Newsletter of the Michigan Entomological Society

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Breaking Diapause

Sat, 25 March 2017 at MSU

See details on page 22

Still Seeking a New Newsletter Editor

See details on page 42

(This may be the last issue)

63rd Annual MES Meeting: August 25-27, 2017

Matt Douglas, President-Elect

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Greetings everyone! We will be holding our 63rd MES Annual Meeting at Pierce Cedar Creek Institute (PCCI), located just south of Hastings, Michigan, from Friday August 25th through Sunday morning, August 27th, 2017. PCCI is an amazing nature reserve and August at PCCI is a fantastic time to collect arthropods of all persuasions and just enjoy Nature at its golden end-of-summer finest. The 740-acre Institute, located just 25 miles from Grand Rapids, provides visitors with a unique exposure to a rare blend of diverse habitats including fens, bogs, swamps, marshes, streams, lakes, old fields, primary and secondary forests, and established reconstructed prairies. The meeting itself, as well as housing and meals will be available on site.

Our invited Keynote Speaker will be Dr. Matthew Aardema [a graduate of both Grand Rapids Community College (GRCC) and MSU]. Matt is currently a Postdoctoral Fellow at the American Museum of Natural History in New York. The tentative title of Matt's talk is "Unraveling Evolutionary Processes in Neotropical Milkweed Butterflies." Registration forms will be mailed later in 2017 as well as placed on the MES website.

The PCCI property is diverse but its biodiversity is still largely unknown. Feel free to bring your gear and collect arthropods on the property (including wetlands) along the 9 miles of groomed trails. Many more details on the habitats found at PCCI are found at: <http://www.cedarcreekinstitute.org/>.

PCCI Conference Center

PCCI Conference room

PCCI Cafeteria

Survey Results on MES Going Digital

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The 2016 survey about moving MES publications and voting to a digital platform has concluded. We had 63 people respond. Here is a quick summary.

- Voting: 65% voted for a confidential online platform.
- Newsletter: 72% voted for a digital copy emailed and on the website.
- The Great Lakes Entomologist (TGLE): 80% voted to move to a digital format. 49% voted for open access and 31% wanted an embargo period for non-members.

continued on p. 39

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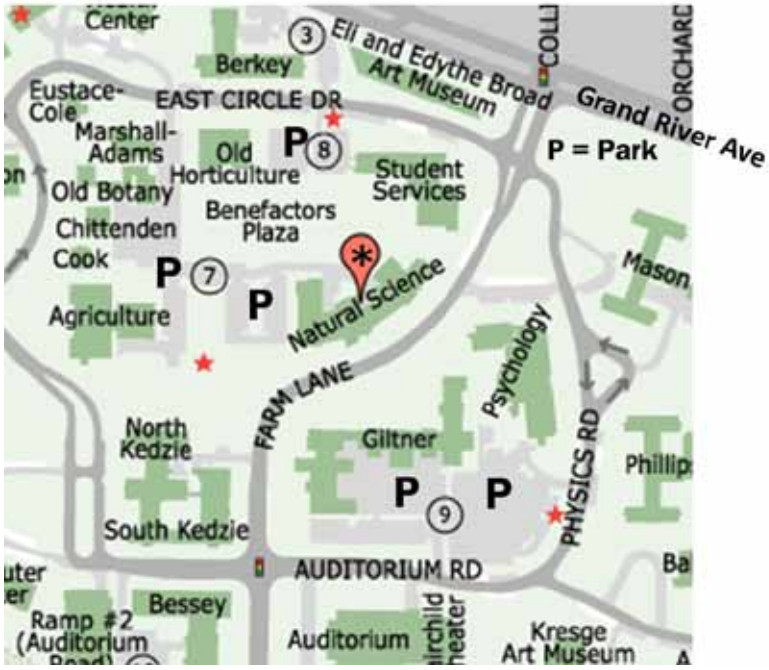

Map of the northeastern portion of the MSU campus showing location of the Natural Science Building (288 Farm Lane) and nearby parking lots (P) that will be open on weekends.. The Entomology Department is on the west side of Nat Sci..

Breaking Diapause

Saturday, 25 March 2017 at MSU

Breaking Diapause is the annual MES spring entomology meeting. It is an informal gathering for members and those interested in becoming members. The meeting will be held from 9:30 AM till mid-afternoon in Room 244 of the Natural Science Building (288 Farm Lane) at Michigan State University in East Lansing. In addition to socializing with a variety of professional and amateur entomologists there will be plenty to do. The insect museum at Nat Sci will be open so bring along your unidentified insects. Folks will be available to show you around the collection if you're unfamiliar and assist you with any unknowns you have. Bring along entomological duplicates you'd like to trade, sell, or just give away. If you have an entomological display, do bring it along. As usual we'll also have a variety of finger foods. President-Elect Matt Douglas plans to give a short talk on monarch migration in South America. We will also try to have a short governing board meeting during Breaking Diapause.

2016 MES Elections: In 2016, we elected Matt Douglas as the new MES President-Elect, and Martin Andree and John Douglass as the two new MES Members-at-Large. We thank the other candidates (Pat Hudson and Ashley Wick) for running for these positions. For 2017, we currently have several members willing to run for Member-at-Large, but only one running for President-Elect. Please consider running. We realize that many people are reluctant to run for President because they need to organize the annual meeting in the year following their election. To ease those concerns, please realize that MES member David Houghton at Hillsdale College, is very happy to host our annual meeting at the Hillsdale College, G.H. Gordon Biological Station in Luther, MI.

Entomology 609 Insect Behavior: A Field Experiment

We took some dead ants
from the edge of a busy colony,
dropped them in acetone overnight
then removed the bodies
and let the mixture evaporate
till we had a sticky extract.
Back at the colony, concoction in hand,
we picked out a random worker,
dabbed some "mortal goo" on her
then placed her back on the hill.
Some workers soon came over,
picked her up and carried her
out to the dead pile and dropped her there,
despite wiggling legs and waggling antennae.
I could almost hear her wailing.
We put her back on the hill a few more times
but each time she was quickly body-surfed
out to the dead pile again.
I don't remember what became of her,
this old notebook doesn't tell.

Ken Tennessen 2016

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Much of Mo Nielsen's Home Library Still Available

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As mentioned earlier in the MES Newsletter, I was asked to curate and sell several of the books and journals that were in Mo Nielsen's home office. Many are still available, but soon they will likely be sold to used book retailers. There are books, bound reports, and special publications. Some are signed by the authors, and over a dozen are from the 1930's or earlier, including the 1889 three-volume set *The Butterflies of the United States and Canada* by Scudder and the 1896-1914 set of Bombycine Moths of North America by Packard. If you are interested in knowing what is still available, please email me at <elsner@msu.edu>.

MES Historical Notes

Robert A. Haack, Newsletter Editor

1991 – 25 years ago. In early 1991, Eugene Kenaga was President; Fred Stehr was President-Elect; Dick Snider was immediate Past-President; Mo Nielsen was Executive Secretary; Mark Scriber, Leah Bauer, and Cathy Bristow were the three Members-at-Large; Mark O'Brien was Journal Editor; and Bob Haack and George Heaton were the Newsletter Editors. The 37th MES Annual Meeting was held 31 May 1991 at the Oleson Center on the campus of Northwestern Michigan College in Traverse City. The featured speaker was George Craig from the Department of Biology at Notre Dame University, who spoke on the arrival of the Asian tiger mosquito. Other talks addressed aquatic insects, bee propolis, *Chymomyza* flies, ambrosia beetles, forest tent caterpillars, cranberry pests, oak twig pruner, *Papilio* speciation, boxelder bugs, leaf beetle control with *Bt*, noctuid phylogeny, lady beetle ecology, swallowtail behavior, birch leafminer, listing insects as endangered, and Hungerford's crawling water beetle. The 1991 Breaking Diapause meeting was held on February 23 at Mattaei Gardens on the University of Michigan campus in Ann Arbor. One long time MES member, Gary Simmons, died unexpectedly in 1991. He was the professor of forest entomology at MSU. Annual dues were $8 per year for active members, $4 for students, and $20 for libraries, but higher rates were approved for 1992 ($10, 4 & 25, respectively). Journal page charges were $30/page. There were about 480 members in good standing and 160 library subscriptions at the close of 1990 and a balance of around $19,153.

1966 – 50 years ago. In early 1966, John Newman was President, Fred Knight was President-Elect, Mo Nielsen was immediate Past-President, and Julian Donahue was the Executive-Secretary and Editor of the MES Newsletter. The 12th annual meeting was held at Wayne State University in Detroit on 2 April 1966. There were 15 MES talks presented on such topics such as old field spiders, the Xyronotidae (Orthoptera), bacterial diseases of notodontids, cercopid life history, blueberry pollinators, otitid flies, dogwood borer, the lepidopterous Types at MSU, South American entomological centers, *Agrilus* mating behavior, summary of the MES spring collecting trip, entomology as a profession, UP tent caterpillars, potato insects, *Chaoborus* flies of MI, and water mites. Several MES members went on a spring collecting trip in May at Tahquamenon Falls and nearby areas. The winning MES logo was announced in 1966, which went to Hollace "Bud" Gordinier. This is the same "butterfly silhouette" logo that we use today on our journal and newsletter. A constitutional change was approved in 1966 that allowed MES to obtain non-profit status in the eyes of the IRS, which we still use today. MES started its journal *The Michigan Entomologist* (now *The Great Lakes Entomologist*) in 1966. Several members provided an entomology workshop for 4-H Leaders at their annual training conference. To increase membership, over 300 letters were sent out to individuals in the Great Lakes region, of which at least 62 joined. In addition, to increase library subscriptions for the new MES journal, over 500 letters were sent to librarians throughout the US and Canada, of which over 100 subscribed. MES dues were $2 per year for regular members and $1 for students in 1966, there were about 225 regular members in 1966, and the Society had a balance of $467.

MES Treasurer's Report

As of December 15, 2016, MES has $23,675.72 in the bank. Printer payments for publication of *The Great Lakes Entomologist* have not yet been cashed, which totaled $4,167.02. After paying the printer, MES would have an available balance of $19,508.70. The next major expense will be printing and mailing of the MES Newsletter. The MES Paypal account has an additional $227.72.

Angie Pytel, MES Treasurer

MES Annual Dues Schedule

Student (thru Graduate School) -- $12
Active -- $25.00
Institutional -- $45.00
Sustaining -- $35.00
Life -- $500.00

The 2016 MES annual meeting was held at the Shanty Creek Resorts <www.shantycreek.com/> in Bellaire, MI, during June 10-12, 2016. More than 30 MES members attended the event, which took place in Shanty's Lakeview Hotel & Conference Center. Besides the Saturday meeting, there was a social on Friday night at Bob & Sheridan Haack's home in nearby Central Lake, and a field trip on Saturday afternoon the Grass River Natural Area outside of Bellaire. Dr. William Ravlin, Chair of the Entomology Department at Michigan State University, was our guest speaker who provided dozens of tips on macrophotography. MES thanks Bob Haack for his efforts in organizing the 2016 annual meeting. On this and the next several pages are summaries of the talks that were presented at the 2016 MES Annual Meeting.

Attendees at the 2016 MES Annual Meeting

Macrophotography:
Entomology, Science, and Art

F. William Ravlin, Professor & Chairperson
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Macrophotography and insect photography in general blossomed with the introduction of the digital technologies. A once lengthy and expensive process is now within reach of most entomologists and is being used freely by many. This image- and species-rich (>40 species presented) talk presented basic concepts and techniques to help neophytes and more experienced photographers to "work the shot" with the goal of increasing the quality of their insect photographs. It addressed the basic issues of: composition, staging, simplifying, light, background, and depth of field primarily as they relate to macrophotography (i.e., making photographs at a scale of 1:1 or greater). Contemporary techniques such as "focus stacking" were presented to overcome the inherent challenges associated with limited depth of field (often <1 mm) associated with close focal distances and increased magnification. Common "post processing edits" were discussed including: cropping, eliminating unwanted elements, sharpness, exposure, highlights, shadows, and selective lightening and darkening.

