Skeeter Scanner

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www.mimosq.org

President's Message

Serving as President this past year has been enjoyable and rewarding. Working with quality professionals that are enthusiastic about mosquito control continues to benefit the MMCA as evidenced by the many accomplishments in 2017 and instills confidence as we look to meeting the challenges of 2018. The active MMCA membership serving on its Board and Committees provide solutions to the various issues facing mosquito professionals today. I want to thank those who have volunteered their time and efforts to the service of MMCA in 2017.

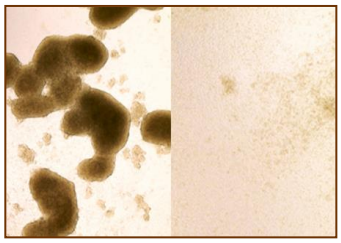
I would like to acknowledge our efforts and successes of 2017:

- Year began with another successful Annual Meeting held in Port Huron. Thank you to Tami Sego and Chris Novak and the entire Planning Committee for all your efforts in providing informative talks and all the extras that make our meetings exceptional.
- The MMCA was represented by Dr. Carl Doud at our nation's capital during the American Mosquito Control Association's Washington Conference. Carl engaged and educated our elected representatives in regards to issues impacting our profession, such as NPDES relief and CDC funding.
- MMCA offered input and comments on the State's Michigan Managed Pollinator Protection Plan. This Plan has been finalized and is available on line. It is not perfect but it does provide communication guidance for applicators and bee keepers, which is the basis for understanding and solving any issues.
- The MMCA website and public outreach displays have been redesigned with a focus on messaging and promotion of our profession. Thank you Joyce Mclaughlin and Margaret Breasbois and the entire Education Committee for all their efforts. Please check out the new website and look for the new display at the Annual Meeting.
- A successful 7F seminar was again held at Bay County Mosquito Control. We continue to provide re-certification credits for both Core and 7F. Thank you to Doug Allen for coordinating this worthwhile event; thank you to Rebecca Brandt and the entire Bay County Mosquito Control staff for hosting; and thanks to all the speakers and volunteers for providing an updated synopsis of mosquito control in Michigan.
- MMCA volunteers assisted with the Michigan Department of Health and Human Services' Zika Surveillance Training for Public Health Departments hosted at MSU. Presentations were given on mosquito biology, control, disease, and surveillance. This training assisted with increased surveillance efforts in the state; better defining Zika, West Nile virus, and other mosquito borne threats.

I am confident that the 2018 MMCA Board and Committees will continue to provide guidance and represent our profession as new challenges and opportunities occur. I wish all members many successes in the upcoming year. It was a pleasure to serve.

When Nature gives you Zika virus ... Cure Cancer with it!

New research shows that Zika kills the kind of brain cancer cells that are hardest to treat.



Brain cancer stem cells (left) are killed by Zika virus infection (image at right shows cells after Zika treatment). A new study shows that the virus, known for killing cells in the brains of developing fetuses, could be redirected to destroy the kind of brain cancer cells that are most likely to be resistant to treatment. Photo courtesy of Washington University School of Medicine. How often have you thought, "There is *no* good reason for mosquitoes!"?

They make veterinary patients pruritic and carry heartworm microfilariae and West Nile virus. In humans, they spread afflictions such as malaria, yellow fever and Zika virus infection. So when researchers look at one of those mosquito-borne illnesses and say, "I can make lemonade out of that," it makes one want to stand up and cheer.

A recent release from Washington University School of Medicine in St. Louis states, "While Zika virus causes devastating damage to the brains of developing fetuses, it one day may be an effective treatment for glioblastoma, a deadly form of brain cancer. New research … shows that the virus kills brain cancer stem cells, the kind of cells most resistant to standard treatments."

Each year, glioblastoma is diagnosed in about 12,000 people in the United States (including Senator John McCain). After surgery, chemotherapy and radiation treatment, a small population of glioblastoma stem cells often survives and soon begins producing new tumor cells. Because of their neurological origins and ability to create new cells, glioblastoma stem cells reminded the researchers of neuroprogenitor cells.
Zika virus is known to specifically target and kill neuroprogenitor cells.

