



Skeeter Scanner

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J. Robb

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www.mimosq.org

PRESIDENT'S MESSAGE

It has been an interesting and enjoyable year. Interesting because of the unusual mosquito season: a significant lack of rain but still evidence of mosquito disease transmission. As many of you may know my husband and I are "hobby" farmers, so I found myself torn between the joy of low mosquito counts, and the lack of rain to produce the hay that our cattle need. Hay is normally \$2.00-\$3.00 per bale this time of the year, a neighbor of ours sold hay for \$7.00 per bale just 2 weeks ago.



Serving as President of our great Association has been an awesome experience. The members of our Board are truly knowledgeable people who are dedicated to mosquito control in Michigan; they have been wonderful to work with. That old adage "Ask and you shall receive" sums them up perfectly. Many of our members have been busy working through committees to finalize the "new and improved" version of the 7F manual, to plan our upcoming conference, produce brochures that explain MMCA and mosquito control, and create the Partnership Strategy Document for the Pesticide Environmental Stewardship Program (PESP). In 2007 MMCA hosted the first Open House that encompassed all four Mosquito Control Districts in the State. Much has been accomplished, but there is always something else to do.

I feel that we should place some items high on our list of to do's. First – when we set up our display at the Michigan Association of Township Boards, in January of 2007, we found out just how little many of our governmental representatives know about mosquito control. Even if they are apprehensive regarding pesticide use – they need to know about the mosquito's life cycle, source reduction, artificial habitat, and disease potential. We need to continue to knock on their doors. Second, as a partner with the AMCA in the PESP we will need to set up a means for all of our members to report their surveillance results to a MMCA committee/sub-committee to be compiled and forwarded to AMCA. This should not be difficult as we already collect this information at the end of each year, now our information can be added to that from other areas to get a larger picture.

It has been a great year, and we are at the beginning of another – Our conference is scheduled for February 6 and 7, 2008, at the Radisson Plaza Hotel at Kalamazoo Center in Kalamazoo. If you have not registered as yet please do so ASAP. You can call Mark Harten 989-755-5751, or visit our web-site at www.mimosq.org. Our conference gives us all a chance to renew old friendships and develop new ones. The Planning Committee has put together an educational and enjoyable program that has information for the novice right through the expert. Our member/vendors will have the latest and greatest innovations for mosquito control on display for us to see up close. This will be the second year for our silent auction, and it promises to be bigger and better, so bring some extra money and enjoy the bidding while you are supporting our MMCA Scholarships.

See you in February!

Margaret Breaslow

Most Dangerous Animal/WNV Incidence Grows With Repeated Mosquito Bites.

At a wilderness medicine conference, after watching videos of a buffalo goring at Yellowstone National Park and grizzly bear attacks, doctors were posed a question. What is the most dangerous animal in the world with regard to illness, injury and death.

The answer was, and still is, the mosquito. A recent study of mosquito bites further enlightens us concerning West Nile Virus, a worldwide illness which is almost epidemic during warmer months in many areas of the United States. Consider the following case.

Mickey is a U.S. Border Patrol officer who works the wilderness boundary area of Montana and Canada. He knows about mosquitoes.

This past year, as the long Montana summer days began to shorten into fall, Mickey and his fellow officers would return from the field to their office where the lights would go on in early evening and the mosquitoes would begin to swarm.

"The mosquitoes would just feast on me," he said.

Soon, Mickey was bitten by a mosquito which carried West Nile. He had all the symptoms of West Nile virus encephalitis. He eventually required hospitalization, and it took many weeks to recover.

Now comes a study that reveals why his case may have been so severe.

Reporting in the online research journal and blog, PLoS (<http://tinyurl.com/2geptv>), researchers have discovered that prior exposure to uninfected mosquitoes may put a victim at greater risk when an infected mosquito eventually does bite.

Mice exposed to heavy feeding by uninfected mosquitoes in a controlled setting and then exposed to a single infected mosquito were much more likely to die from West Nile than mice who were exposed only to the infected mosquito. The explanation is thought to lie with the body's immune response to mosquito saliva.

When uninfected mosquitoes bite, their saliva is injected into the skin. Multiple exposures apparently modify the immune response in such a way that more cells rush to the site of new mosquito bites, readily acquiring viral particles and presenting them to the lymphatic system. This results in an amplified West Nile infection allowing a better initial foothold than would otherwise have occurred had the victim not been repeatedly and previously bitten. This also might explain why West Nile seems to be more deadly in the older and very young. People at the extremes may not be aware of mosquito bites or able to take precautions to prevent them.