Introductory sources of information and equipment are readily available on the Internet including, but not limited to the following.

General tips and techniques
Digital Photography School (good periodic electronic newsletter)
http://digital-photography-school.com

Digital Photo Mentor (General photography tips)
http://www.digitalphotomentor.com

Macrophotography techniques
http://www.macroshooting.com/
http://extreme-macro.co.uk/

Equipment available from many sources but common ones are:
B&H Photo < http://www.bhphotovideo.com/>
Adorama < http://www.adorama.com/>
Amazon < https://www.amazon.com/>

Who is laying eggs on my dock? Seasonal emergence of alderfly larvae (Sialidae) from Intermediate Lake, Antrim County, Michigan

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After retiring from the USDA Forest Service in October 2015, my wife and I moved to Central Lake, Antrim County, MI in northern Lower Michigan. Since 2011, we have owned a property on the south end of Intermediate Lake in Antrim County. This lake is one of 14 lakes that form the Elk River Chain of Lakes, a 75-mile-long waterway. Intermediate Lake is over 1500 acres in size, about 6 mi long, averages about 0.4 mi wide, and has a maximum depth of about 70 ft.

Two adult female alderflies, likely *Sialis mohri*, ovipositing on a boat hoist at Intermediate Lake in 2016. The blackish egg masses were laid in the current year (2016), while the light grayish egg masses were laid the previous year (2015).

Entomologically speaking, having a waterfront property has been very interesting, especially in regard to watching the seasonal emergence of adult alderflies (Megaloptera), caddisflies (Trichoptera), mayflies (Ephemeroptera), stoneflies (Plecoptera), and many other aquatic insects. The alderflies are particularly noticeable because they are medium-sized (1/2-1 in long), dark-colored insects that usually feed, mate, and oviposit on vegetation growing along the water's edge. And as many waterfront owners know, they oviposit on various structures close to the shoreline such as docks, boat hoists, and boats.

Alderflies (Sialidae) demonstrate complete metamorphosis. Females lay several hundred eggs in tightly packed egg masses. Upon emergence, larvae fall into the water, or on the nearby shoreline and then walk to the water. Larvae are aquatic, largely predaceous, and breathe through seven pairs of abdominal filaments. Sialids have a 1-2 year life cycle. In spring and early summer, mature larvae crawl out of the water onto the shoreline and tunnel into the soil to pupate. Adults soon emerge to feed, mate, and lay eggs along the shoreline. Emergence of sialid larvae from the water usually occurs at night. One report from Japan (Takeuchi and Hoshiba 2012), stated that about half of the emerging sialid larvae did so on nights when it rained or when it rained the day before, while the others emerged under drier conditions. My objectives were to monitor seasonal emergence of sialid larvae from Intermediate Lake and if possible to relate the emergence pattern to local weather events.

I used two barrier pitfall traps to monitor alderfly larval emergence from our lot on Intermediate Lake during April-June in 2015 and 2016. The same two traps were used each year as well as the same locations. The traps consisted of a central collection cup that was flush with the surrounding soil and had two curved 1-m-long plastic arms that were partially buried in the soil and positioned parallel to the water. The plastic arms intercepted primarily insects as they walked inland from the water and directed them towards the collection cup. The cups were partially filled with soil to allow alderfly larvae, and other organisms, to enter the soil and pupate. In 2015 (pre-retirement and living over 200 miles away), the traps

were usually checked at 1-3 week intervals, while in 2016 (post-retirement and living only 13 miles away) the traps were usually checked daily and weather events recorded. When checking for larvae the soil from the collection cups was emptied and sorted on a large tray with all alderfly larvae collected and counted. After counting, new clean soil was added to the cups and then the cups were repositioned, flush with the soil level, between the plastic arms of the barrier trap.

In 2015, the first sialid larvae were collected during the 3-week-long period April 19 - May 7, while the last larvae were collected during the 2-week-long period May 16-31. In 2016, the first sialid larvae were collected during the 2-day-long period April 17-19, and the last larvae were collected during the 1-day-long period June 6-7. Weekly collection data for 2016 are presented in the following table. In 2016, 1711 sialid larvae were col-

A few of the *Sialis* larvae collected from one of the two pitfall traps in a single day.

Photos of the two pitfall traps used in this study. The same trap locations were used each year. The cups were placed flush with the soil level.

lected in the two traps, with 1182 collected in a single day (May 4-5). A small sample of the larvae and adult sialids that were collected at the study site in both 2015 and 2016 were all identified as *Sialis mohri* Ross (1937). It is possible that other *Sialis* species were present, but no other species were identified.

In 2016, when collections were often made on a daily basis during the morning hours, about 99% of the sialid larvae were collected on days when it had rained during the previous evening hours or on the previous day. Such data strongly suggest that sialid larvae, or at least *Sialis mohri* larvae, prefer wet conditions when they emerge from the water and dig into the shoreline soil to pupate. On May 4-5, 2016, when 1182 sialid larvae were collected during a single day the high temperature on May 4 was 48°F (≈9°C) and the low temperature on the morning of May 5 was 35°F (≈2°C), and it had rained about 0.4 inches (≈ 1 cm) on the evening of May 4 and early morning hours of May-5. Emerging at night under wet conditions to pupate would benefit aquatic insects like sialids and help them avoid desiccation and allow for easier digging into the soil.

References

Ross HH. 1937. Studies of Nearctic aquatic insects. I. Nearctic alder flies of the genus *Sialis* (Magaloptera, Sialidae). The Illinois Natural History Survey Bulletin 21: 57-78.

Takeuchi Y, H Hoshiba. 2012. The life histories of two species of Sialidae (Megaloptera) from Japan. Aquatic Insects 34: 205-216.

Table. Total number of alderfly larvae collected from both traps in 2016 by week.

Week starting date	No. Larvae
15 April	78
22 April	12
29 April	1344
6 May	0
13 May	No data
20 May	0
27 May	11
3 June	65
10 June	0

How do bees like their coffee? Implications of shade management and forest proximity on coffee pollinator communities in southern Costa Rica

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Sustained pollinator services within coffee farms depend substantially on a diverse bee community for adequate pollination and are heavily influenced by local ecology and farm management. However, the mechanisms, scale, and species through which important ecosystem services are provided is poorly understood. While studies have been conducted to understand the impacts of forest proximity and farm level management on pollinators, few have examined the interaction between these two spatial scales. We examined how distance from contiguous tropical forest within shaded and sparsely-shaded (sun) portions of a large organic coffee farm influence pollinator communities in southern Costa Rica. We selected sites at 0, 50, and 150 m from the forest edge within shaded and sun portions of the farm to quantify the influence of both shade management and distance to contiguous forest on pollinator communities. Overall, pollinator diversity and activity did not differ significantly between the shade management types, or among sites at 0, 50, or 150 m from forest edges. However, pollinator diversity was found to be significantly higher at sun sites near the forest (0 m) compared to farther away, whereas diversity was the same for shade sites regardless of forest proximity. We found that greater amounts of coffee flowers within each site increased bee abundance and flower visitation frequency. Bee abundance was greater in sites with less ground cover and bee diversity and visitation frequency were higher in sites with greater amounts of shade canopy cover and trees in flower. Based on our results, we suggest including flowering shade trees that provide high levels of canopy cover, maintaining or re-establishing forested areas within or surrounding coffee farms, and eliminating or reducing agrochemical use to increase native pollinator activity and diversity within coffee farms.

Diurnal oviposition timing of blow flies and DNA identification of early arrivers

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Forensic entomology is the use of insects in the criminal justice system. Blow flies (Diptera: Calliphoridae) are usually the first insects to arrive and oviposit (lay eggs) on carrion. Their early arrival makes the timing of blow fly oviposition critical for postmortem interval (PMI) calculations. The PMI is the time that has passed between death and corpse discovery. There is little known about the diurnal timing of oviposition in forensic entomology. This study documented the earliest oviposition time in relation to hours after sunrise. Three pigs were placed in a field one hour after sunrise and observed hourly for the presence of blow flies and oviposition. Three bait cups filled with aged chicken liver were also placed in the field to note differences in oviposition timing and magnitude between pigs and liver. The experiment was replicated three times in September 2015. No oviposition was observed on any of the chicken liver bait cups. The earliest oviposition on pigs occurred four and a half hours after sunrise but adult flies were observed starting two hours after sunrise. Egg masses were collected from pigs immediately after oviposition to ensure the first blow fly species ovipositing was recorded. Egg masses were frozen in a -20°C freezer prior to DNA isolation. The DNA was sequenced using a DNA purification kit, amplified using PCR and identified using BLAST. The two blow fly species identified were *Lucilia coeruleiviridis* (Macquart) and *Lucilia illustris* (Meigen). These results confirm previous findings that *Lucilia* species are early arrivers on carrion. It is important to note that blow flies did not start ovipositing immediately after sunrise, and forensic entomologists should take this into consideration when making PMI estimations.

A wasp preying on blow fly eggs.

A number of large blow fly egg masses and a female adult blow fly.

Monarch migration in the Americas:

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Current Monarch (*Danaus cleophile, D. plexippus, D. erippus)* migration patterns began as a range expansion and/or altitudinal migration from a Mexican-Caribbean metapopulation basally and phenotypically similar to *Danaus cleophile* approximately 2 million years ago. This would have occurred prior to speciation events leading to *Danaus cleophile* and *Danaus erippus* (both of which may currently exhibit range expansions, or altitudinal and partial migrations). Over 20 major advances of ice sheets during this time could have restricted the extent of the original seasonal range expansion in *Danaus plexippus*. About 12,500 years ago, as glaciers finally retreated for the last time, *Asclepias* spp. reclaimed their original pre-glacial distribution, and the Monarch population split into East Coast, Midwest, and West Coast cohorts, all of which have the potential to "migrate" either latitudinally or altitudinally or both.

Matt Douglas also sent this picture along of a fossil insect. What do you think it is? What Order?

New bee distribution records and the benefits of collecting

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The bee fauna of Michigan is quite rich, with approximately 450 confirmed species for the state as part of a manuscript in preparation. Nevertheless, many counties remain poorly sampled. In the year following the last Michigan Entomological Society meeting species lists for individual counties have slowly increased. Twenty-three counties now have over 100 recorded species, 5 more counties than a year ago. Despite estimates that each lower tier county should have over 300 bee species, only 3 counties currently have more than 200 species documented. The site of last year's meeting in Lake County resulted in a substantial increase in the species list for that county, including the collection of uncommon native species such as *Anthidium psoraleae* Robertson. Other collections have resulted in the discovery of new exotic species for the state. In some cases these closely resemble common species. Only through extensive collections of 'easy-to-identify' species was it possible to discover the presence of these new records. Additional collections of wild bees are needed to better understand the distribution of the Michigan bee fauna, discover new species records and provide baseline data crucial for understanding temporal and spatial patterns in bee abundance and diversity. Even small contributions to this effort can substantially improve our knowledge of wild bee distribution. At the beginning of the 2016 Michigan Entomological Society meeting in Bellaire, Antrim County had a mere 34 bee species recorded. In conjunction with

3 other meeting participants, Julia Brokaw, Katherine Odanaka and Shiala Naranjo, I spent a single day collecting in the vicinity of Bellaire. At the time *Rubus* (Rosaceae) was in bloom and provided the greatest diversity of bees. In a single day of collecting we compiled an additional 50 species for Antrim County, bringing the total to a more respectable 84 bee species. Based on this result, species lists for undersampled counties could be dramatically improved with only minor effort.

