



Skeeter Scanner

October, 2008

Volume 22, Number 1

THIS ISSUE:

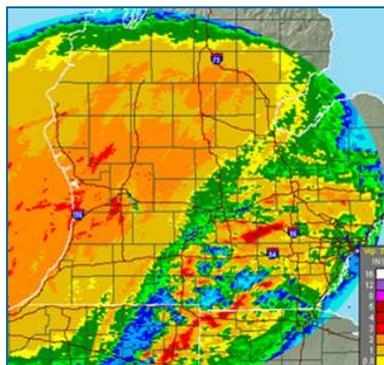
- ▶ NEHA WORKSHOP
- ▶ CHIKUNGUNYA VIRUS
- ▶ WASTING DISEASE IN KENT COUNTY DEER
- ▶ NEW THEORY ON DEET
- ▶ TEMPERATURE, VIRAL GENETICS, AND TRANSMISSION OF WNV
- ▶ WILLIAM LEHEL STUDENT PAPER COMPETITION
- ▶ MMCA BOARD MEETING HIGHLIGHTS
- ▶ AROUND THE DISTRICTS

PUBLISHED BY THE
MMCA PUBLIC INFORMATION
AND EDUCATION COMMITTEE
www.mimosq.org

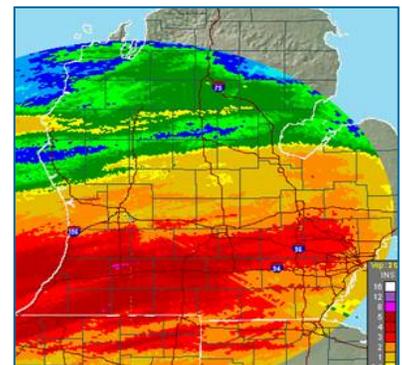


President's Message

Who would of thought that Michigan would be affected by a hurricane let alone two of them a week apart. Our thoughts and prayers go out to those affected in Texas and Louisiana as they begin their recovery from hurricanes Gustaff and Ike. After severely battering the gulf coast the storms remained sufficiently intact to affect Michigan and the midwest states. Midland County received almost 5.5 inches of rain throughout the district. When compared to the 8-9 inches that the southern part of the State received we feel very lucky. What is left of our seasonal staff is trying to put the finishing touches on the larviciding program. As the final technicians are about to depart and Midland County closes out the 2008 season everyone feels that it is time for a well deserved break. What is needed now is for Mother Nature to do her thing and frost/freeze the emerging *Aedes vexans* population.



Gustav



Ike

On a happy/sad note Tom Burt has retired from Saginaw County Mosquito Abatement Commission. This is the first of the original "field group" to leave. We want to wish Tom the best of luck in his retirement and hope that he is able to do all that he would like to.

Remember to mark your calendar for the 2009 conference in Ann Arbor. Please contact Joyce McLaughlin at (989) 687-5044 if you have information to present.

Charles Dimmore

National Environmental Health Association Workshop

The Saginaw County Department of Public Health and National Environmental Health Association, in collaboration with the Environmental Health Services Branch of CDC's National Center for Environmental Health, is pleased to announce the exclusive availability of this free, first-come/first-serve two-day workshop entitled "Biology and Control of Insects and Rodents". The program will be held at the Four Points by Sheraton of Saginaw on October 22 - 23, 2008. This program includes lecture and group discussion on the biology of insects and rodents of public health significance; effective physical and chemical insect and rodent control methods (including integrated pest and sanitation management); and insect and rodent-borne diseases of public health significance, including possible Bioterror agents. This program is sponsored by the Environmental Health Services Branch of CDC's National Center for Environmental Health. Topics include: Vector-borne Diseases of Public Health Importance / Vector-borne Diseases of Bio-terror Agents / Integrated Pest Management / Health Effects of Pesticides / Mosquito Control / Biology and Control of Rodents / Biology of Ticks and Mites / Tick Control for Lyme Disease Prevention / Miscellaneous Pests / Vector Control and the Environment.