The researchers tested whether the Zika virus could kill stem cells in glioblastomas removed from human patients. The virus spread through the tumors, infecting and killing the cancer stem cells while avoiding other tumor cells. This suggests that Zika infection and chemotherapy-radiation treatment could be used as complementary treatments, with one killing the bulk of the tumor cells and Zika attacking the stem cells.

If Zika virus were used in people, it would need to be injected directly into the brain. If the virus were introduced elsewhere, the immune system would clear it before it could reach the brain, the release states. The idea of injecting a virus known to cause brain damage into the brain is disquieting, but its targets—neuroprogenitor cells—are rare in adult brains. Other studies using brain tissue from epilepsy patients have shown that the virus does not infect noncancerous brain cells. As another safety measure, the researchers introduced mutations that weakened Zika's ability to combat cell defenses against infection. The mutant strain still succeeded in killing the cancerous cells.

Zika Virus, not Vaccine or Insecticide, Linked to Birth Defects in Brazil

In the fall and early winter of 2015, a startling number of infants in northeastern Brazil were born with abnormally small heads. Mounting global concern gave rise to theories about what was responsible. And while public health authorities fairly quickly fingered the Zika virus as the culprit, a couple of other theories established deep roots on social media platforms.

But the just-published final report[2] of a study conducted in Brazil discounts those two theories. The work, by Brazilian scientists, suggested there is no link between the cases of microcephaly and exposure to the insecticide pyriproxyfen, or to maternal vaccination during pregnancy.

The Brazilian government had begun treating drinking water sources with pyriproxyfen in 2014 to control *Aedes aegypti*, the main mosquito species that transmits Zika, dengue, and other viruses. And in late November of that year, it also started offering pregnant women a vaccine to protect against tetanus, diphtheria, and pertussis.

The Tdap vaccine, as it is called, is widely given elsewhere during pregnancy. The Centers for Disease Control and Prevention, for instance, recommends pregnant women get the shot during each pregnancy to protect their newborns against pertussis — whooping cough.

Pertussis infection in infants can be life-threatening, but because of the way their immune systems work, babies do not begin to get vaccinated against the bacterium until they are 2 months old. Antibodies from their mothers protect them in their first weeks of life.

The Brazilian researchers conducted a case-control study in Recife, a northeast city hard-hit by microcephaly. They compared the pregnancies of women who gave birth to babies with microcephaly to women who gave birth at the same time to babies without the condition.

The case-control study gathered reams of information about the gestation of the cases — 82 babies and nine affected fetuses that were stillborn — and those of 173 healthy babies that served as the "controls." By comparing a multitude of factors — things like smoking or vaccination rates — between the two groups of mothers, qualities that differentiated the two groups come into focus.

This kind of study cannot prove that Exposure X caused Condition Y. But it can indicate where there seem to be links or "associations" between an exposure and an illness — and where no such association exists.

The Sweet Smell of Malaria: 'Breath Test' Promising for Dx

Mosquitoes attracted to certain odors in infected patients

The breath of children who tested positive for malaria smells different than the breath of those who tested negative, suggesting it may be possible to identify the malaria based on a "breathprint," researchers here found.

Children who were infected with malaria displayed significantly higher levels of two known mosquito attractants compared to children who tested negative for the disease, reported Chad Schaber, MD, of Washington University in St. Louis, Missouri, and colleagues.

By identifying which odorants had the highest correlation with malaria infection, the authors developed a diagnostic algorithm to predict malaria positive or negative infection using this breath test, which had overall 83% accuracy with 94% sensitivity and 71% specificity.

At a presentation at the American Society of Tropical Medicine & Hygiene annual meeting, Schaber pointed out the gaps in existing malaria diagnostics. The gold standard, blood-smear microscopy, is difficult to implement in resource-poor settings, but even rapid diagnostic testing has developed some limitations, he said. Schaber said that some forms of the malaria parasite are lacking the histidine rich protein II (HRP II) antigen altogether, which make them "invisible" to current HRP II-based diagnostic testing.

He discussed how breath diagnostics are used for such diseases as tuberculosis, because certain diseases or malignancies cause a change in odorants in the breath of the patients, and those changes can be used to detect disease.