Recreating a locust swarm in your backyard

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Desert locusts are known to exhibit an extreme density-dependent phase polyphenism which allows them to change their coloring and behavior. Recent studies suggest that the desert locust is the earliest branching lineage within the genus *Schistocerca* which houses mostly nonswarming grasshoppers. This raises the possibility that density-dependent phenotypic plasticity may be present in the entire genus.

Studying sedentary members of the genus *Schistocerca* could shine light on this matter. Two non-swarming species, *Schistocerca americana* (Drury) and *Schistocerca serialis cubense* (Saussure) were captured in Florida and reared under laboratory conditions. Different soil mixtures, moisture, room temperature and food were tested in order to mass rear these species. For both species, individuals were more active when reared under conditions that recreated swarm environments as compared to those that were reared in isolation. Rearing density had a major impact on subsequent behavior in both species.

The effects of longleaf pine savanna restoration on native bee diversity

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Native bees are important pollinators that are crucial for terrestrial ecosystem functioning. The longleaf pine savanna is a highly threatened, fire-maintained ecosystem unique to the southeastern US. In the absence of fire, savannas become closed canopy woodlands. Harvesting trees is one method used to restore longleaf pine savannas to an open canopy state. We explore how historical land use and current restoration practices affect diversity of native bees in longleaf pine savannas. We found significantly greater abundance and richness of native bees in restored plots, but no effect of historical land use. Reduction of canopy cover in restoration treatments was the best predictor of native bee diversity suggesting that savanna restoration will also restore bee communities.

Biological diversity of Hymenoptera in different habitats of a northern Lower Michigan ecosystem

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A formal abstract was not submitted by Joel, so I (newsletter editor) will give a short synopsis. Joel's objective was to compare the diversity of hymenopteran taxa in different habitats based on various collection methods. The habitats sampled included a recent clear-cut, hardwood forest pine forest, field, and prairies that had been replanted 2 and 5 years earlier. The trapping methods included malaise traps, transect sweeping with a net, pan traps, and black lighting. Specimens of several hymenopteran families were collected, including Apidae, Braconidae, Chrysididae, Colletidae, Formicidae, Halictidae, Ichneumonidae, Pompilidae, Sphecidae, Tenthredinidae, and Vespidae. The preliminary results suggest that overall hymenopteran diversity was greater in the prairie and field sites than the forest sites. The best trapping method varied among the hymenopteran families, with malaise traps being best for Braconidae, transect sweeping being best for Apidae and Formicidae, pan traps being best for Halictidae and Pompilidae, and black lighting being best for Ichneumonidae.

The ability of specific-wavelength LED Lights in attracting night-flying insects

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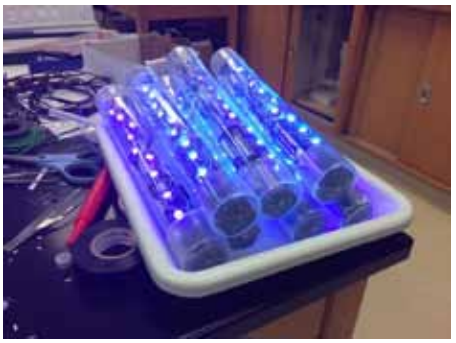
The objective of this experiment was to test the level of attraction of night flying insects to various wavelengths of light emitting diode (LED) and ultraviolet (UV) lights. The study took place along a small stream at the G.H. Gordon Biological Station in Luther, Michigan from 21 May 2016 to 26 July 2016. Twelve ethanol traps were used; each consisted of a white tray filled with ethanol. Two of these traps used standard fluorescent UV bulbs as a control and had a unique wavelength. The ten other traps used custom-built UV LED tubes representing one of five specific wavelengths ranging from 379-402 nm (two traps per wavelength). In the past, researchers would have to carry large 12-volt batteries that can often weigh up 15 pounds, which limits the number and selection of research sites. By contrast, custom built LED tubes running on eight AA batteries would weigh less than half a pound, which would certainly benefit entomological field research. During the study, the traps were placed in similar environments along the stream and were rotated throughout the site. The traps were placed out at nightfall and collected 2 h later. The preliminary results of this research show that certain wavelengths can affect the level of attraction within certain orders of insects. While there was no significant difference in numbers of orders collected between LED and fluorescent UV traps, the florescent UV tubes did collect greater numbers of Diptera (flies). Although not all samples have yet been analyzed, results of this experiment indicate that ultraviolet LEDs do attract many groups of insects and that different wavelengths can preferentially attract members of different insect orders.



Each LED light contains nine 3-watt bulbs and eight AA batteries.

Figure shows the ultraviolet florescent light used in this study and the associated battery, as well as the LED light used (top) to compare their relative sizes.

Establishing *Oobius agrili* (Hymenoptera: Encyrtidae), the introduced egg parasitoid of emerald ash borer, in Michigan ash stands

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The egg parasitoid *Oobius agrili* Zhang and Huang (Hymenoptera: Encyrtidae) is one of four parasitoid species from northeast Asia being released in regions of North America as part of a biological control program to manage the invasive emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae) (Bauer et al. 2015). To date, *O. agrili* has been released in 23 U.S. states and two Canadian provinces. At Michigan study sites where *O. agrili* was released starting in 2007, average egg parasitism reached up to 40% over a five-year period (Abell et al. 2014). From 2007 to 2011, *O. agrili* were released into the field as live adults after they were allowed to feed on honey for at least 24 hrs (USDA–APHIS/ARS/FS 2016). In the laboratory, unfed *O. agrili* adults died within 24 hrs (unpublished data). In 2012, release methods transitioned from the release of parasitoids as adults to the deployment of parasitoids as pupae which completed development and emerged as adults in the field. This new method includes using EAB eggs that were laid on filter paper and presented to *O. agrili* in the laboratory. *Oobius agrili* parasitize and develop inside the EAB eggs and when they reach the pupal stage, small pieces of the filter paper with parasitized eggs are placed in small plastic containers referred to as "oobinators" that have an open end covered with screening (USDA–APHIS/ARS/FS 2016). After placement of the oobinators on EAB-infested ash trees in the field, *O. agrili* complete development and adults chew round exit holes in the EAB eggs and then crawl through the oobinator screening to disperse. Streaks of honey are placed inside the oobinators for emerging *O. agrili* to feed upon. Utilizing oobinators has greatly eased handling efforts given that adult *O. agrili* are only 1-mm long, making them difficult to count and transfer between containers. This release method has also simplified releases in the field, where oobinators can be placed in the field regardless of current weather conditions, which is important when releasing *O. agrili* as adults, i.e., heavy winds and rain should be avoided (USDA–APHIS/ARS/FS 2016).

There is some concern by researchers and managers that releasing *O. agrili* using oobinators is not as effective for establishment of *O. agrili* when compared to releasing live adults fed honey. However, these claims are based primarily on anecdotal observations. Releasing egg parasitoids as pupae within host eggs has been used successfully for inundative releases of various Trichogrammatidae (Hymenoptera) species, however, only two papers evaluating releases of adults versus pupae were found in the literature (Saavedra et al. 1997, Chowdhury et al. 2016).

In 2015, we initiated a study to compare the establishment success of *O. agrili* released as adults fed honey to those released as pupae in oobinators. We selected 16 sites (8 for each treatment) in the lower peninsula of Michigan where *O. agrili* was not previously released. For each site, variables such as basal area of live and dead ash, percent canopy dieback of live ash trees, and basal area of all live non-ash trees were recorded. To monitor EAB adult flight and abundance, we placed three green funnel traps baited with *cis-3*-hexenol in the lower to mid canopy of live ash trees at each site and collected captured insects at 1-2 week intervals.

Preliminary results demonstrate that overall EAB egg densities, EAB adult densities, and percent canopy dieback of ash trees increased from 2015 to 2106 at most sites. We followed parasitoid release guidelines (USDA–APHIS/ARS/FS 2016) for timing releases of *O. agrili* in 2015, and these coincided with peak EAB adult flight and oviposition, as determined by trapping EAB adults and estimation of initial oviposition beginning approximately two weeks after initial adult emergence. For samples sorted to date, EAB eggs with the signs and symptoms of parasitism by *O. agrili* were recovered from bark samples collected after releases were made at two sites that received adults and two sites that received oobinators, confirming *O. agrili* reproduction at 4 of the 16 sites. Successful establishment of *O. agrili* will again be assessed at all sites in 2017. We will also continue to monitor EAB adult flight, EAB egg densities, and ash canopy condition at all sites in 2017.

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A Review of the effect of nitrogen concentration on ambrosia beetle (Coleoptera: Curculiondae: Scolytinae) Symbiosis

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Ambrosia beetles construct and raise their brood in the sapwood of woody plants that typically have a low nitrogen content. Estimation of the amount of nitrogen in wood ranges in percentage dry weight from 1 to 5 % in the cambium to 0.05% to 0.3% in the sapwood (Merrill and Cowling 1966, Haack and Slanksy1987). Various studies have shown that reproductive success of scolytine bark beetles is correlated to nitrogen levels in the cambium (Vega and Hofstetter 2015).

French and Roeper (1973) showed that broods of *Anisandrus (Xyleborus) dispa*r F. reduced the amount of dry weight nitrogen in sapwood of *Malus sylvestris* from 0.34% to 0.18%. Using a defined agar-based *in vitro* medium for *A. dispar*, it was observed that successful brood development occurred with L-asparagine as a nitrogen source at a minimum level of 0.1 and 1.0% dry weight nitrogen. Using acetylene reductase method on these *in vitro* cultures, nitrogen fixation was not recorded.

In *Acer saccharinum* the levels of wet weight nitrogen varied from 0.256% in the bark /phloem interface to 0.068% in the sapwood (Mead 1977). *Xyleborus affinis* Eichoff constructs brood galleries in the bark/ phloem interface first before boring brood galleries in the sapwood (Roeper et al. 2015). Using *in vitro* culture techniques on defined media using L-proline as a nitrogen source, it was found both the beetle and two associated fungi, a *Raffaelea* species and a *Fusarium* species, would flourish at the nitrogen levels present in the bark /phloem interface. The reproduction of the beetle was reduced 60% from 15 beetles per culture tube at bark/phloem interface levels to 9 beetles at the nitrogen levels found in the sapwood. It is likely that the parent female supplements its nitrogen nutrition by feeding first in the bark/phloem region prior to boring into the sapwood (Roeper et al. 1996). *Corthylus punctatissimus* (Zimmermann) delays its attack flight upon maple saplings until late June in Michigan (Larsen et al. 1994). There is a hypothesis that the delay in attack is related to a change in nitrogen concentration in the sapwood caused by a shift from apical growth in early spring to secondary sapwood growth in June. Analysis of nitrogen concentration of the sapwood and growth of the primary symbiotic fungus *Meredithella norrisii* (McNew , Mayers & Harrington) support this hypothesis (Table 1).

Characteristic of growth of *M. norrisii* in the pre-constructed egg/ larval cradles of the gallery system forms a rich layer of fungal growth (Figure 1). Fungal growth occurs at the level of nitrogen present in the maple saplings sapwood. The beetles completed their development without further fungal growth. By the time progeny adults were observed the symbiotic fungal growth was entirely consumed (Figure #2).

The general conclusion was that Ambrosia Beetle/ Fungal Symbiosis appears to be able to occur at the relatively low nitrogen concentrations found in the sapwood of the host trees. The beetles complete their development without further fungal growth.

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Figure #1. Larva feeding upon growth of M.norrissi with larval cradle.