Further information can be found on the MMCA Home Page at: <http://www.mimosq.org>

Temperature, Viral Genetics, and the Transmission of West Nile Virus by *Culex pipiens* Mosquitoes

The distribution and intensity of transmission of vector-borne pathogens can be strongly influenced by the competence of vectors. Vector competence, in turn, can be influenced by temperature and viral genetics. West Nile virus (WNV) was introduced into the United States of America in 1999 and subsequently spread throughout much of the Americas. Previously, it was shown that a novel genotype of WNV, WN02, first detected in 2001, spread across the US and was more efficient than the introduced genotype, NY99, at infecting,

disseminating, and being transmitted by *Culex* mosquitoes. In the current study, we determined the relationship between temperature and time since feeding on the probability of transmitting each genotype of WNV. It was found that the advantage of the WN02 genotype increases with the product of time and temperature. Thus, warmer temperatures would have facilitated the invasion of the WN02 genotype. In addition, we found that transmission of WNV accelerated sharply with increasing temperature, T, (best fit by a function of T⁴) showing that traditional degree-day models underestimate the impact of temperature on WNV transmission. This laboratory study suggests that both viral evolution and temperature help shape the distribution and intensity of transmission of WNV, and provides a model for predicting the impact of temperature and global warming on WNV transmission.

Chikungunya Virus

There have been many reports during the past months of the continuous spread of chikungunya virus (CHIKV). Compared with past experience, this is totally atypical and has recently been largely explained in the publication of 2 papers: De Lamballerie (2008) *Virology Journal*, 5: 33 doi: 10.1186/1743-422X-5-33. and Tsetsarkin et al *PLoS Pathog.* 2007;12:e201. doi: 10.1371/journal.ppat.0030201.

One feature of the current CHIKV is that a single mutation in the envelope protein has adapted this virus to *Aedes albopictus*, the so-called tiger mosquito. As is well known, this mosquito has not only been extremely successful in its spread throughout the tropics and sub-tropics, but it has a wider distribution (i.e. urban, semi-urban, rural) than *Aedes aegypti*, which appears to favor urban environments. Thus, the selection of the variant of CHIKV by *Aedes albopictus* is almost certainly the major factor that has determined why this virus has been so much more successful in causing epidemics than previous CHIKV strains. Almost certainly, this success of CHIKV is the result of a combination of additional factors that include increased movement of *Aedes albopictus* via ships carrying scrap tires and other commercial products that provide a suitable environment for these mosquitoes, increased travel by humans incubating CHIKV, increased population

densities of the tiger mosquito, increased opportunities for *Aedes albopictus* to transmit the virus in urban regions as the result of the increased number of cases of CHIKV due to *Aedes albopictus*, and other factors, possibly including climate change.

One of the obvious implications of this adaptation to *Aedes albopictus* is that CHIKV could continue to disperse and eventually reach the New World, where the appropriate mosquitoes will be waiting (the virus has already proven it can establish in northern Italy)! Thinking more laterally, should a similar adaptation (possibly by selection of variants from quasi-species populations) take place in dengue virus, yellow fever virus (or other arboviruses), the consequences could be even more serious. Clearly, the need for effective vaccines and antivirals has never been greater, but some have never really understood why we cannot reproduce the mosquito control activities that worked so well to reduce yellow fever virus and presumably dengue virus in the Americas all those years ago. Countries such as Singapore, Cuba, New Zealand, and Australia effectively reduce the risk to their human populations by concerted mosquito control strategies. We do not have to develop new concepts to control mosquito populations; we need to organize our infrastructures and possibly look for a safe alternative to DDT.

New Theory on DEET: Mosquitoes Just Dislike It

Earlier this year, researchers announced they had solved a mystery: how DEET works. DEET, the most popular mosquito repellent, jams odorant receptors in insect nervous systems, masking other odors that attract the bugs.