In summary, this is important research. As West Nile and similar diseases spread among us, we must be aware that repeated exposure to the insects may set us up for a worse outcome should we ever suffer a bite from an infected insect.

Malaria: Discovery Could Help Stop Malaria at its Source - the Mosquito

An interdisciplinary team led by researchers from Rensselaer Polytechnic Institute has found a key link that causes malarial infection in both humans and mosquitoes.

If this link in the chain of infection can be broken at its source - the mosquito - then the spread of malaria could be stopped without any man, woman, or child needing to take a drug. The researchers' discovery will be published in the Journal of Biological Chemistry.

The team found that humans and the mosquitoes that carry the malaria parasite share the same complex carbohydrate, heparan sulfate. In both humans and mosquitoes, heparan sulfate is a receptor for the malaria parasite, binding to the parasite and giving it quick and easy transport through the body.

The discovery allows us to think differently about preventing the disease. If we can stop heparan sulfate from binding to the parasite in mosquitoes, we will not just be treating the disease, we will be stopping its spread completely.

Malaria parasites are extremely finicky about their hosts. Birds, rodents, humans, and primates all can be infected with malaria, but each species is infected by a different species of mosquito and each of those mosquitoes is infected by a different malaria parasite. In other words, there needs to be a perfect match at the molecular basis for malaria to spread from one species to another. Researchers have long understood this deadly partnership, but the molecular basis for the match had never been determined.

The discovery marks a paradigm shift in stopping malaria. Now we can work to develop an environmentally safe, inexpensive way to block infection in mosquitoes and not have to worry about drug side effects in humans.

Robert Linhardt and his collaborators were the first to discover the link between the spread of malaria in humans and heparan sulfate in 2003. Those findings were also published in the *Journal of Biological Chemistry*. In this earlier study, Linhardt compared the receptors in the liver of humans to those of rodents. The liver is the first organ to be infected by the malaria parasite in mammals. The researchers found that heparan sulfate in the human liver was the unwitting transporter of the disease to the human bloodstream. The receptor found in rodents was a different heparan sulfate.

The next step was to determine if heparan sulfate was also present in the species of mosquito known to spread malaria to humans, *Anopheles stephensi*.

After finding heparan sulfate in mashed mosquitoes, the researchers needed to determine if heparan sulfate was in the mosquito organs known to host the malaria parasite. If so, it was likely that heparan sulfate was the reason malaria spreads from mosquito to human and human to mosquito.

In mosquitoes, the malaria parasite infects the digestive tract. A mosquito bites a human who carries the malaria parasite in his or her bloodstream. The parasites move into the bug's gut and then to their salivary glands, allowing the mosquito to infect another human during its next blood meal. To isolate a two-microgram salivary gland and the four-microgram digestive tract from

each mosquito required extreme skill. Once isolated, the guts and glands were analyzed, Heparan sulfate was found in both mosquito organs.

As a final step, the Rensselaer team proved that the heparan sulfate in the mosquito bound to the same malaria parasite that heparan sulfate found in the human liver did. It was an unfortunate perfect match.

SIDE EFFECTS; No Skeeters, No Problem? Not So Fast

Elizabeth Willott is the kind of professor who gives the ivory tower a good name.

She is an entomologist and environmental ethicist at the University of Arizona, and she was asked this simple question: What good are mosquitoes?

Dr. Willott seemed like a good person to call because she has spent some time thinking about these issues. She has an article in the current issue of *Restoration Ecology* titled "Restoring Nature, Without Mosquitoes?"

In it she notes that in planning wetland restoration, people sometimes fail to give enough thought to one inevitable consequence -- more mosquitoes. In the bad old days, not all wetlands were drained to build hotels. Another motivation was the real fear of death and disease, as spread by mosquitoes.

So, I asked, what about mosquitoes? Would everything really collapse if we got rid of them? Well, she said, no. The web of life is not that fragile. "If you take a snip, it won't unravel."

In fact, she said, there is "quite a bit of ecological research now showing that removal of a species doesn't make a huge difference." If the species of mosquitoes that are intimately connected with human beings were made to disappear, there might be some ecological disturbance, but "you probably could remove them without catastrophe."

Do they do anything of value, then? That depends on your point of view, she said. The philosophical arguments about intrinsic value versus instrumental value can get quite complicated. In essence they ask whether a mosquito, or a tree, or anything, has a

value in and of itself, apart from what human beings think.