Figure #2 Progeny within Cradles with consumed fungus

Table 1. Effect of concentration of nitrogen (L-proline) on growth *of Meredithella norrisii* and nitrogen (percentage wet weight) in maple saplings

N concentration (% wet weight)	mg of growth of *M. norrisii*
0.0	18
0.014	78
0. 019 (Found in maple stems in late May)	
0.027	140
0.046 (Found in maple stems in late June –July)	
0.077	221
0.110	188
0.230	191

17-Year Cicadas in Michigan

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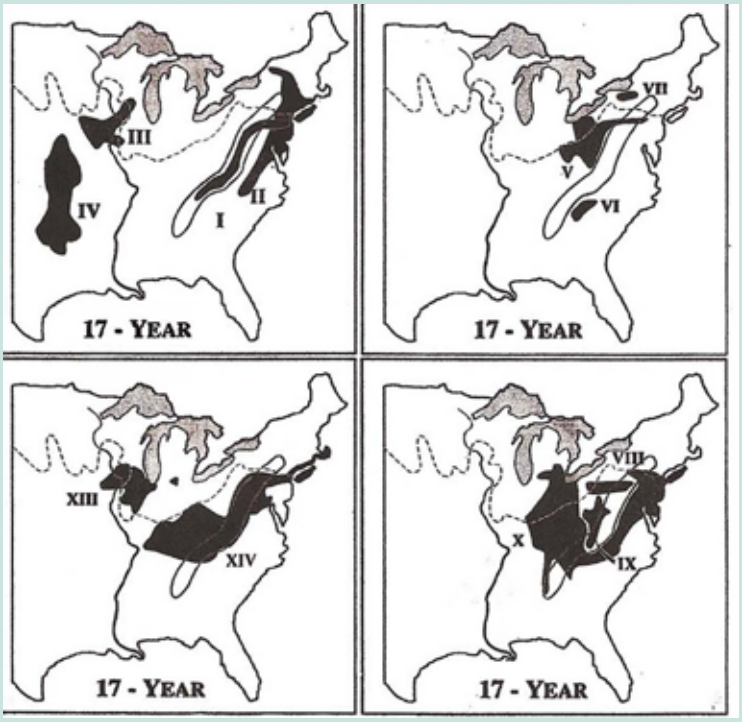
A unique and dramatic North American phenomenon in early spring is the emergence of hordes of adult periodical cicadas. These large numbers of adults emerge from the soil over vast areas of wooded or shrubby regions of the nation after an absence of many years. Both adults (above ground) and nymphs (on roots in the soil) feed on xylem sap, which is well over 90% water most of the year. Up to six million cicadas may occur per acre. They all die and disappear after two to three months, not to be seen again in those same areas for 13 or 17 years. These are Periodical Cicadas (*Magicicada*, including three species of 17-year cicadas and four species of 13-year cicadas), daytime loud-singing and flying insects that cannot be ignored. They occur in populations covering substantial geographic areas, but do not emerge over the whole of eastern North America in the same year, and emerge as chronologically and geographically separated populations called broods, designated by Roman numerals (Figs. 1 and 4; Alexander and Moore, 1962).

Only two of the extant 12 broods of 17-year cicadas (Broods X and XIII), and only one of the three species (*Magicicada septendecim*), are documented as occurring in Michigan. This is the first publication of the documentation of Brood XIII in Michigan (southeasternmost Branch Co., and southwestermost Hillsdale Co.) (map, Fig. 2). This also is the first documentation for the same species and the occurrence of Brood XIII in adjacent Indiana (northeasternmost Steuben Co.) and adjacent Ohio (northwesternmost Williams Co.).

Surprisingly, this is also the first published documentation for Brood X (*M. septendecim* in the 1987 and the 2004 emergences) in the same counties in both Indiana and Ohio, and the same two counties in Michigan (map, Fig. 3). In Ohio, for Brood X in those years, adjacent Defiance Co., and Paulding Co., also had *M. cassini* and *M. septendecula* emerging along with *M. septendecim*. As can be seen on the maps, it is 100 or more miles to the nearest known extant populations of these two isolated brood populations. Also, the widely distributed genus-specific parasitoid cicada fungus, *Massospora cicadina*, has not been reported for cicadas in any of these counties mentioned. The maps show only records for *M. septendecim* as that is the only species involved here, even though both *M. cassini* and *M. septendecula* are known elsewhere



Most recent, and expected next several years of emergence, of 17-year Cicada adults (*Magicicada septendecim*, *M. cassini*, and *M septendecula*, all three species combined) by Brood.
Asterisk(*) marks broods that emerged or will emerge in the same year with a 13-year Cicada brood (of these, only Brood XIX of 13-year cicadas has any opportunity of appearing nearby or possibly overlapping with 17-year cicadas-with Brood IV in 1998 and with Brood XIII in 2024; overlapping years of emergence will not occur again with the same broods for an interval of 221 years, 13 X 17 years, or seventeen 13-year generations and thirteen 17-year generations).

Brood I	1995	2012	2029	2046
Brood II	1996	2013	2030	2047
Brood III	1997	2014*	2031	2048
Brood IV	1998*	2015	2032	2049
Brood V	1999	2016	2033	2050*
Brood VI	2000	2017	2034	2051
Brood VII	2001*	2018	2035	2052
Brood VIlI	2002*	2019	2036	2053*
Brood IX	2003	2020	2037*	2054*
Brood X	2004	2021	2038	2055
Brood XIII	2007	2024*	2041	2058
Brood XIV	2008	2025	2042	2059

These map diagrams are modified from Thomas E. Moore, 1993, Acoustic signals and speciation in cicadas (Insecta: Homoptera: Cicadidae), pages 269-284 in Evolutionary Patterns and Processes, Linnaean Soc. Symposium No. 14, D.R.·Lees and D. Edwards (eds.), London: Academic Press.

Fig. 1. Generalized diagrams of Brood emergences for 17-year cicadas, all three species, and recent known or future expected dates of emergence.

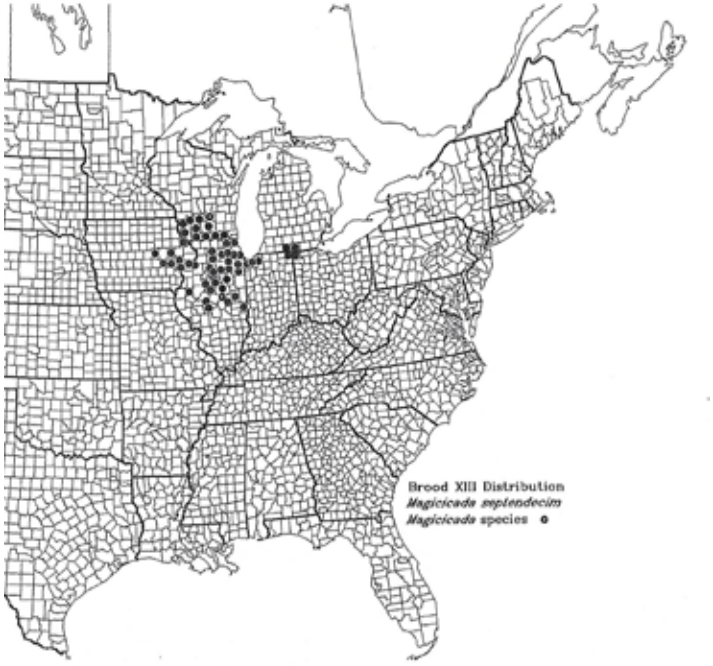


Fig. 2. Brood XIII, *Magicicada septendecim* records (the only species of *Magicicada* known in Michigan) summarized by county. Records listed by species, based on vouchers in many institutions, trusted song records or publications, as determined by the author, for all known dates of emergence. Most records by the author. Note Michigan, and northern Indiana and Ohio records, and isolated known populations.

Fig. 3. Brood X, *Magicicada septendecim* records (the only species of *Magicicada* known in Michigan) summarized by county. Records listed by species, based on vouchers in many institutions, trusted song records or publications, as determined by the author, for all known dates of emergence. Most records by the author. Note Michigan, and northern Indiana and Ohio records, and isolated known populations.

for both broods. These maps also show the maximum Pleistocene glacial boundary, the trace of the Mississippi River and Appalachian Mountains, and the outlines of the Great Lakes for orientation. As one can see, Brood X is the most widely dispersed of all the broods, with several clumped, discrete, separated populations all emerging in the same year making up one brood.

17-Year Cicadas (37 visits)

I			1961	1978	1995	(3)
II			1962	1979	1996	(3)
III			1963	1980	1997	(3)
IV			1964	1981	1998	(3)
V			1965	1982	1999	(3)
VI					2000	(1)
VII			1967	1984	2001	(3)
VIII			1868	1985	2002	(3)
IX			1969	1986		(2)
X		1953	1970	1987	2004	(4)
XI			1971			(1)
XIII	1939*	1956	1973	1990	2007	(5)
XIV		1957	1974	1991		(3)
			17-Year Total			(37)

*witnessed & collected as 9-year-old

13-Year Cicadas (9 visits)

XIX	1959	1972	1985	1998	(4)
XXII		1975		2001	(2)
XXIII	1963	1976	1989		(3)
		13-Year Total			(9)
			Grand Total Brood Visits		(46)

Summary notes.
46 visits X at least 3,000 miles per visit (conservative average estimate) = >138,000 total miles or more traveled investigating brood emergences.
46 visits X 10 field days per visit (conservative estimate) = >460 days or more in field

Figure 4. Summary, by year, of *Magicicada* brood emergences, all seven species, personally investigated by the author.

In the past, *Magicicada septendecim* specimens representing a few other county locations have made their way into insect collections. These have been either mislabeled, or isolated individuals blown by storm winds, or transported unwittingly by humans who stopped for a time in the midst of a major emergence elsewhere, etc. Extensive searching in all such areas since 1956 has failed to confirm a consistent past or extant population in any of those areas. William Casello, reporting to the Washtenaw Co., MI/Michigan State University Cooperative Extension Office in 1987, investigated every Michigan report of cicadas that came to the Extension Office, and added greatly to our knowledge of isolated populations of Brood X in Washtenaw Co., but added no additional counties to the nine currently confirmed. One interesting transportation record for the Michigan State University campus in East Lansing, published by Chilcote and Stehr (1984), traced a population of emerging *Magicicada* species representing Brood V to balled shrubs transplanted in 1982 from a Pennsylvania county known to support Brood V. However, the MSU-emerging cicadas were all devoured by predators and left no continuing isolated Brood V population.

In Brood X, and several other *Magicicada* broods, one of two other black and red or orange cicadas in another genus (*Okanagana canadensis* and *O. rimosa*), sing in the midst of the larger and louder choruses of periodical cicadas. They are thought to have life cycles of eight or nine years from egg to adult, and to have slightly variable life cycles, but have gotten off cycle so many times that some adults appear every year. They emerge at the same time of year as periodical cicadas and similarly live to July. They are not in any way periodical cicadas. They just happen to be there as adults whenever periodical cicada adults emerge in the same areas.

O. rimosa in particular sometimes emerges in rather large numbers, and like periodical cicadas also has a species-specific parasitoid fungus (*Massospora levispora*). In addition, it has a species-specific parasitoid sarcophagid fly (*Emblemasoma auditrix*) complicating its biology (Soper et al., 1976). These two *Okanagana* species have sometimes been misidentified and reported by novices as periodical cicadas.

Brood XIII in Wisconsin shows a typical example of what happens to brood populations containing a single species at the margin of overall brood distribution, as recounted by Lange (2014), and in private communications. The earliest records for Brood XIII, particularly in the unglaciated southwestern corner of Wisconsin in Sauk Co., included reports of huge masses of cicadas and such loud noises that people had to shout to be heard in 1888. These population numbers and geographic distribution of adults were reduced in subsequent emergences of the Brood in 1905, 1922, 1956, 1973, and 1990, until in 2007 they could only be found in the easternmost county, Walworth Co., near Lake Geneva.