Not so fast, say Walter S. Leal and Zainulabeuddin Syed of the University of California, Davis. In a paper in *The Proceedings of the National Academy of Sciences*, they have a

simpler explanation. Mosquitoes, they say, smell DEET directly and avoid it.

Dr. Leal said that in the earlier research, both DEET and an attractant compound were combined in a

cartridge that was used to deliver them to mosquitoes. That had the effect of “trapping” the attractant so that far less of it reached the insects, he said. The mosquitoes showed a reduced response to the attractant, but that was only because there was less of it available. “This decreasing response is a result of the chemicals being in the same cartridge,” Dr. Leal said.

In their work, the Davis researchers used the mosquito that carries West Nile virus. First they identified a single olfactory neuron on one of the bug’s antennas that responded to DEET. Then, using a different way to deliver the chemicals to the mosquitoes, they tested the neuronal response first with the attractant alone and then in combination with DEET. There was no difference in response, suggesting that the DEET had not affected the receptor. “This clearly shows that there was no jamming,” Dr. Leal said.

Instead, he said, DEET appears to set off some avoidance behavior. “They smell it and they go away because they don’t like it for some reason,” he said.

Leslie B. Vosshall, a researcher at Rockefeller University who was involved in the earlier study, said that her team stood by its work, and that its findings were based on a variety of experiments. So for now, at least, there still appear to be some mysteries surrounding DEET.

Scientists Discover New Virus Infecting U.S. Honeybees

Scientists at the Edgewood Chemical Biological Center (ECBC), located in Edgewood, Md., working with scientists at the University of Montana and industry partners Bee Alert Technology and BVS have discovered in U.S. honeybees a virus only before identified in European honeybees.

The invading bee virus newly discovered in the U.S. is called Varroa Destructor Virus-1 (VDV-1). First definitively identified in Europe in 2006, VDV-1 is carried by both honeybees and the tiny varroa mites that affect them. VDV-1 is related to a family of paralytic viruses that causes a breakdown of some membranes. In silkworms the virus causes flaccid disease, which causes the worms to digest themselves internally.

The virus was discovered using a technology developed for battlefield detection of viruses. This technology, called Integrated Virus Detection System/Proteomic Mass Spectrometry, reveals virus by size and peptide information contained in a sample and compares that information against known genetic sequences. This approach may provide important clues to scientists around the world working to find the cause of Colony Collapse Disorder — a mysterious malady that has caused rapid depopulation of beehives around the globe.

This is the first detection of this virus in North America and will allow beekeepers in the U.S. the possibility of early control and quarantine of affected colonies.

New Microscopy Techniques Show How the Malaria Parasite Attacks Red Blood Cells.

In work that could lead to new ways of detecting and treating malaria, MIT researchers have used two advanced microscopy techniques to show in unprecedented detail how the malaria parasite attacks red blood cells.

The researchers' images show red blood cell membranes becoming less flexible, which causes the cells to clump as they try to navigate tiny blood vessels. They also show the destruction of hemoglobin, the critical molecule that red blood cells use to carry oxygen.

The images are made possible by microscopy techniques that reveal tiny vibrations in red blood cell membranes.

"By studying the way the cell membrane vibrations progressively change as the malaria parasite matures inside the cell, we can study the changes in its mechanical, elastic and dynamic properties," said Michael Feld, director of MIT's George Harrison Spectroscopy Laboratory and a professor of physics.

Feld and Subra Suresh, dean of MIT's School of Engineering, are senior authors of a paper on the work that was published in the Proceedings of the National Academy of Sciences in September.

The study establishes the first experimental

connection between cell membrane vibration and the pathological state of a living cell.

"You can establish a measurement of membrane-fluctuation changes as a function of the gradual progression from a healthy state to a severely pathological state," said Suresh, who has appointments in materials science and engineering, biological engineering, mechanical engineering and the Harvard-MIT Division of Health Sciences and Technology.