This is the sort of discussion that may be intriguing in an air-conditioned classroom, but seems absolutely incomprehensible at dusk near a marsh. If there's a chance that our children might get encephalitis, then we're ready to wipe mosquitoes off the face of the earth.

One small step beyond this "me, me, me" approach is to think about the value of any given organism to environmental balance. This is still not intrinsic value, since environmental balance is useful to people, but it is a bit less self-centered. Step outside the anthropocentric view of life and one possible value of mosquitoes is population control. Mosquitoes have historically kept human populations down worldwide, and still do in much of the third world. The problem is that they do this by facilitating pestilence and death, so this is not going to enhance their status, among human beings at least.

Mosquitoes may also keep some other animal populations down by spreading disease -- something we might be able to see the value of. And other creatures -- some fish, frogs birds and bats -- eat them. It's possible that if we were able to wipe out mosquitoes, some other species might either suffer from lack of food, or explode in numbers because the burden of disease was lifted.

Another value of mosquitoes, perverse to some, obvious to others, is that they "keep out the riffraff," meaning human beings. Concentrations of pests offer protection to wilderness areas. The tsetse fly, which causes livestock disease as well as human sleeping sickness, has kept humans away from some wildlife refuges and has been called "Africa's best conservationist." Of course, this view has been described by others as ecological imperialism.

In any case, the reality, said Dr. Willott, is that "we're not going to get rid of the mosquitoes." It's just impossible, particularly if we want to use methods that don't kill off everything else. DDT is very effective at mosquito control, but it may cause issues for birds of prey if used improperly.

When I asked Dr. Willott if she thought it was immoral to try to make a species go extinct, assuming you could do it without hurting other organisms, she thought the question was significant enough to require a formal statement. "Striving for the unachievable is not an appropriate use of resources," she said. "If one acknowledges that eradication is highly unlikely to work or might have serious side effects, the moral thing to do would be to find another way." In other words, don't be stupid.

What she suggests is that we take the middle ground and try to kill some of the mosquitoes some of the time.

At the end of the conversation it was mentioned that although mosquitoes were not that much fun to be around in reality, some people shared her fascination with them. As a subject to talk and write about, they are irresistible.

Yes, she said, "and they find us the same."

Nominations for the MMCA Board of Directors

Positions open for nomination of candidates:

1. Vice-President
2. Treasurer
3. Trustee (one position)

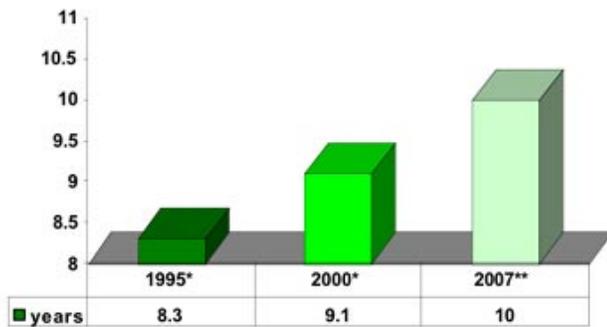
The office of Vice-President is a 2-year term, serving one year as Vice-President and a second year as President. The Treasurer serves a 2-year term and Trustee serves for 2 years.

Everyone is welcome and urged to participate. You may volunteer your own services or nominate a colleague. Please call or send your nominations by January 18, 2008, to MMCA Secretary, Mary McCarry (989-894-4555, 810 Livingston, Bay City, MI, 48708, mccarrym@baycounty.net) Candidates must be MMCA members. The elections will take place during the General Business Meeting during the Twenty-second Annual MMCA Conference at the Radisson Plaza Hotel at Kalamazoo Center, on February 6-7, 2008.

Cost and Time Involved in Introducing New Insecticide

Most Pest Management Professionals probably don't spend much time considering the science and technology behind the products they use to manage their customer's insect pests problems. New active ingredient development for pest management, as well as the control of agricultural pests, is not so dissimilar from that of a new pharmaceutical; costs are astonishingly high, it takes many years from discovery to market and the chances of success are not guaranteed, even in the final stages of development. In fact, one might argue that pesticide development can be more complex than drug development as it includes not only efficacy and human safety testing but also detailed and costly monitoring of the environmental fate of the product.