At the University of Michigan, Museum of Zoology, we have a unique combination of long-term studies and records for all *Magicicada* broods and species, dates of appearance, geographic distributions, and field tape-recordings of the songs of all species in all broods, plus neurophysiological and developmental analyses. Figure 4 documents some of the particulars in the author's following the broods of periodical cicadas.

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Magicicada septendecim

Monarch and Wild Pollinator Planning Summit

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In response to increasing concern over the plight of native bees and the monarch butterfly, the Michigan Department of Natural Resources established a steering committee in early 2016 to create a strategy for the conservation of habitat for monarchs and wild pollinators in Michigan. I was invited to be on this committee to represent Michigan State University Extension, and I tried to keep the MES at the table as well. The committee decided to facilitate a planning summit which was held on September 21-22 in East Lansing. Invited participants represented a broad array of governmental agencies and departments, educational institutions, conservation oriented groups, and private companies that manage large areas of land in the state.

The summit included informative presentations from:

Bill Moritz, Natural Resources Deputy, Michigan Department of Natural Resources;
Tom Melius, Regional Director, US Fish and Wildlife Service;
Nigel Raine, Rebanks Family Chair in Pollinator Conservation, University of Guelph, Ontario;
Karen Oberhauser, Professor, University of Minnesota, Department of Fisheries, Wildlife and Conservation Biology;
Dan Kennedy, Endangered Species Coordinator, Michigan DNR Wildlife Division;
Mike Parker, Conservation Partners Program Specialist, Michigan DNR;
Carl Bednarski, President, Michigan Farm Bureau.

By the end of the two-day session numerous goals and supporting objectives were created by the participants. The original steering committee is now working with their outputs to produce a more refined document. Public input will be sought in 2017.

Constitution and By-Laws of the Michigan Entomological Society

ARTICLE I – Name
Section 1. This organization shall be known as THE MICHIGAN ENTOMOLOGICAL SOCIETY.

Article II – Purpose
Section 1. Promote the science of entomology in all its branches and by all feasible means and to advance cooperation and good-fellowship among persons interested in entomology.

Article III – Membership
Section 1. Any individual or organization interested in the purpose of the society shall be eligible for membership without regard to race, creed, color, religion, sex, national origin, ancestry, disability, age, or exercising their right of free speech.

Section 2. The classes of membership shall be Active, Honorary Life, Student, Sustaining, Institutional, and Life.

Section 3. Active: For Individuals.

Section 4. Honorary Life: May be conferred upon any member who has performed long and distinguished service in the field of entomology to the State of Michigan or to the Society. Proposals for Honorary Life Membership shall be made in writing with a supporting statement by two Active Members and shall be acted upon by the Governing Board and submitted to the society for vote by mail ballot. Nominees must receive four-fifths of the ballots cast to be elected. The total number of Honorary Life Members shall not exceed five at any one time and not more than two shall be elected in any one year. Honorary Life Members shall be exempt from payment of dues but shall have all the privileges of active membership.

Section 5. Student: An individual attending school through graduate school.

Section 6. Sustaining: Any person or organization supporting the aims of the society by submitting an annual fee set by the Board.

Section 7. Institutional: Any institution, society, school, museum, or other organization desiring to support the aims of the Society, but not to the extent of a sustaining membership.

Section 8. Life: A one-time individual fee.

Article IV – Officers
Section 1. The officers of this Society shall be President, President-Elect, Past President, Secretary, and Treasurer.

Section 2. President-Elect/President/Past President. The President-Elect shall be elected by mail ballot as specified in the By-Laws. He/she shall serve one year as the President-Elect, second year as President and third year as Past President. He/she shall assume the office of President-Elect at the close of the annual meeting next following his/her election.

Section 3. Secretary and Treasurer. The Secretary and Treasurer shall be appointed by the Board and shall serve for three years. They shall assume office at the close of the annual meeting next following his/her appointment or sooner if the position is vacant.

Article V – Governing Board
Section 1. The Board shall consist of the following members: President, President-Elect, Past President, one of the most recent available Past-Presidents, Secretary, Treasurer, four elected Members-at-Large, Associate & Journal Editors, Associate & Newsletter Editors, and Webmaster.

Section 2. The Governing Board shall conduct the business of the Society, interpret, and implement Society policy.

Section 3. In the event that a regional branch has not held a branch meeting for one year, a member-at-large shall be elected to the Governing Board in the same manner as other officers. The last branch chairman shall continue to serve on the Governing Board until he/she is replaced by an elected member-at-large.

Article VI – General Guidelines
Section 1. Notwithstanding any provision of the Constitution or By-Laws which might be susceptible to a contrary construction:

(a) The Society shall be organized and operated exclusively for scientific and educational purposes;
(
b) No earnings or use of the Society name shall be incurred to the benefit of any private individual;

(c) No substantial part of the activities, funds, or publications of the Society shall be made to influence legislation or a public office candidate;

The Society shall not be organized or operated for profit;

The Society shall not:
Lend any part of its income or corpus, without the receipt of adequate security and reasonable rate or interest;

Pay any compensation, in excess of a reasonable allowance for salaries or other compensation for personal services actually rendered;

Make any part of its services available on a preferential basis;

Make any purchases of securities or any other property for more than adequate consideration in money or money's worth;

Sell any securities or other property for less than adequate consideration in money or money's worth.

The prohibitions contained in this subsection do not mean to imply that the Society may make such loans, payments, sales or purchases to anyone else, unless such authority be given or implied by other provisions of the Constitution or By-Laws.

Section 2. No officer or committee of the Society or of its Branches shall solicit in the name of the Society contributions for use in obtaining or paying for specialized entertainment.

Article VII – Funds
Section 1. Society funds shall be the responsibility of the Treasurer as specified in the By-Laws.

Section 2. A permanent fund shall be established to include donations and

bequests. The fund shall be in custody of the Governing Board. Funds shall be invested and may be expended only by the Governing Board. Loans may be made to other established funds of the Society for self-liquidating projects.

Article VIII – Publications
Section 1. The publications of the Society will be a journal, a newsletter, and computer webpage.

Article IX – Standing Committees
Section 1. Standing Committees shall be identified by the Governing Board. Their duties and election are set forth in the By-Laws.

Article X – Meetings
Section 1. The annual meeting shall be at such time and place as may be decided upon by the President-Elect. Special meetings may also be called by the Governing Board.

Article XI – Branches
Section 1. Branches shall be established on the basis of convenience of local members.

Section 2. Establishment of branches must be endorsed by the Governing Board and be approved by the Society.

Section 3. Membership shall be voluntary. Branch voting is limited to Branch members.

Section 4. Officers of each Branch shall have a Chair, a Vice-Chair, a Secretary-Treasurer, and a Recording Secretary. These officers shall be elected by their respective Branches.

Section 5. Activities of each Branch shall operate autonomously subject to the Society Constitution and By-Laws.

Section 6. Financial Responsibility of Branches shall not incur financial indebtedness in the name of the parent Society without explicit prior approval of the Governing Board.

Section 7. If any Chair of a Regional Branch should be elected to the position of President-Elect, his/her position as Chair of the Branch shall be considered vacated and the Branch shall fill the office in their designated manner.

Article XII – Amendments
Section 1. All proposed amendments shall be presented at an annual meeting. The President shall at that time appoint a special committee to consider the amendment or amendments and to report its recommendations at the next annual meeting. At that time members may make changes germane to the subject and purpose of the amendment, which shall then be referred by mail ballot to the entire membership. If two-thirds of the votes cast are in the affirmative, the amendment shall be adopted.

Article XIII – Dissolution
Section 1. Upon dissolution of the Society, the Governing Board shall distribute the assets and accrued income to one or more organizations as determined by the Board but which organization or organizations shall meet the limitations prescribed in Section 1 of Article VI, immediately preceding.

BY-LAWS

Article 1 – Membership
Section 1. Privileges. All members shall have equal privileges, except as otherwise herein specified.

Section 2. Membership of persons who are accepted before July 1 shall begin with the preceding January 1; membership of those accepted at a later date shall begin in the following January 1, unless the earlier date is requested and the required dues have been paid.

Article II – Officers' Duties
Section 1. President shall have and exercise such powers as are reasonably necessary to carry out his/her official duties, including: preside at Governing Board meetings and annual business meeting; arrange with Secretary in setting date of fall Governing Board meeting and agenda; appoint special committee members and Chair, specify their charge and time to report recommendations; with Governing Board approval, fill vacancies in the standing committees, such appointees to serve until the next annual meeting; appoint representatives to other organizations and meetings as needed.

Section 2. President-Elect shall serve as Annual Meeting Chair, determine site, date, and agenda and act as President if President cannot serve.

Section 3. Past President shall Chair the Nominating Committee, solicit nominees from the Board and from the membership by Newsletter notice, obtain needed information from all nominees, and notify the Secretary of those results; tabulate votes; notify all candidates of election results.

Section 4. Secretary shall record minutes of Governing Board and annual business meetings and submit them for publication in the Newsletter; prepare and send Governing Board members their meeting agenda; prepare ballot for printing; respond to routine mail requests; maintain an up-to-date membership/subscriber list, submit periodic changes to mailing firm, and submit it bi-annually for publication in the Newsletter; prepare membership meeting notices for the Newsletter.

Section 5. Treasurer shall maintain Society incomes and expenses; submit a report of Society's financial status at Annual and Governing Board meetings; file Non-profit organization form with IRS; maintain checking and other accounts; pay all bills in a timely manner; maintain backlog of all Society publications; maintain current dues status of all members and subscribers; purchase needed business supplies and equipment; prepare and mail author invoices. The Treasurer shall be bonded to assure Society liquidity.

Article III – Governing Board Duties
Section 1. Shall interpret and implement policies of the Society.

Section 2. Print the dues schedule in the Society's publications and review the dues schedule each odd numbered year to determine if a change is needed for the next year.

Section 3. Provide recommendations to the President in his appointment and charge for Special Committees.

Section 4. Fill a vacancy in the office of the President-Elect by the candidate in the most recent election who received the next highest number of votes for that office; if

such candidate is not available the Board shall form a committee of it own members with the President as Chair.

Section 5. Shall, in the event the Secretary or Treasurer cannot continue duties, fill that vacancy by appointment.

Section 6. General responsibility for the publications of the Society shall rest with the Governing Board.

Section 7. Appoint Editors of the Journal and Newsletter and associate editors for each, and a Webmaster.

Section 8. The Journal Editor's duties shall include: review and edit all manuscripts submitted for publication in The Great Lakes Entomologist; notify authors of charges; submit manuscripts to reviewers; prepare each issue of the Journal; respond to all publishing related quires; provide authors with separates and notify Treasurer of author charges; report status at Governing Board and Annual meetings.

Section 9. The Newsletter Editor's duties shall include: prepare at least 3 issues per year for printing, including Entomology Notes as available and membership list each two years; report status at the Governing Board and Annual meetings.

Section 10. Associate Editors duties shall include: assist Editors; assume duties of respective Editors in their absence.

Section 11. The Members-at-Large duties shall include: attend Governing Board and Annual meetings; participate in discussions of agenda items; serve on committees as requested by the President; assist other Board members as needed.

Section 12. The Webmaster duties shall include: creation and maintenance of the Society Webpage.

Article IV – Dues

Section 1. Dues for the Life membership class shall be at 20 times Active class, payable within one calendar year.

Section 2. Members in arrears at the end of the calendar year shall be dropped from membership.

Section 3. Sustaining shall be greater than Active and set by the Board.

Article V – Committees: Standing and Special

Section 1. Terms of Office and Rotation. Unless otherwise indicated, members of standing committees shall serve for periods of three years each. Their elections shall be so arranged that one-third of the terms shall expire each year. Special Committees shall be limited to one year unless extended by the President.

Section 2. Election of Standing Committees. The Governing Board shall serve as the nominating committee to propose a slate of candidates for election to positions on standing committees not filled in other ways. The candidates nominated by the Board, together with any nominated from the floor, shall be voted upon at the annual meeting. The Board shall designate which member of each standing committee shall serve as chair.