It has been known for more than a century that red blood cell membranes continuously undulate. These vibrations are difficult to study because the measurements involved are so tiny (nanometer, or billionth of a meter, scale), and occur in just microseconds.

Suresh and colleagues have previously shown that the cell membranes of red blood cells invaded by the malaria parasite lose their elasticity, as proteins transported from the parasite attach to the membranes and make them significantly stiffer.

In the new paper, the researchers describe using a technique called diffraction phase microscopy to image living cells over the first 48 hours of malaria parasite maturation inside the cell. They showed that infection reduces elasticity and decreases the vibration frequency of the cell membrane.

The team also used a technique called tomographic phase microscopy, which was developed in Feld's laboratory and is based on the same concept as a CT scan: To create a 3D image, the researchers combine about 100 two-dimensional images taken from different angles. Those images are produced with a technique known as interferometry, in which a light wave passing through a cell is compared with a reference wave that doesn't pass through it.

The technique allowed them to study changes in the refractive index of a cell, which is a measure of how much the speed of light is reduced as it passes through the material.

Images generated by tomographic phase microscopy revealed the degradation of hemoglobin as the malaria parasite interacted with the cell.



NEHA

Biology and Control of Insects and Rodents Workshop

Day 1: October 22, 2008 (Wednesday)

7:00 – 7:45 AM	Continental Breakfast
7:45 – 7:55 AM	Welcome, Course Expectations and Introductions
7:55 – 8:00 AM	Pre-Test
8:00 – 8:55 AM	Vector-borne Diseases of Public Health Importance
8:55 – 9:05 AM	Break
9:05 – 10:20 AM	Integrated Pest Management (IPM)
10:20 – 10:30 AM	Break
10:30 – 12:00 PM	Mosquito Control
12:00 PM – 1:00 PM	Lunch
1:00 – 1:50 PM	Biology and Control of Rodents Part I
1:50 – 2:00 PM	Break
2:00 – 2:50 PM	Biology and Control of Rodents Part II
2:50 – 3:00 PM	Break
3:00 – 3:50 PM	Biology and Control of Rodents Part III
3:50 – 5:00 PM	Instructor Panel Q&A

Day 2: October 23, 2008 (Thursday)

7:00 – 8:00 AM	Continental Breakfast
8:00 – 9:40 AM	Vector-Borne Disease as Bio-Terror Agents
9:40 – 10:00 AM	Break
10:00 – 10:50 AM	Ticks, Tick-borne Diseases, and Their Control
10:50 – 11:40 AM	“Green” Pest Control / Health Effects of Pesticides
11:40 AM – 1:00 PM	Lunch
1:00 – 1:50 PM	Pest Insects Associated With Housing & Lodging Environments
1:50 – 2:00 PM	Break
2:00 – 2:50 PM	Pest Insects Associated With the Food Service Environment
2:50 – 3:00 PM	Break
3:00 – 4:00 PM	MDA Insect & Rodent Program: Overview and Future Directions
4:00 – 4:30 PM	Instructor Panel Q&A
4:30 – 4:45 PM	Post Test & Evaluations
4:45 – 5:00 PM	Closing Remarks

2009 Conference Updates

The Planning Committee has been working together to bring a great conference to you in 2009. Hope to see everyone at Four Points by Sheraton in Ann Arbor on February 4-5, 2009. The following are a few of the many items we have been working on:

- Silent Auction will be again organized this year by Melinda Moreno, please call (989) 894-4555.
- Vendors will be contacted by Mr. Putt (or if you have suggestions of other vendors or products, please call (989) 894-4555).
- Photo Salon will be hosted by Tom Wilmot so remember to take lots of photos and submit them to twilmot@co.midland.mi.us.
- Keynote speaker, we are excited to report, will be Graham White an internationally renowned expert on malaria and mosquito management.
- Presentations are coming along and ideas are always welcome.

Our many thanks to the members and vendors supporting our conference.