"Malaria doesn't seem like an ideal candidate for this test -- it's not in the lungs like tuberculosis," Schaber said at the presentation.

He added that researchers always thought the malaria parasite, which requires a mosquito vector to be transmitted was a "passive player" in the process of infection. But Schaber said that recent in vivo and in vitro studies found mosquitoes disproportionately prefer odors from patients infected with malaria compared to those who do not have the disease. For example, one study found that mosquitoes preferred to go towards blood cultures of infected patients versus non-infected patients, and that certain odorants were only present in infected cultures.

Peter Hotez, MD, of Baylor College of Medicine, told *MedPage Today* that this research was interesting because it "reveals the mechanism" that shows how the mosquitoes are being attracted.

Schaber's group performed two independent studies of patients ages 4 to 12 years old. One was comprised of 17 patients who tested positive for malaria via blood smear and rapid diagnostic testing, and one who did not. The other had 18 patients who tested negative. If patients tested positive for one and not the other, they were excluded from the study.

Patients blew into an inert bag and it was pumped out into a sorbent tube to be analyzed via thermal desorption gas chromatography-mass spectrometry.

Children had a median age of 7 to 8 years, and 47% of malaria-positive patients were girls compared to 59% of malaria-negative patients. There were no significant differences between groups except muscle/joint pain was significantly higher in the malaria-positive group.

Schaber characterized this as "not surprising" because it is a common symptom of malaria, and it was controlled for as a potential confounder.

Once his team identified compounds in patient's breath that were positively correlated, negatively correlated and not correlated at all with malaria status between the two groups of patients, they compiled six compounds with the highest correlation coefficients and summed them together to establish a threshold to diagnose malaria patients as positive or negative. While the algorithm had 83% accuracy, it yielded one false positive and four false negatives.

Schaber cautioned that this was a post-hoc analysis, but characterized this data as "a first step towards a new molecular diagnostic," and one that did not require a blood draw. He said his team also collected sweat samples from the patients, but that data had not been analyzed yet. When speculating about future use of this research, Schaber said it could be used to tailor the odor baits used in mosquito traps and might have applications with other vector-borne diseases.

After a validation study, Schaber said his team hoped to turn this concept into a point-of-care device for use in the field.

Neurological Symptoms of West Nile Virus May Persist Years Later

Note that this study was published as an abstract and presented at a conference. These data and conclusions should be considered to be preliminary until published in a peer-reviewed journal.

Patients diagnosed with West Nile virus infection continued to experience neurological symptoms as many as 8 years post-infection, researchers here found.

At that time, almost half of patients had some abnormal neurological finding, including decreased strength, abnormal reflexes, and tremors following infection, reported Shannon E. Ronca, MD, of Baylor College of Medicine in Houston, and colleagues. Lingering comorbidity was as high as 70% for those patients who initially presented with encephalitis.
"As we've had more infections, we've been able to study what happens as a result of infection and many patients are still experiencing complications."

Along with weakness and fatigue, she cited depression as one of the most common conditions to result from the disease, with prior research finding 31% of patients had new-onset depression and 75% had Center for Epidemiologic Studies- Depression (CES-D) scores indicative of clinical depression.

Overall, 117 adults participated in the neurocognitive exams. Participants had a mean age of 57 years, 53% were men, and about 80% were white. At the time of West Nile infection, a third of these participants initially presented with uncomplicated fever, while 30% had encephalitis, and 23% were asymptomatic.

Almost half (49%) of patients had an abnormal finding on a neurological exam, with about a quarter experiencing decreased strength, 14% with abnormal reflexes, and 10% with tremors. 22% of patients had clinically abnormal RBANS scores, including 31% with clinically abnormal immediate memory and a quarter with delayed memory.

Of the 117 participants, 30 also received MRIs. These patients had an abnormal neuropsychological exam, neurological complaints, and a RBANS score of less than 85 (clinically abnormal). These 18 women and 12 men were an average age of 46, and were matched with 30 age and gender-matched controls from the OASIS database.

"This is uncovering a spectrum of disease associated with West Nile infection that previously people were not aware of." "All this means is West Nile is probably a much more severe disease in terms of public health and economic impact than people had previously realized."