Section 3. Function of Special Committees. Develop and make recommendations to the Board on specific issues, normally within one calendar year. The committee is dissolved when final recommendations are accepted.

Article VI. Voting Procedure

Section 1. Voting and holding office shall be open to all individual members.

Section 2. The President-Elect and Members-at-large shall be elected by mail ballot by the following procedure: Membership shall be solicited by notice in the Newsletter and at least six months preceding the next election for nominees to fill vacancies. At least four months prior to each annual meeting the Governing Board shall meet to consider nominations. Nominees are apprised of office responsibilities, their approval to serve obtained, and notify the Secretary of candidate names. Names shall be placed alphabetically on a ballot, mailed to each member not later than two months before the annual meeting, for return in an envelope marked "Ballot." A return date of at least thirty days after issue shall be specified for the return of the ballots. Ballots received later than the specified date shall not be counted. The votes shall be tabulated by the Past President and two other non-candidate members s/he selects. The candidate or issue receiving the most votes shall be declared approved. The Governing Board and all candidates shall be promptly notified of the outcome.

Section 3. Terms of service of the four members-at-large shall be staggered over two years by filling two positions per year.

Section 4. If only one nominee accepts candidacy for a vacancy the Board shall declare that candidate winner without a vote.

Section 5. If two candidates for any office tie for high vote the winner shall be decided by the membership through secret ballot vote at the next annual business meeting.

Article VII – Quorums

Section 1. Ten active members shall constitute a quorum for the transaction of the business of the Society.

Section 2. Four members of the Governing Board shall constitute a quorum for the transaction of the business, provided, that all members of the board have been informed of the intent to meet.

Article VIII – Amendments

Section 1. Changes in these By-Laws may be made by a two-thirds vote of any general meeting or by a two-thirds majority of all votes cast in a mail ballot; provided, that written notice of the proposed amendment shall have been sent to every active member at least one month before the date of the meeting at which it is to be considered, or the last date for the receipt of the ballots in case of mail vote.

Article IX. Parliamentary Authority

All business, unless stated otherwise in the Constitution or By-laws, shall be conducted according to Robert's Rules of Order, revised edition.

Revised: 2016

Future Changes in the MES Constitution and By-Laws

At the 2016 MES Annual Meeting, we discussed moving the MES journal and newsletter to a completely online format. In addition to our journal and newsletter, the MES Governing Board (GB) is hoping to utilize email and other electronic formats to conduct MES business, such as elections and voting on proposed changes in the MES Constitution and By-Laws. There are several places in our current Constitution and By-Laws that refer to "mailing" or a "mail ballot." To allow the MES GB to interact electronically with the membership in these matters, there are several places in our Constitution and By-Laws that should be revised. Below is a list of the sections that need updating in regards to "mail" notification. Perhaps these sections can be modified with a simple addition of the words "or electronic" after "mail" so that we allow both notification and voting by regular mail and by email or other electronic means.

Constitution; Article III – Membership; Section 4. Honorary Life: Proposals for Honorary Life Membership shall be made in writing … and submitted to the society for vote by mail ballot.

Constitution; Article IV – Officers; Section 2. President-Elect/President/Past President. The President-Elect shall be elected by mail ballot as specified in the By-Laws.

Constitution; Article XII – Amendments; Section 1. All proposed amendments shall …. be referred by mail ballot to the entire membership.

By-Laws; Article VI – Voting Procedure; Section 2. The President-Elect and Members-at-large shall be elected by mail ballot … Names shall be placed alphabetically on a ballot, mailed to each member.

By-Laws; Article VIII – Amendments; Section 1. Changes in these By-Laws may be made by a two-thirds vote of any general meeting or by a two-thirds majority of all votes cast in a mail ballot; provided, that … the last date for the receipt of the ballots in case of mail vote.

In addition, making amendments to the MES Constitution and By-Laws is a long-term process, currently taking over a year to make even a simple change to the Constitution. This matter was also discussed briefly at our 2016 Annual Meeting. Below is the current wording in our Constitution and By-Laws. We are considering changes that would speed up the process, such as notifying the members of proposed changes by email and allowing say 30 days for comment, and then resending the revised proposed changes to MES members and allowing say another 30 days for voting. Changes in the MES By-Laws can be done more quickly, i.e., at least 30 days notice followed by a period for voting.

Constitution; Article XII – Amendments; Section 1. All proposed amendments shall be presented at an annual meeting. The President shall at that time appoint a special committee to consider the amendment or amendments and to report its recommendations at the next annual meeting. At that time members may make changes germane to the subject and purpose of the amendment, which shall then be referred by mail ballot to the entire membership. If two-thirds of the votes cast are in the affirmative, the amendment shall be adopted.

The above changes will be voted on at the upcoming 2017 Annual Meeting.

Robert Haack, President

Smart gardening to support monarchs

Erwin 'Duke' Elsner, MSU Extension
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Condensed from the original document at: http://msue.anr.msu.edu/resources/smart_gardening_to_support_monarchs

You can make monarch-friendly choices in plant selection, garden design and pest management practices that will help make a difference for the future of monarchs, one garden at a time.

Monarch caterpillar host plants—milkweeds. Monarch butterflies need plants in the milkweed family for their caterpillars to feed on and plenty of flowers with nectar for the adults. Gardeners who want to help can add more flowers, including milkweed in landscape beds, gardens or even container plantings. Monarch adults and caterpillars are susceptible to several commonly used pesticides, so be careful with your pest management practices to protect monarchs.

All of the acceptable food plants for monarch caterpillars are in the dogbane family (Apocynaceae). Ten milkweed species are native to Michigan. The most common species are common milkweed (*Asclepias syriaca*), butterfly milkweed (*A. tuberosa*) and swamp milkweed (*A. incarnata*). Common milkweed is the most important for supporting monarch populations. For some gardeners, common milkweed can become a problem because it produces long, underground rhizomes that produce more plants in unwanted places. Butterfly milkweed and swamp milkweed can be important hosts, and may be better choices for most garden settings as they do not spread from rhizomes and are easier to manage. Common, butterfly and swamp milkweed are very cold-hardy perennials when grown in suitable locations.

The female monarch is rather picky about what plants she will lay eggs on, almost always choosing plants in the genus *Asclepias*. However, eggs are sometimes laid on black swallow-wort (*Cynanchum louiseae*) or pale swallow-wort (*C. rossicum*), which are unable to support caterpillars. Both are invasive species that should be removed so monarchs do not lay eggs on "dead end" hosts where the resulting caterpillars will not thrive.

Adult monarch food: Nectar in flowering plants. The adult monarch butterfly can feed on the nectar of many species of flowering plants. As they travel throughout Michigan from May through October, select flowers with a wide range of blooming times to support monarchs. You should have something blooming throughout the growing season. A series of blooming plants will also benefit many species of pollinating bees and natural enemies of pests.

Some of the trees, shrubs and other plants monarch butterflies visit for nectar include wild cherry, lilac, Labrador tea, blazing star, red clover, dogbane, goldenrods, ironweeds, joe-pye weed, marigolds, asters, rattlesnake-master, sunflowers, thistles, vetches and milkweeds.

Why are monarchs more at risk than other butterflies? The monarch is the only butterfly in the United States that has a long migration, traveling well over 1,000 miles to Mexico in the fall. They must be able to find food—nectar in flowering plants—throughout the way to provide much-needed energy for flight. Foul weather during the migration or at their overwintering sites can kill millions of monarchs in a day.

Common milkweed, an important food plant for monarch caterpillars, is considered to be a weed in crop fields and pastures. Technological advances in weed control have greatly reduced the number of common milkweed plants in croplands compared to 20 years ago. Large and small landowners can work together to make a difference by growing smart plants to support monarchs.

MES 2016 Annual Meeting Minutes – June 10-12, 2016

62nd Annual Meeting
Shanty Creek Resorts, Bellaire, MI

Present: The General Membership plus Governing Board Members: Martin Andree, Kristi Bugajski, Matt Douglas, John Douglass, Bob Haack, Adrienne O'Brien, Mark O'Brien, Angie Pytel, Bill Ruesink, Bill Scharf, Mark VanderWerp

Undergrad Student Presentations:
There were two student presentations this year by Hillsdale College students Joel Parker and Ryan Zemel. Both talks were excellent.

Reports:
Secretary: Adrienne O'Brien – Membership numbers are down a bit – 247 total of Active, Sustaining, Student, Honorary and Lifetime members.

Treasurer: Angie Pytel – Angie replaced Dave Houghton as Treasurer in spring 2016 when Dave started his sabbatical. Angie presented a general update on the MES budget.

Newsletter: Bob Haack – Bob is ready to turn over the Newsletter to someone else. He will finish with the 2016 newsletter issues – Volume 61. A possible replacement is Dan Swanson but other members are asked to step forward.

Journal: Much discussion on this topic. See below

Webmaster: Mark O'Brien – is exploring other forms of social media

Old Business: The constitutional amendment proposed by John Douglass in 2015 was approved by the Membership in February of 2016. The gist of the proposal was that the Member-at-Large position be changed from a 3 year term to a 2 year term and that there would be 2 people elected each year, for a total of 4 Members-at-Large. In addition, a change in language in the Constitution was changed to reflect that the Secretary and Treasurer positions are appointed, rather than elected.

New Business:

Elections:
Congratulations to our new Members-at-Large, Martin Andree and John Douglass (2016-18) and President Elect, Matt Douglas. Thank you to the other candidates, Ashley Wick and Pat Hudson for agreeing to be on the ballot. And, finally, thanks to Julie Craves, Member-at-Large (2013-16), and David Stanton, Immediate Past President, for their service to MES. We hope that they will continue to be involved with the Society.

Our Move to the Digital Age:

After years of discussion, it was decided to bring the question of moving the Journal and Newsletter to a digital platform to the MES members. Our new Scientific Editor, Kristi Bugajski, has available to her at Valparaiso University the ability to host our journal and newsletter on their website at no cost. A committee, with Kristi, Bob Haack, Mark and Adrienne O'Brien, Alicia Bray and Martin Andree was formed to work on a questionnaire/survey to send to the members.

In addition, it was proposed that other questions be put to the membership on how we can use online surveys or email to more quickly make changes to the Constitution, voting for elections, and possibly membership. The wording of the Constitution will need to be changed to reflect the digital age we live in. The following people were assigned to this committee: Bob Haack, John Douglass and Ron Priest.

And Finally…
Thanks to Bob Haack for planning and executing the 62nd Annual Meeting. Everything about it was great – diverse talks, as well as a wide range of ages and backgrounds of the attendees. And, of course, Shanty Creek Resorts was an excellent venue in a gorgeous part of Michigan.

Adrienne O'Brien, MES Secretary

Continued from p. 21

- 87% of people would continue their membership if we move all publications and communications online.

There were numerous comments and suggestions on how we should move forward, as well as much discussion within the MES governing board. The governing board voted to keep membership fees the same. They are quite reasonable, and even though we will save money by not printing TGLE, we will still have expenses as an organization.

TGLE will publish its final print issue with the 2016 volume, and then move to an online, open access format in 2017. Kristi Bugajski is working with Valparaiso University to get this set up, and the editorial board trained in the new software. It will become a streamlined submission system, making it easier for authors, editors, and peer reviewers. The site will be indexed by Google, greatly increasing our visibility. We should see more traffic, more readers, and hopefully more submissions. This service from Valparaiso University is available free of cost to MES, even if Kristi steps down as the editor. Since it will not cost MES anything to publish the journal, we have decided to pass those savings onto our members. Once the journal moves online, the publication costs will be $5/page for members and $20/page for non-members. For papers with multiple authors, the first author must be a member to receive the member rate. If the authors make extensive changes to their galley proof they will be billed at a rate of $1.00 per line. Until the site is active, continue to submit manuscripts via email to Kristi.Bugajski@valpo.edu . Once the site is up and running, we will not have to wait for a full issue to publish individual papers, but rather it can happen immediately after the final version is complete. We will still have individual issues, with cover art, but the articles can be published as they are accepted.