MMCA BOARD OF DIRECTORS CALL FOR NOMINATIONS

Positions open for nomination of candidates will be Vice-President, Secretary, and two Trustee positions. The office of Vice-President is a 2-year term, serving one year as Vice-President and a second year as President. The Secretary serves a 2-year term and Trustees serve for 2 years.

Everyone is welcome and urged to participate. You may volunteer your own services or nominate a colleague. To propose a candidate, please contact MMCA's Secretary, Mary J. McCarry (989-894-4555, 810 Livingston, Bay City, MI 48708, mccarrym@baycounty.net). Candidates must be MMCA members and nominations must be received by January 23, 2009. The election will take place during the General Business Meeting during the twenty-third annual MMCA Conference at the Four Points Sheraton Ann Arbor on February 4-5, 2009.

Board Meeting Highlights - August 14, 2008

President Dinsmore stated that a letter had been received from an Ann Arbor high school student asking MMCA to improve the "Emerging Disease" section of the website. The Scientific Committee will review the information on the website.

Treasurer McLaughlin withdrew \$1,240.39 from the checking account and deposited it in the National City CD, bringing the CD balance to \$10,000. Furthermore, \$2,500 was withdrawn from the checking account to begin a second 6-month CD. Account balances: Chemical Bank checking (\$4,342.36), National City CD Sept. 2009 maturation (\$10,000), National City CD February 2009 maturation (\$2,500), Total funds \$16,842.36.

Finance Committee proposed raising the conference fees from \$75 to \$85 (Pre-paid two-day registration), \$85 to \$95 (Walk-in two-day registration), and \$150 to \$200 (Exhibitor fee). This was put into a motion and approved.

Secretary McCarry mailed fifteen membership solicitation letters to people/industries who applied for and received approval authorizing mosquito control in surface waters with the MDEQ.

Planning Committee Chairman, Ms. McLaughlin, met with the committee on August 4 to discuss conference details. The committee is still looking for speakers. Site visits for the 2010 conference in Northern Michigan are being planned for October.

Planning Committee Chairman for the 2011 conference, Ms. McCarry, stated that a contract has been signed with the Amway Grand.

MMCA Photo Salon

We plan to continue the photo salon as part of the evening entertainment at our MMCA conference in February, 2009. Hopefully, you have all been taking photos this summer for possible use in the revised 7F Mosquito Control Manual. Please choose a few of your best shots and submit them for the photo salon. We expect to have cash and prizes for photos in the categories of: mosquitoes, mosquito habitat, mosquito control, surveillance and nature/wildlife. Digital photos can be (preferably) submitted to Tom Wilmot via email at: twilmot@co.midland.mi.us. If you are in the paper or slide photo mode, mail photos to Midland County Mosquito Control and they can be scanned. Thanks!

Wasting Disease Shows up in Kent County Deer

A whitetail deer born and culled from a Kent County [Michigan] deer farm has chronic wasting disease (CWD), state wildlife officials announced in August. Chronic Wasting Disease is a transmissible neurological disease of deer and elk that produces small lesions in brains of infected animals. It is characterized by loss of body condition, behavioral abnormalities and death. CWD is classified as a transmissible spongiform encephalopathy (TSE), and is similar to mad cow disease in cattle and scrapie in sheep. It is the 1st time the fatal neurological disease has turned up in Michigan. Its presence is triggering big changes for hunters and deer farm owners.

"It's triggering bait and feeding restrictions for whitetail deer in all of the Lower Peninsula, and carcass handling restrictions in the hot zone," said Becky Humphries, the Department of Natural Resources (DNR) director. Hunters who kill deer this fall from Tyrone, Solon, Nelson, Sparta, Algoma, Courtland, Alpine, Plainfield, and Cannon townships will be required to bring their deer to DNR check stations. Other hunters will be strongly encouraged to do so as well.

To date, there is no indication that any wild, free-ranging deer have the disease. The 3 year old female doe with CWD is the 1st reported case in Michigan.