Time from Discovery To Market
Number of years between discovery and first significant sales



*Phillips McDougall for American Crop Life / European Crop Protection Association / **Bayer

Facts and Figures

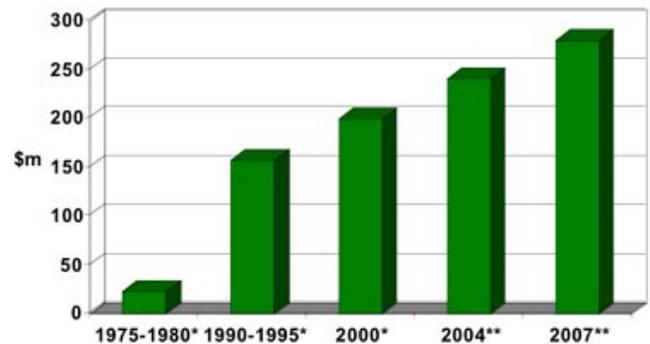
Some facts and figures may help to put the process in perspective: Bayer spends in excess of \$650 million annually on research and development. R&D involves not only the discovery of new active ingredients but also the continued support of existing products. In a study carried out by Phillips McDougall for American Crop Life and the European Crop Protection Association, the estimated cost of bringing a new agrochemical to market in the year 2000 was approximately \$200 million. Today, the costs are considered to be in excess of \$250 million. As well as in-house research and development, Bayer Environmental Science alone invests approximately \$3 million

annually with about 42 major universities in North America. The work varies from basic research on the mode of action of new chemistry to efficacy profiling on pests, weeds and diseases. On average, it takes eight to 10 years to get a new active ingredient from the laboratory bench to the customer. If you invest \$250 million in new technology, you clearly do your best to protect your investment with patents. The life of a patent in North America varies from 17 to 20 years, which means a company has only about 10 years after launch to recoup its investment before generic companies can potentially encroach.

Cost of Developing a New Pesticide

*Phillips McDougall for American Crop Life / European Crop Protection Association

(*Aventis, BASF, Bayer, Uniroyal, Dow, DuPont, FMC, Monsanto, Sumitomo, Syngenta / ** Bayer)



Moms Against EEE

The Moms Against EEE are celebrating their hard work paying off as they have gathered the signatures of nearly 400 supportive community members and a response from Gov. John Lynch.

The governor has requested State Sen. Maggie Hassan, chairwoman of the Arboviral Task Force, assist in drafting a coordinated arboviral policy for state-owned lands by Jan. 15, 2008. Lynch would like the plan to put the health of the public first, and take into account the lands' unique characteristics, including the public's access and use.

The time frame, though short, will ensure the steps needed for implementation will be in place in time for the spring season, Lynch said. The fact the governor has recognized the need to take action before heading into another Eastern equine encephalitis (EEE) season is huge, said Audrey Dean of Moms Against EEE.

In addition, U.S. Sens. Judd Gregg and John Sununu announced Oct. 31, the Centers for Disease Control and Prevention will increase assistance to New Hampshire regarding surveillance and control activities for EEE.

Audrey Dean, and Pam Bronson, of Exeter, and Robin Connor, of Newfields, stated, "We, the Moms Against EEE, would like to thank both Senators Sununu and Gregg for involving the CDC in our fight against EEE. Due to the public health threat in our area, it is imperative that the CDC is involved. We are pleased to hear about the CDC's involvement, especially with a visit in the spring of 2008, when our state will have a mosquito program in place on state lands. We are hopeful that all public and private lands, including conservation lands not covered by the new state mosquito policy, will implement similar policies of prevention. Along with the change in policy on state lands, CDC funding availability and the need for more details about this funding is critical so that we can continue to reduce the cases of EEE in the state."

MMCA 2008 Silent Auction

This year the MMCA Annual Meeting will feature a Silent Auction. Proceeds will benefit the MMCA Scholarship Funds. MMCA needs your donations to help make the 2008 Silent Auction a success and donating to the Silent Auction is a great way to support the mosquito control profession and have fun at the same time!

Donations of auction items are being sought in a variety of categories, including (but certainly not limited to):

- Art, photography, or books
- Sports equipment and clothing
- Gift certificates or themed gift baskets
- Electronics
- Mosquito-related items
- Handmade craft items (paintings, needlepoint, quilts, etc.)

Donations to the MMCA Silent Auction provide ongoing exposure throughout the conference in the exhibit/vendor room. Donors will be acknowledged on the auction bid sheets.

Please remember that we can't pull off this fun event without the generous support of our members. If you are interested in donating a gift to the Silent Auction or have questions, please email or call Tom Putt at puttt@baycounty.net or (989) 894-4555 (810 Livingston Avenue, Bay City, MI 48708). Items can be brought to the MMCA registration desk when you arrive at the meeting. Thanks very much.