Please feel free to contact Kristi with any questions, comments, or concerns. Thank you to everyone who participated in the survey.

Most Highly Cited MES Newsletter Articles

Robert A. Haack, Newsletter Editor

Several of the articles printed in the MES Newsletter have been highly cited in the scientific literature. When considering the top 12 most highly cited papers, all of them dealt with exotic (alien or nonnative) insects. I was an author on many of these papers and quite often I placed the stories in the MES Newsletter because I had to fill an issue. That is, the page length of the Newsletter is nearly always multiples of 4 pages, i.e., 12, 16, 20 etc. Often I found myself one or more pages short to complete an issue, so I often filled the space with information on some new forest insect that had been recently discovered in the USA that I or others were working on. Here are the references for the top 17 most highly cited MES Newsletter articles and the number of citations in Google Scholar as of 1 January 2017. By far, the Haack et al. (2002) story on the discovery of emerald ash borer (EAB) in the USA and Canada was the most highly cited (361 times), mainly because it was the first review to be written on EAB and of course since its discovery in North America in 2002 it has become a major pest with many papers subsequently published on EAB, and thus it was often cited.

No. citations	Reference
361	Haack RA, E Jendek, H Liu, K Marchant, TR Petrice, TM Poland, H Ye. 2002. The emerald ash borer: a new exotic pest in North America. Newsletter of the Michigan Entomological Society 47(3-4): 1-5.
140	Hoebeke ER, DA Haugen, RA Haack. 2005. *Sirex noctilo*: Discovery of a Palearctic siricid woodwasp in New York. Newsletter of the Michigan Entomological Society 50(1-2): 24-25.
63	Bauer LS, H Liu, D Miller, J Gould. 2008. Developing a classical biological control program for *Agrilus planipennis* (Coleoptera: Buprestidae), an invasive ash pest in North America. Newsletter of the Michigan Entomological Society 53(3&4): 38-39.
52	Poland TM, RA Haack, TR Petrice. 1998. Chicago joins New York in battle with the Asian longhorned beetle. Newsletter of the Michigan Entomological Society 43(4): 15-17.
40	Haack RA, JF Cavey, ER Hoebeke, K Law. 1996. *Anoplophora glabripennis*: A new tree-infesting exotic cerambycid invades New York. Newsletter of the Michigan Entomological Society 41(2-3):1-3.
36	Poland TM. 2007. Twenty million ash trees later: current status of emerald ash borer in Michigan. Newsletter of the Michigan Entomological Society 52(1-2): 10-14.
28	Haack RA, JF Cavey. 1997. Insects Intercepted on wood articles at ports-of-entry in the United States: 1985-1996. Newsletter of Michigan Entomological Society 42(2-4): 1-6.
22	Poland TM, DG McCullough. 2010. SLAM: A multi-agency pilot project to SL.ow A.sh M.ortality caused by emerald ash borer in outlier sites. Newsletter of the Michigan Entomological Society 55(1&2): 4-8.
20	Fraedrich SW, TC Harrington, RJ Rabaglia. 2007. Laurel wilt: a new and devastating disease of redbay caused by a fungal symbiont of the exotic redbay ambrosia beetle. Newsletter of the Michigan Entomological Society 52(1-2): 15-16.
15	Haack RA. 2004. *Orthotomicus erosus*: a new pine-infesting bark beetle in the United States. Newsletter of the Michigan Entomological Society 49(3-4): 3.
9	Hoebeke ER. 2001. *Hylurgus ligniperda*: a new exotic pine bark beetle in the United States. Newsletter of the Michigan Entomological Society 46(1-2): 1-2.
7	Haack RA. 2001. Exotic scolytids of the Great Lakes region. Newsletter of the Michigan Entomological Society 46(3): 6-7.
6	Nielsen MC. 1998. Preliminary list of Michigan moths: the Microlepidoptera. Newsletter of the Michigan Entomological Society 43:1, 4-14.
5	O'Brien MF, J Craves. 2008. *Megachile sculpturalis* Smith—A new bee for Michigan (Hymenoptera: Megachilidae). Newsletter of the Michigan Entomological Society 53(1-2): 4.
4	Haack RA, CM Eckelmann, E. Green. 2000. Southern pine beetle outbreak in Belize. Newsletter of the Michigan Entomological Society 45(3-4): 13-15.
4	Haack RA, RK Lawrence, G Heaton. 1993. The pine shoot beetle: a new exotic pest. Newsletter of the Michigan Entomological Society 38(1): 1-2.
3	Wilson LF. 1971. A portable cage for insect study in the field. Newsletter of the Michigan Entomological Society 16(3-4):1, 3.

New Records of Sphinx Moths in Emmet and Cheboygan Counties, Michigan

Brian Scholtens (Dept. of Biology, College of Charleston and University of Michigan Biological Station) and Caleb P. Nusbaum (University of Michigan). Email: ScholtensB@cofc.edu

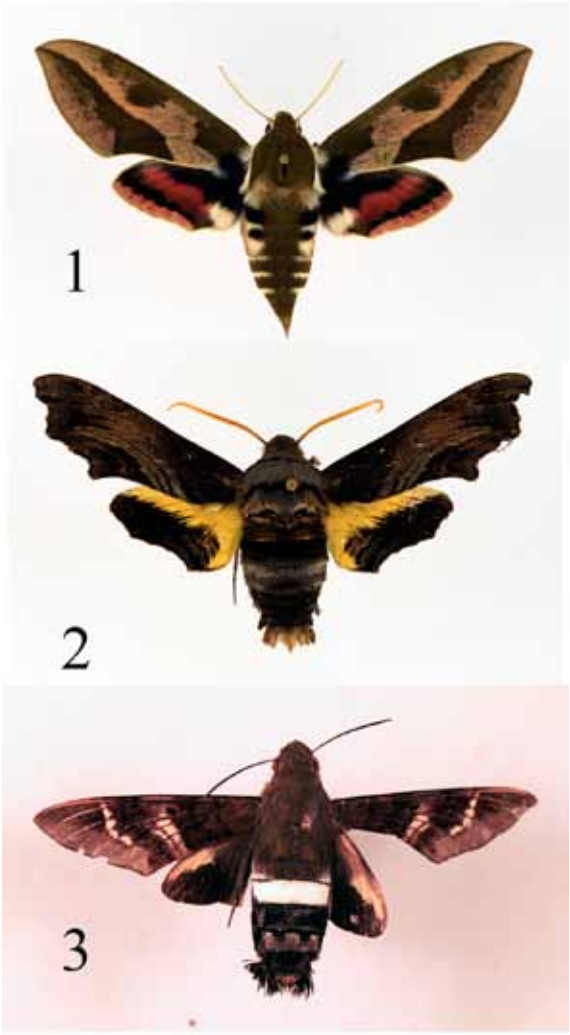
Over the last three years, three species of Sphingidae have been found at the tip of Michigan's Lower Peninsula that were not previously known from the area. This is significant because this area of the state has been actively collected for over 70 years. Ed Voss (1969) published a very complete list of the sphinx moths of the region, and no new species had been found since that time, despite intensive collecting since the mid-1980s.

On 30 June 2014, the Biology of Insects class from the University of Michigan Biological Station participated in their annual 4th of July Butterfly Count in southern Cheboygan and Emmet Counties. Each year we visit the same sites, including a jack pine area south of Indian River in Cheboygan Co., MI. At this site the students in the class located several larvae of the spurge sphinx (*Hyles euphorbiae* (L.)) feeding on *Euphorbia virgata* Waldst. & Kit. (*E. esula* in Voss 1985), a common introduced species of spurge in the northern Lower Peninsula and Upper Peninsula of Michigan (Voss 1985). The larvae were nearly full-grown and were taken for rearing in the lab. Students in the class reared several adults that first year, and have found larvae to rear each year since (Figure 1). The species was first found in Michigan in 2013 and reported by Elsner (2014) in the MES Newsletter.

Also during the summer of 2014, one of my entomology students brought in a larva of *Sphecodina abbottii* (Swainson), the first recorded in the region. This larva failed to survive, but the following summer in 2015, I collected an adult at a MV light on 15 June at a cabin near the University of Michigan Biological Station, confirming its status as a new resident (Figure 2).

During the summer of 2016, on 7 July, while I was away at the annual Lepidopterists' Society Meeting, my entomology class visited the dunes at Sturgeon Bay in Wilderness State Park to work on our annual survey project in the park. That day, Caleb Nussbaum, a student in the class collected an interesting sphinx moth visiting milkweed flowers. Upon my return, he showed me the specimen and I determined that it was the first record of *Aellopos titan* (Cramer) from the area (Figure 3). This species had been recorded from several counties in northern Michigan, but never from Emmet or Cheboygan Counties (Moth Photgraphers Group 2016).

This sequence of new occurrences in an already well-sampled family is unusual. The three species involved appeared due to three different reasons. *H. euphorbiae* has been gradually spreading to our area from the west (Oehlke 2012, Moth Photographers Group 2016) after introduction for biocontrol (Batra 1983), finally arriving in 2014. *A. titan* is a known migrant finally recorded in our area. *S. abbottii* is likely expanding its range northward, since it is not a common migrant and has never been recorded from the area. This coincidental combination of events is not likely to be duplicated any time soon.



New species of Sphingidae for the northern Lower Peninsula of Michigan: 1) *Hyles euphorbiae*, 2) *Sphecodina abbottii*, and 3) *Aellopos titan*.

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Elsner, E. 2014. Sphingid records: old and new. Newsletter of the Michigan Entomological Society 59: 1-3.

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Oehlke, B. 2012. *Hyles euphorbiae* (Linnaeus, 1758). http://www.silkmoths.bizland.com/Sphinx/heuphorb.htm Accessed 31 December 2016.

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Voss, E. G. 1985. Michigan flora. Part II. Dicots. Cranbrook Institute of Science and University of Michigan Herbarium, Bloomfield Hills and Ann Arbor, MI. 724 pp.