Deer farms all over the state also are being quarantined. There are 580 in total, including breeding farms, hobby and exhibition facilities, and ranches where the deer are hunted.

In West Michigan, there are 6 farms of concern, the Kent County facility where the sick deer was found and 5 others in Osceola and Montcalm counties, which did business with the other farm. Don Koivisto, the director for the Michigan Department of Agriculture, said 5 facilities were quarantined over the weekend [23-24 Aug 2008]. Their records are being examined to trace the sale and transfer of deer. The facilities' names were withheld pending further investigation.

Wind vs. Mosquitoes

In the backyard of Bridges Child Care, a family child care provider, three children are fixated on some chickens, instead of mosquitoes. One boy runs around freely without his shirt. So what's these kids' secret weapon in the battle against the biting bug?

It's not willpower but wind power. The key to freedom for these kids and others enrolled at Bridges Child Care is a barn fan, purchased for around \$200 at a home improvement store. The strong breeze blows on the kids and keeps out the bugs. In fact, it blocks the mosquitoes because they just can't handle the wind. Experts in insects said the wind theory is valid and based on science.

Phil Pellitteri, of the University of Wisconsin Entomology Department, said, "Ten miles an hour is about the cutoff that they can't fly against so if you've got a good stiff breeze coming out of the fan there's no way the mosquitoes can get to you. So that really is a very smart way of doing it."

CALL FOR 'WILLIAM J. LEHEL II, MEMORIAL SCHOLARSHIP STUDENT PAPER COMPETITION PRESENTERS MMCA Conference February 4-5, 2009 at the Four Points Sheraton Ann Arbor.

The William J. Lechel, II, Memorial Scholarship is a student presentation competition held in conjunction with the Michigan Mosquito Control Association Annual Conference. Those entering this competition will present findings from their research projects. Presentations on mosquitoes in particular are preferred, but related research may include information in health or pest-related fields; insects, insect control, weather, Lyme Disease, science education, etc. A total of 15 minutes will be allowed for each presentation.

If you are interested please visit:

<http://www.mimosq.org/PDF/LechelStudentPaperCompetitionApplication2009.pdf> for more information on how to apply. Deadline is January 1, 2009.



News From Around The Districts

SAGINAW

During the last months of the mosquito season we had contrasting mosquito populations throughout the county. The southern half of the county has been very dry with marginal mosquito populations. The northern half of the county had numerous heavy rain storms resulting in significant mosquito densities. Townships with the highest mosquito populations would include Carrollton, Zilwaukee, Buena Vista, Blumfield, Kochville, Tittabawassee, and Thomas.

This year we started using permethrin as our routine ULV adulticide. We have used malathion since 1978 and once we use our remaining product in stock our spray operations will use permethrin exclusively. The most noticeable change for the public was that permethrin has almost no odor compared to malathion which has a very pungent odor, thus we had many citizens calling to comment on the lack of odor.

In late August our Education Department sent out information packets to schools informing them of our classroom educational programs and encouraging teachers to schedule a time early as it is sometimes difficult to honor late requests. Currently over 70 presentations are already scheduled for the school year.

So far our disease detection program has only found one mosquito sample positive for West Nile virus from a trap collection taken in Spaulding township. An additional four positive mosquito samples are currently being re-tested for conclusive verification.

Our three tire drives this year collected a total of 7,466 tires. Additional tires collections throughout the summer have resulted in our agency disposing of a record total of 16, 448 tires and still counting!

On September 27th we hosted the annual county auction at our facility. A few days later on September 30th our facility host a Scrap Computer Drive in cooperation with the Saginaw County Environmental Health Department.

Tentatively, we are planning to have a tour of our facility on October 22, 2008 as part of the Biology and Control of Insects & Rodents Workshop jointly organized by the National Environmental Health Association and the Saginaw County Department of Public Health.