Researchers look for new ways to control mosquitoes

A team of UW-Madison entomologists are working to find a new way to control mosquitoes that has minimal environmental impact and won't affect other animals. To do that, they're focusing on inhibiting mosquitoes' ability to metabolize cholesterol.

Cholesterol is key because mosquitoes require the substance for growth, development and egg production. Mosquitoes cannot synthesize their own cholesterol, so they must ingest it from the decomposed plants they eat while in their larval stage. The transmission of disease is in the adult stage so the idea is to control them before they emerge.

Research focuses on blocking that cholesterol use. To do that, the team has been tracking possible chemical agents which ultimately would be part of a mosquito-specific pesticide that would disrupt the process.

In the old days, sorting through these chemical agents would have been hugely labor intensive, requiring researchers to test one chemical at a time. But taking advantage of high-tech computerized equipment used by UW-Madison's cancer researchers, the team used a technique called high-throughput screening to evaluate more than 40,000 chemicals. It was determined that only 12 met their criteria.

The team is now in the process of setting up field testing, to be done next summer at U.S. Department of Agriculture facilities in Florida. If all goes well, putting the science to practical use is likely 5-10 years down the road.

Russo Swats at Fed Plan to Curb Mosquito Spraying on Refuge

The Board of Selectmen in Newbury will be asked to go on record against a proposed federal regulation that would set new and probably more stringent guidelines for the spraying of insecticides to kill salt marsh mosquito larvae in the Parker River National Wildlife Refuge.

Chairman Vincent Russo said he would put discussion of the proposal on the agenda for the board meeting.

The U.S. Fish and Wildlife Service is proposing a national policy to "allow populations of native mosquito species to function unimpeded" on national wildlife refuges, "unless they cause a human and/or wildlife health threat," because of the insect's value to the marsh's ecosystem. Mosquitoes and mosquito larvae are a source of food for a number of species of fish and birds.

That could affect mosquito control in the Parker River watershed, on Plum Island and at the Salisbury State Reservation.

"That's great, when there isn't a vulnerable human population in the area," Russo said. "In a big national park, with no people around, OK, but this is a small national park."

Refuge manager Graham Taylor emphasized that the proposed policy would not mean an outright ban on spraying anywhere on the refuge. "The policy is to implement a more consistent procedure in applying insecticides or larvacides," Taylor said. "The policy doesn't say that we won't spray on refuges."

Russo, a physician, is also on the board of the Northeast Massachusetts Mosquito Control and Wetlands Management District. He said he and district director Walter Montgomery have advocated pre-emptive spraying to kill mosquitoes before they hatch. Montgomery could not be reached for comment yesterday.

Taylor said pre-emptive larva spraying might indeed be halted under the new policy, but he also

said there are sections of the refuge where the mosquito control program is currently not allowed to spray.

"They do the spraying, but we issue them a permit telling them when and where," he said. Taylor also said the policy would not restrict any off-refuge spraying.

Russo said he was concerned about the proposed ban because mosquitoes can transmit diseases, such as Eastern equine encephalitis and West Nile virus.

Taylor said it is his understanding that most of the mosquitoes that have tested positive for those diseases are freshwater species, which are relatively rare on the refuge.

The mosquito control program, which has its office in the former refuge headquarters at Plum Island Point, has previously conducted spraying on portions of the 4,662-acre refuge. The bulk of the refuge is on Plum Island, in the towns of Newbury, Rowley and Ipswich.

The proposed policy has been published in the Federal Register. Public comments on the plan will be accepted until Feb. 19.

Photo Salon – 2008

The Michigan Mosquito Control association would like to request submission of digital photographs for presentation at our 2008 Conference. All shutterbugs are invited to e-mail photos to Photo salon organizer Tom Wilmot at twilmot@co.midland.mi.us or send a disk to 2180 N. Meridian, Sanford, MI 48657 by January 15, 2008. Please, do not submit photos that have been shown at previous MMCA salons.



If a sufficient number of photos are received, cash and prizes will be awarded in the following categories: Mosquitoes, Operations, Surveillance, Mosquito Habitat and Nature/Wildlife. A prize will also be offered for Best of Show and for the most amusing title or intriguing story to accompany a slide.



News From Around The Districts

We wrapped up our season on October 15th with an end to official control operations. Since then we've been busy with paperwork, cleaning, inventories/orders, equipment repairs, and preparations for the 2008 season.

We completed our 2007 Annual Report, which will be presented to the Board of Commissioners as well as to the Mid-Michigan Technical Advisory Committee in March, 2008.