At the presentation, Ronca said that these findings "warrant further studies with larger sample sizes to do more robust neurologic testing to see how this affects outcomes."

Merry Christmas and Happy New Year

See you all at the MMCA Conference

Michigan Mosquito Control Association
Conference Agenda

Wednesday, January 31, 2018	
8:00 am	**Registration -**Complimentary mugs and refreshments provided by Al's Aerial Spraying
9:00 am	**Welcome / Packet Information -**William W. Stanuszek, 2017 MMCA President
9:10 am	**The History of Malaria Control and the President's Malaria Initiative - Keynote Address** Peter J. Obenauer, PhD, Navy and Marine Corps Public Health Center Detachment-CDC
9:50 am	**Malaria, Agriculture, and Irrigation: a Case Study in Malawi** Edward D. Walker, PhD, Michigan State University
10:20 am	**Mid-morning Break**
William J. Lechel, II Memorial Scholarship Student Presentation Sponsored by Clarke & APM Mosquito Control	
10:50 am	**A Bioplex Assay for the Simultaneous Detection of Host, Mosquito Species, and *Plasmodium* Parasites in Malagasy Anopheline Mosquitoes -** Riley E. Tedrow - Case Western Reserve University
11:05 am	**West Nile Virus in Michigan—What Do Mosquito Infection Rates Tell Us About Human Disease Risk?** Anthony M. Langlous - Michigan State University
11:20 am	**Investigating *Borrelia Miyamotol* Infection Prevalence and Density of Infected Larval, Nymphal, and Adult *Ixodes Scapularis* in Wisconsin** Han Seungeun - Michigan State University
11:35 am	**Variation in the Emergence Timing and Duration of Survivorship of *Ixodes Scapularis* Tick Populations in Rhode Island, Wisconsin, Tennessee, and Florida** Genevieve C. Pang - Michigan State University
11:50 am	**Active Surveillance of Blacklegged Tick Populations and Lyme Disease Pathogen Using a Canine Tick Surveillance Network in Michigan** Megan L. Porter - Michigan State University

Wednesday, January 31, 2018	
12:05 pm	**MMCA Business Meeting and Lunch**
1:25 pm	**Efficacy Trials of Sumilarv 0.5G in St. Paul, Minnesota Catch Basins** Kirk A. Johnson, MS, Metropolitan Mosquito Control District
1:45 pm	**Discovery of Natural and Synthetic Small Molecule Mosquitocides With Novel Mechanisms of Action** Peter M. Piermarini, PhD, Ohio State University
2:15 pm	**Michigan Lyme Disease Update** Jennifer L. Sidge, DVM, PhD, Michigan Department of Health and Human Services
2:35 pm	**Michigan Arbovirus Disease Update** Erik S. Foster, MS, Michigan Department of Health and Human Services
3:05 pm	**Vendor Introductions and Explanation of Their Mosquito Control Products and Services** MMCA Vendors
3:20 pm	**Break**
3:45 pm	**Controlling *Coquillettidia Perturbans* in Rooted and Floating Cattail Sites With Vectolex FG** Stephen A. Manweiler, PhD, Metropolitan Mosquito Control District
4:05 pm	**Taming the Tiger! The Discovery of *Aedes Albopictus* in Lucas County & the TASD Response** Paul R. Bauman, MS, Toledo Area Sanitary District
4:30 pm	**Michigan's Managed Pollinator Protection Plan - An Update** Michael G. Hansen, Michigan Department of Agriculture and Rural Development