TUSCOLA

June thru September we had over 5 inches of rain a month. The exception was August with 3.3 inches. This is not typical. September was unusually dry except for the extra-tropical Gustav and especially Ike which dropped in some places 6 inches of rain.

We have had tested 200 mosquito pools and additional pools in house. We have tested 4 corvids and have not found West Nile Virus in either mosquito pools or corvids.

When October came the weather became cold with below normal day high temperatures. We have kept three technicians and a foreman to handle any problems in the field should they arise. We lost half of our technicians the 29th day of August and the remaining dwindled away.

Don't forget to mark your calendars for February 4-5 2009 for the 23rd Michigan Mosquito Control Association Conference at the Four Points by Sheraton in Ann Arbor.

It will be here before you know and I hope to see you there!

Once more we have made it through a summer in Midland County with no evidence of West Nile virus activity. Statewide there have been only five human cases reported as of this writing. It is interesting to speculate about possible reasons for the decline but we cannot relax nor assume that we are over the West Nile problem. Remember that the number of cases in Michigan was also down in 2003 and 2004 but rebounded to over 50 or 60 the next two years. Even if it was only a temporary reprieve, we are appreciative and would certainly live with another cool spring and/or summer if that were needed to keep the virus at bay (that's just a figure of speech, Mr. Putt. I didn't mean at Bay County).

The residents of Midland County voted during the August primary election to increase and extend the millage for mosquito control. We are very grateful for this expression of support in difficult financial times. I guess that means you'll have to put up with four more years of "Around the Districts" news from Midland County.

Joyce McLaughlin and the rest of the Planning Committee are hard at work making sure that our 2009 annual conference is an educational and entertaining event. In addition to presentations on mosquitoes and disease in Michigan we plan to have speakers from as far away as the World Health Organization (via U.S. Armed Forces Pest Management Board) and California. Please plan now to be in Ann Arbor on February 4 & 5

July, August, and September all saw above-average rainfall, leading to numerous hatches of *Aedes vexans* and other floodwater species. Roadside ditches, retention ponds, and flooded fields saw a lot of action from mosquito control technicians. We're happy to see October come with virtually no rain occurring during the last two weeks of September. A frost has been forecast for the first few days of October so soon the 2008 will be behind us and we'll be in gear planning the 2009 season. Part of that practice involves assessing what happened over the course of the season and deciding what processes could be upgraded or changed and mapping will take center stage.

Larviciding and fogging operations will be suspended for the season on October 3, barring a warm spell or significant rain. Since early September few citizen complaint calls (1-2 per week) have been received and few mosquitoes have been captured in traps; however, the last week of September did see a rise in calls in the northern portion of the county.

The last official day of the season will be spent hosting the second annual scrap tire drive. The drive will be held October 3-4 and we're hoping to rid the county of thousands of breeding habitats. We're currently working with Bay County's Finance Department on a Request for Proposals for the 2009 Scrap Tire Drives.

Disease surveillance efforts will continue through September. We recently had confirmation on the second crow from Bay County testing positive for West Nile virus. The first positive was from a crow found in early July. Seventeen birds were tested this year compared to 25 last year. None of the mosquito pools submitted to date have tested positive for West Nile Virus, although we are waiting for results on a few pools. Over two hundred pools were assembled with 3,680 *Coquillettidia perturbans*, *Culex* species, *Aedes japonicus*, or *Culiseta inornata* female mosquitoes.

Tom Burt retires after 30 years with Mosquito Control

On September 12, 2008, Tom Burt, a foreman for Saginaw County Mosquito Abatement Commission, started new life as a retired person.

Tom started his career in mosquito control with the newly formed Saginaw-Bay Mosquito Control Commission in 1978. In 1985 he joined the Saginaw County Mosquito Abatement Commission when the two county programs split. He worked as a foreman, and was involved in the development of the equipment used in Saginaw County. Tom was a long time member of MMCA, serving on committees and as Secretary of the association. His friendship and passion for his job will be greatly missed.



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

Fall