved in leadership positions with Bay County 4-H and Bay County Fair Board.



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**SUMMER**