MES Annual Meeting Locations

Year	#	Location	Chairperson
1955	1st	Michigan State University	George C. Steyskal
1956	2nd	University of Michigan	George C. Steyskal
1957	3rd	Wayne State University	Ray Hutson
1958	4th	University of Michigan	Irving J. Cantrall
1959	5th	Michigan State University	Irving J. Cantrall
1960	6th	University of Michigan	Roland L. Fischer
1961	7th	Wayne State University	David R. Cook
1962	8th	University of Michigan	Henry K. Townes
1963	9th	Western Michigan University	Roland L. Fischer
1964	10th	Michigan State University	Stanley K. Gangwere
1965	11th	University of Michigan	Mogens Nielsen
1966	12th	Wayne State University	Henry K. Townes
1967	13th	University of Michigan	John W. Newman
1968	14th	Grand Valley State University	Fred B. Knight
1969	15th	Alpena Community College	T. Wayne Porter
1970	16th	MSU Kellogg Biological Station	Louis F. Wilson
1971	17th	Albion College	Richard J. Snider
1972	18th	Toronto, Canada	Richard J. Snider
1973	19th	Michigan State University	Richard G. Fleming
1974	20th	Adrian College	Richard G. Fleming
1975	21st	Glens Oaks Community College	Robert W. Husband
1976	22nd	Neithercut Woodland Camp	David C. L. Gosling
1977	23rd	Calvin College	Al Bratt
1978	24th	Central Michigan University	Al Bratt
1979	25th	UM Douglas Lake Biological Station	Daniel K. Young
1980	26th	MSU Kellogg Biological Station	Gary Simmons
1981	27th	UM Stinchfield Woods	Gary Simmons
1982	28th	Chippewa Nature Center	John Witter
1983	29th	4-H Kettunen Conference Center	Ron Priest
1984	30th	MSU Kellogg Biological Station	Gary Dunn
1985	31st	UM Douglas Lake Biological Station	David Cowan
1986	32nd	UM Matthaei Botanical Gardens	Mark O'Brien
1987	33rd	MTU Ford Forestry Conference Center	Ken Kraft
1988	34th	Ferris State University	Phil Watson
1989	35th	MSU Hidden Lake Gardens	Richard J. Snider
1990	36th	Chippewa Nature Center	Eugene Kenaga
1991	37th	Northwestern Michigan College	Fred Stehr
1992	38th	Michigan State University	Robert Haack
1993	39th	UM Douglas Lake Biological Station	Cathy Bach
1994	40th	Fernwood Botanic Garden	Dave Gosling
1995	41st	Alma College	Richard Roper
1996	42nd	MSU Kellogg Biological Station	Cathy Bristow
1997	43rd	Chippewa Nature Center	Daniel Herms
1998	44th	MSU Hidden Lake Gardens	Leah Bauer
1999	45th	Ralph A. MacMullan Conference Center	Ron Priest
2000	46th	MSU Kellogg Biological Station	George Balogh
2001	47th	Leelanau School	Mark O'Brien
2002	48th	Indiana Dunes Environmental Center	James Dunn
2003	49th	Tollgate Education Center	Thomas Wallenmaier
2004	50th	Ralph A. MacMullen Conference Center	Robert Kriegel
2005	51st	Lake Superior State University	John Douglass
2006	52nd	Big Rock Valley	Bill Westrate
2007	53rd	Cran-Hill Ranch	Stephen Ross
2008	54th	University of Michigan - Dearborn	Tom Wallenmaier
2009	55th	Ralph A. MacMullan Conference Center	Erwin 'Duke' Elsner
2010	56th	Kettunen Center	Ethan Bright
2011	57th	Pierce Cedar Creek Institute	Toby Petrice
2012	58th	G.H. Gordon Biological Station	David Houghton
2013	59th	Drummond Island	Martin Andree
2014	60th	Saginaw Valley State University	David Stanton
2015	61st	G.H. Gordon Biological Station	Angelica Pytel
2016	62nd	Shanty Creek Resorts	Robert Haack
2017	63rd	Pierce Cedar Creek Institute	Matthew Douglas

The table to the left shows the meeting site and Chairperson for all MES Annual Meetings from 1955 through 2017. In the early years of MES, usually the MES President presided over the annual meeting, whereas in recent decades the President-Elect organized the annual meeting, but the President handled the business meeting. At times, the same person is listed as Chair for two consecutive years. This may have happened because the actual Chair was out of town, or due to illness, and even death in one case.

Robert A. Haack, Newsletter Editor

Still Seeking a New Editor for the MES Newsletter

We are still seeking a new editor for the *MES Newsletter*. I will step down as editor after publishing this issue. I've been editor since 1988, a span of 29 years, so it is time for some new blood. The MES Newsletter was first published in 1956, and has continued until present. In the early years, the newsletter focused mainly on MES business, collecting trips, news from the members, and reprinting insect-related stories from the popular press. During my tenure as editor, I focused on MES business news, printing abstracts from the speakers at our annual meetings, and soliciting original stories to print. One of our most prolific authors in recent years was Martin Andree, who has submitted at least 14 *Martinoptera* columns, the first in 2001 and the last in 2015. Thanks Martin!

In the questionnaire that was sent to the MES members in 2016, the vast majority of responders wanted the MES Newsletter to continue, and they were fine with it being published online only. The advantage to publishing online is that the newsletter can be any length. By contrast, when I published the newsletter in hard-copy format, I would try to fill multiples of 4 pages (12, 16, 20, etc.).

If someone does step forward to be the next editor, they can change the format in any way they want. They can change the frequency of publication, the content, and the length. MES does have a webpage, and a Facebook page, so perhaps that is enough. However, for these outlets to be successful, the MES members have to use them and actively participate by submitting stories and news items. I'd be happy to work with anyone who wants to try their hand at being the next editor. Give it some thought and let me know. No matter what happens, I've enjoyed serving as the MES Newsletter Editor for the past 29 years.

Robert Haack, Newsletter Editor, haack@fs.fed.us or haack@msu.edu.

2016 Update on Hemlock Woolly Adelgid in Michigan

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Hemlock woolly adelgid-infested branch. Photo courtesy of MDARD.

Hemlock woolly adelgid (HWA) was detected on four properties in Ottawa County and two properties in Muskegon County in 2015. In 2016, HWA was detected on three additional properties in Ottawa County and one in Muskegon County. There are no known established populations of HWA anywhere else in Michigan. Past and present HWA infestations in Michigan have been reported by landscapers, arborists, and other alert citizens knowledgeable about HWA and its potential impacts.

Prior to 2015, HWA had been found infesting landscape hemlock in Emmet (2006, 2007, 2010), Macomb (2010/two locations), Ottawa (2010/two locations), Berrien (2012), and Allegan (2013) counties. Eradication efforts were initiated at each of the locations the year they were detected. To date, there is no evidence that HWA persists at any of these locations.

So far, no clear source of the infestations has been found, but a likely source is hemlock nursery stock moved into Michigan from infested areas outside of the state either prior to the Michigan Department of Agriculture and Rural Development's (MDARD) Hemlock Woolly Adelgid Quarantine was implemented in 2001, or in violation of the quarantine. This exterior quarantine restricts the movement of hemlock into Michigan, and includes a complete ban of movement of hemlock into Michigan from infested areas.

Survey work completed in 2016 at the ten known sites of infestation showed that the infestations ranged in size and scope from a single property with a few infested trees on it to multiple properties with hundreds of infested trees on them.

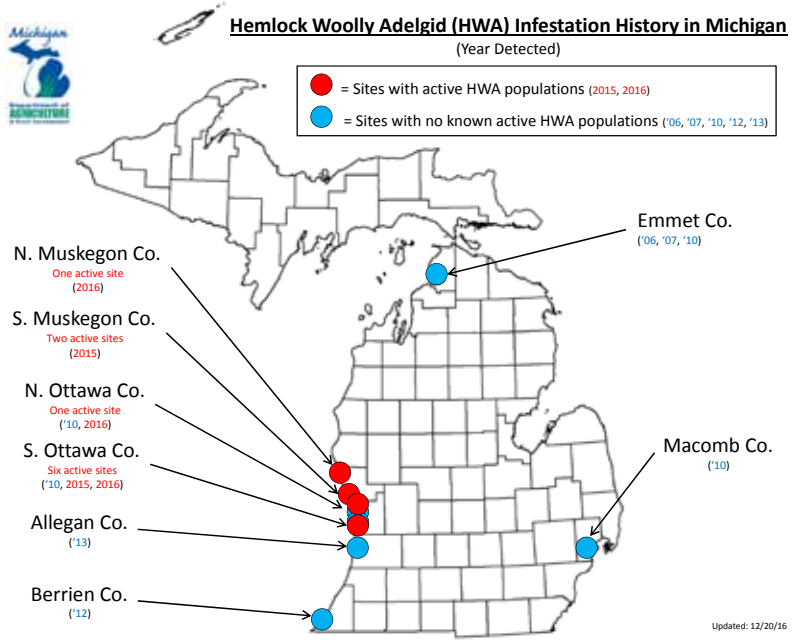
In September and October, a number of communication activities took place. There was a mailing to 240 licensed pesticide application businesses and over 2000 property owners who work and live in and around the known infested sites. The mailing included a letter describing the problem, information on pesticide treatment options, suggested best management practices, links to additional web-based resources and an invitation to two HWA informational sessions that were conducted in early October. Property owners are being urged to inspect their hemlock trees and, if evidence of HWA is found, to treat them.

In late December 2016, MDARD opened a comment period of 45 days to allow the public an opportunity to provide input on a proposed Hemlock Woolly Adelgid Interior Quarantine. The proposed Michigan HWA Interior Quarantine would regulate the movement of hemlock (*Tsuga* spp.) nursery stock, branches, boughs and forest products with bark attached. Exemptions include forest products with the bark removed such as lumber or posts. The proposed quarantine would establish a regulated area in western Lower Michigan. Movement of regulated articles from the regulated area to the rest of Michigan and beyond would be prohibited except under a compliance agreement issued by MDARD. The proposed quarantine would also prohibit movement within the regulated area except under compliance agreement. It is anticipated that a final version of the quarantine will be implemented in early 2017.

Quarantine details are available by visiting MDARD's quarantine information webpage at: www.michigan.gov/pestquarantines.

A HWA response group with representation from MDARD-PPPMD (Pesticide and Plant Pest Management Division), MSU Entomology Department, DNR Forest Health Division and USDA-Forest Service-State and Private Forestry continues to develop and implement a response strategy. The response strategy will be used to inform those from which funds to increase and continue response activities are being sought. Activities at the infestation sites have been supported in part by a Forest Health Protection grant from USDA-Forest Service.

For more information visit MDARD's HWA webpage at: www.michigan.gov/HWA.



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Bloody Business

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The penalty for any mosquito attempting to take a person's blood is death. The sentence is automatic, and universal; carrying out the sentence is suspect. Oh, we employ lots of ways to kill them. No doubt the most common method is the one-handed slap. It is no mystery how Slapneck Creek in the Michigan UP got its name. Visit any campground in the North Woods in June and listen for the slap. When you hear two slaps in rapid succession, you can bet the mosquito got away. But only to come back and try again to suck that warm blood. You know for sure the mosquito got away if you hear a slap and then a few cuss words. If the victim is accurate but slow to react, one slap, one red spot.

Another common method is the one-handed catch. This is less successful than the slap, but necessary if one hand is holding something, like a drink. That's the time to resort to the "cup and squish." If the fist is closed too soon, the increased air pressure helps the would-be blood sucker flit away. To come back, of course. Now, in the dark, when a flighty one is zee-ing, slowly getting nearer your ear, and finally close enough to land on you, that's a good time to try the one-hand catch. Better than busting your eardrum with a one-handed slap. I think one-handed mosquito murdering is so common because people usually have something in at least one hand.

Mosquitoes really know when both hands are full. This invariably leads to the bump shoulder up against the head technique, the only resort when you're carrying two beers and a hungry one lands in your ear. It is less common than the slap, nonetheless a vital part of one's mosquito-fighting arsenal. Although it usually doesn't kill them directly, you will see them fly helter-skelter away.

Now, on the occasion that both hands are free, that's when you hear the clap. Yes, the two-handed smash. If you get the bugger, keep on clapping, because this method is also inefficient. So usually when you hear more than one clap, yep, that mosquito got away too.

My favorite method, both to use and to watch, is the ball-cap whap. This technique requires quickness and coordination, for you must grab bill of cap between thumb and forefinger, whisk cap from head, and invert it while aiming dead-on at a minuscule, maneuverable missile. It's akin to staring the batter down, then zipping a fastball right by him. Makes me think of my dad, how good he was at it, and how he would let out a little "hyeh" after he got one. Double ball-cap whap means horsefly!

The most difficult situation you will find yourself in is trying to slap a mosquito against a windshield. This always takes numerous blows, and almost always results in bruised knuckles and a very erratic mosquito that almost always escapes. Awkward doesn't begin to describe the motion of whacking away with the back of one's hand against a curved, slanted surface. And while you're intending to viciously smash that one against the glass, her sister is greedily tapping into your carotid artery, soon to become a red balloon.

When I was growing up in northern Wisconsin, people said that if you had a lot of mosquitoes after you, it meant that you ate too much candy. Is that still true?