Thursday, February 1, 2018	
7:45 am	**Refreshments Available**
8:10 am	**Embracing Millennials** Christine M. Heverly, MA, Michigan State University, Extension
8:30 am	**Wayne County's Albopictus Surveillance Program & APM Mosquito's Response to Livonia's Infestation** Theresa M. Brestovansky, REHS, Wayne County Depart. of Health Chuck Mullins, APM Mosquito
9:00 am	**Climate Change and Infectious Disease: Sleeping Sickness and the Tsetse Fly** Joseph P. Messina, PhD, Michigan State University
9:20 am	**Don't Drink That! Lessons Learned From Coordinated Multi– Agency Catch Basin Larvicide Evaluations in 2017 -** Justin E. Harbison, PhD, Layola University
9:40 am	**Automated Aerial Delivery of *Bacillus Thuringiensis Israelensis* (Bti) for Spring Woodlot *Aedes* Species in Michigan -** Carl W. Doud, PhD, Midland County Mosquito Control
10:00 am	**Break**
10:30 am	**Toledo Area Sanitary District's Gravid Trapping Program and West Nile Surveillance** Jacob D. Sublett, MS, Toledo Area Sanitary District
10:50 am	**New Mosquito Control Posting Requirements** Tom K. Lawrence, Michigan Department of Agriculture and Rural Development
11:10 am	**Washed Away - A Tale of the 2017 Flood** Mary J. McCarry, BS, Bay County Mosquito Control
11:30 am	**Legislative Update** Carl W. Doud, PhD, Midland County Mosquito Control
11:50 am	**Concluding Remarks - President's Drawing** Rebecca J. Brandt, 2018 MMCA President

Hurry!!!

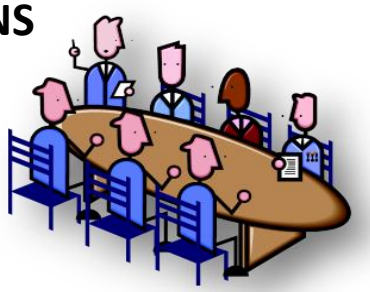
Get your registration in for the 2018 conference.
To register, go to the MMCA website: mimosq.org and print out the registration form or go through PayPal.
Get additional information about the hotel accommodations, conference location, and photo salon.

ATTENTION!

Must have hotel reservations in by January 15th to receive MMCA roommate.

MMCA BOARD OF DIRECTORS

CALL FOR NOMINATIONS



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 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, Melinda Moreno (989-894-4555, 810 Livingston, Bay City, MI, morenom@baycounty.net). Candidates must be MMCA members and nominations must be received by January 19, 2018. The election will take place during the General Business Meeting during the 32nd annual MMCA Conference at the Radisson in Lansing on January 31, 2018.

Photo Salon - 2018

The Michigan Mosquito Control Association would like to request submission of photographs for presentation during the Awards Banquet at our 2018 Conference. All shutterbugs are invited to submit digital photos and short video's (no more than 30 seconds) to Photo Salon organizer Randy Knepper.

Email to rknepper26@chartermi.net by January 26, 2018. Please, do not submit photos/videos 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 and video's. A prize will also be offered for the most amusing title or intriguing story to accompany a slide.

News From Around The Districts

BAY

The past few months have kept us busy closing out our 2017 treatment year and preparing for 2018. In October, an application was submitted to the DEQ to again request grant funding for scrap tire cleanup projects in 2018. Permitting processes for next season were undertaken too, with the NPDES Annual Report submitted and approved, along with the annual filing fee. In conjunction with that, BCMC also updated our annual Pesticide Discharge Management Plan for the 2018 season. The annual permit application to allow trapping and treatment at the Bay City State Recreation has also recently been submitted.

The joint insecticide bid process between Bay, Tuscola, and Midland Counties is underway with bids to be opened January 17, 2018.

Our department's 2017 Annual Report has also been compiled and will soon be distributed.

Noteworthy this fall was a meeting with MDARD in regard to procedural changes for mosquito control districts in 2018. Primary undertakings for next season will include the required posting notifications in homeowner yards and vehicle rinse water testing for permethrin.

Our improvements to GIS mapping are moving along with the help of an intern obtained through the Bay County GIS Department who is getting us on track with accurate layers of habitats, routes, and disease activity. Beginning in 2018, an interactive map will be available on the Mosquito Control website to provide residents with nightly ULV treatment information and locations.

An "exit questionnaire" was given to all seasonal staff at the conclusion of our treatment season. We were happy to see the staff holds our program in a positive regard, but we hope to make some improvements in 2018 to our equipment, training, and operating procedures based on their suggestions.

Staff continues to be actively involved with MMCA with the 7F Training Seminar, Public Education & Information Committee and Awards Committee duties.

TUSCOLA

Our season ended on October 1st and work began on routine winter maintenance of truck ulv's and handheld equipment.

Trucks have been detailed and winterized. Two trucks that received body damage have been sent for repair.