Our 2008 chemical order was compiled and bid specifications were sent out to vendors in early December in conjunction with Midland County Mosquito Control and Tuscola County Mosquito Abatement. Chemical bids will be opened in Midland in January and vendors will be notified.

We continue our community-outreach efforts, which include presentations at local elementary schools and planned updates and changes to the mosquito control web page.

We will be attending our 22nd Annual Conference of the Michigan Mosquito Control Association, February 6th – 7th, 2008. We will take this opportunity to network with vector control professionals, researchers and educators from around the world to discuss the science, technology and products used to conduct research and control vectors. Our attendance at these conferences is very beneficial to our program, keeping us updated on “what’s new” in the mosquito control industry. Presentations are given from a variety of people and include new control materials, procedures, technologies, and research.

We continue to work on plans for the 2008 season with a major emphasis on expanding public outreach efforts through Bay 3 TV.

BAY

2007 is just a memory and a blur. 2008 is quickly marching forward and we will be knee-deep in spring treatment before we know it!

First off we have to get all the new news at the 22nd annual Michigan Mosquito Control Association Conference in Kalamazoo February 6th- 7th. This is a golden opportunity to catch up with acquaintances and make new ones and find out what’s new in Mosquito Control. I trust I will see everyone of you there. Please stop me and say “Hi”.

2007 was such a good season we have our fingers crossed that 2008 will be just as good or should I dare to hope-better?? West Nile Virus activity and other mosquito transmitted virus activity was practically nil.

With the change of the calendar comes a whole host of activities for 2008. Planning for the season, supplying the “troops” with equipment and control materials, reporting what we did in 2007 and what we have planned for 2008 and much more.

I will see you in K’zoo!

TUSCOLA

As is typical for this time of year staff are busy on winter projects which include: repair and preventative maintenance of application equipment and vehicles; fabrication of new ULV spray equipment control boxes for truck cabs; body work on damaged vehicles; build five new gravid traps; investigate updating our automatic vehicle location (AVL) system; and purchase and fabricating a new tire trailer. We also purchased new mopeds for catch basin larviciding that all need to be outfitted with application equipment and safety features.

Our 2007 annual report has been completed and can be reviewed or printed from our website at www.scmac.org for those who may be interested. Our website has been totally redone and just put on-line so I would encourage anyone who hasn't visited it in awhile to check it out as it has a completely new design and more important is full of much more information and pictures than our last website.

School presentations by our education department continue to be very popular. This school year our Education Coordinator has already scheduled 149 classroom presentations.

We have already begun the process of securing permits to allow us to conduct aerial larviciding for spring mosquitoes on federal and state refuge lands. Our agency will also be submitting comments to the U.S. Fish and Wildlife Service in regards to the "Draft Mosquito and Mosquito-Borne Disease Management Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997."

In the next couple months we will begin the process of hiring staff for the upcoming season; revise and update our yearly Program Plan; and send out letters to citizens on our No Spray list and Medical Certification list.

As always, we have the whole winter to get our projects done but it seems this time goes very fast and before you know it you are looking at larvae from vernal snowmelt pools!

Another year has come and gone and we are again taking time to review the accomplishments of the last year, planning how to improve operations next year and recharging our batteries. Among the important winter projects was development of bids for 2008 insecticides. Waiting for bid-opening day is always a scary, nervous experience.

No sooner do we finish one mosquito control season than people start asking for predictions about the upcoming year. West Nile virus activity was down significantly in Midland County last season compared to the previous few years, but there is little reason to expect that this trend will continue indefinitely. I believe that the late frost last spring knocked down the post-hibernation *Culex restuans* and contributed to the delayed development of WNV. Hopefully, it's not too much to ask for another such spring.

As always at this time of year, we can feel the excitement of the upcoming annual conference. We hope to see you all in Kalamazoo February 6 and 7. We could use more and better pictures for the MMCA photo salon (have I ever mentioned that before). Please look through your photographs and consider sending me a few to share with the group. Thanks!

Kenley Farrel Memorial Scholarship Winner - 2007

Trisha Herbert is a fourth-year student at Central Michigan University. She transferred from Saginaw Valley State University to study health fitness and pursue a career in medicine. At CMU, she is an active member of Eta Alpha Epsilon—an honorary health fitness organization—where she gets many volunteer opportunities. She enjoys music and was involved in band throughout high school and through three years of college. She will be starting her fifth season working at Bay Harbor marina and her second season at Bay County Mosquito Control.



Trisha Hebert



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Winter