Annual reports are complete and updates to the database have been made.

Maps and forms are in the process of being updated.

We attended the 7F training, many thanks to those that make it happen each year.

We are beginning the process of hiring seasonal technicians, applications will be accepted through February 2, 2018.

We have testing for those needing to become certified scheduled on March 13, 2018.

Wishing everyone a Happy New Year.

SAGINAW

Happy New Year! May 2018 be more rewarding than 2017. Saginaw is looking forward to new opportunities as we incorporate new technologies and technicians into our yearly response to disease and nuisance mosquitoes.

Margaret Breasbois our long time Education Coordinator is retiring in January. We wish her nothing but the best in her retirement, and we are truly grateful and better for her 17 years with us. She is responsible for putting together a recognized Community Education Program that has educated thousands of individuals in regards to threats mosquitoes pose and the responsible control of them.

We look to continue her efforts in the New Year as we welcome her successor, Mathys "Thys" Kotze. Thys (pronounced Tace), who has worked with Margaret for the past four seasons, brings a wealth of experience and ability to the position. We look forward to his stewardship of our Education Program. Please look for both Margaret and Thys at the upcoming Annual MMCA meeting in East Lansing; wish Margaret the best and welcome Thys to our profession.

As for what is normal this time of year, staff are busy with winter projects that include: repair and maintenance of application equipment and vehicles; revising sections of the employee manual; body work on damaged vehicles; updates to various maps and data bases; updating yearly program plan; seasonal workforce recruitment; website updates; property owner lists; and the purchasing and outfitting of new trucks and bicycles for our fleet.

Our 2017 annual report/2018 calendar is complete and can be viewed on our website, www.scmac.org. If you would like a hard copy please call Gloria Katch at 989-755-5751 or email her at gkatch@scmac.org and let her know the number of calendars you would like to receive.

We are again in the process of justifying the treatment of mosquitoes on refuge lands. Please wish us luck as we apply sound reason and community support to a system that is rather restrictive. We appreciate the USFWS willingness to engage and seek appropriate information needed to ensure treatment and relief for residents living near refuge property. This annual treatment of the Shiawassee National Wildlife Refuge has occurred for well over 30 years. We have already received treatment permits for the aerial larviciding of the Shiawassee River State Game Area and Gratiot-Saginaw State Game Area. We are again seeking partial funding for our Household Scrap Tire Collection Program with the MDEQ's Scrap Tire Grant.

Our agency is now in the process of hiring for our seasonal workforce. We will accept summer job applications through February 20, 2018. Interested individuals can apply at our facility or directly on-line at www.scmac.org. Interviews will be held in February, with our annual training session scheduled for April 6th and 7th 2018.

MIDLAND

The MCMC staff is working hard to prepare for the upcoming 2018 MMCA meeting. Charlie has lent his leadership and organizational skills to serve as meeting Planning Chair. He has lined up an impressive agenda for the event which will contribute to, and maintain the great reputation the meeting has gained.

Joyce has worked very hard to support the meeting and to help with the establishment of the new MMCA website. If you have not visited this site, please do! It has brought some welcomed updates and reflects well on MMCA as an organization.

Doug has finally emerged from the pile of mosquitoes captured in 2017! The numbers once tallied confirmed just how monumental our season was last year. The data will no doubt reveal interesting trends and lessons we have yet to uncover as we analyze them.

Wishing you a profitable, safe and joyous 2018. Looking forward to seeing you at the meeting.

Kenley Farrell Memorial Scholarship

1st Place: Dana Bauer

A freshman at St. Clair County Community College studying nursing.

2nd Place: Hannah Leszczynski

A sophomore at the University of Michigan (Ann Arbor), studying Chemical Engineering. Hannah has been a seasonal technician at Bay County Mosquito Control for the past 2 seasons.

Conference Attendance Opportunity Grant

Cherie Cassavar - is the winner of the MMCA Opportunity Grant – she is a senior at the University of Toledo studying Environmental Science. During the summer of 2017, she worked as a field technician for the Toledo Area Sanitary District where she gained an interest in mosquito biology and control. She will receive her Bachelor's degree in the spring.

Michigan Mosquito Control Association
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Winter