Newsletter of the Michigan Entomological Society

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MES Needs Three New Officers

MES needs to fill three positions on its Governing Board: President-Elect, Webmaster, and Recording Secretary. Please consider volunteering yourself or nominating another member for one of these positions.

President-Elect is a one-year term. The President-Elect oversees the planning of the next annual meeting. This involves selecting the meeting site and dates, as well as arranging for meals and inviting the keynote speaker. The President-Elect can ask other Governing Board members to help with these tasks too. Although in-person meetings are typical for MES, the annual meeting can also be held entirely on a Zoom-type platform, and therefore any member can serve no matter where they live! The President-Elect becomes President of MES in the second year and oversees the business matters of the Society, of which there are usually few. In the third year, this officer becomes the Immediate Past President and generally offers sage advice.

Webmaster. Mark O'Brien has been the MES Webmaster for over 20 years, and now wishes to step down from that position. MES is working with a private consultant this fall to upgrade the MES website, using features and plug-ins from WordPress (wordpress.com). The MES website will likely be hosted by Siteground (siteground.com) in the future. Mark O'Brien will be happy to work with anyone who wishes to become the Webmaster. The main task as MES Webmaster is to keep the various web pages current. Mark has also been involved in developing online ballots for MES elections and various proposals that require online voting. Mark has used Google Docs for these tasks.

Recording Secretary. MES plans to split the current Secretary position into two new positions. The Membership Chair would handle membership issues; the Recording Secretary would handle recording of minutes at all MES Governing Board meetings held throughout the year, and submitting of those notes for publication in the MES Newsletter. Adrienne O'Brien has been the MES Secretary since 2010. Adrienne would like to remain the MES Membership Chair, but since she now lives in North Carolina, it is difficult for her to attend all MES meetings and record minutes. Therefore, MES is seeking a member to volunteer to serve as Recording Secretary.

If you are interested in volunteering for one of these positions, or want to nominate another member, please contact MES President John Douglass <jfdouglass7@gmail.com>. Alternatively, contact Mark O'Brien at <mfobrien@gmail.com> if you wish to know more about the MES website, and Adrienne O'Brien <amobrien@umich.edu> for information on the MES Secretary position.

Harbor View Marina: Venue for 2023 MES Annual Meeting

69th Annual MES Meeting

The 2023 MES Annual Meeting was held on September 15-17 in Ludington, MI, at the Harbor View Marina. President-Elect John Douglass made all local arrangements, and we thank him for all his efforts. We had over 40 attendees, most from Michigan, but several from other US states (IL, NC, OH, and WI) and Canada (ON and SK).

On the following pages are abstracts of each talk. Speakers were asked to expand their initial abstracts that appeared in the program, and also add a few figures if they wanted to. Some did and some didn't. Pictures were not taken of the speakers at this meeting,

Abstracts from the 69th Annual Meeting

M.E.S.: The Early Years

A vintage presentation by **Julian P. Donahue** given in 2004 and updated by **Robert A. Haack**. Contact: julian.donahue@gmail.co and haack@msu.ed

The young Julian Donahue while at MSU in 1966

This slide show presented some of the early history of MES. It was originally presented by Julian Donahue at the MES 50th Anniversary meeting in 2004 (see Donahue 2004). Julian was very active during the early years of MES while a student at MSU. Julian joined MES in 1959 while an undergrad at MSU and he is still a member today. Julian twice lived in India for 16-month periods each, once during his undergrad years and again when a MS candidate in Entomology at MSU. During the second period in India, he collected about 16,000 butterflies and 5,000 moths, of which 13,000 were later donated to MSU. His MS thesis was entitled, "An annotated list of the butterflies of Delhi, India," and is online at (https://d.lib.msu.edu/etd/10661). Julian then began his Ph.D. program at MSU, working on "A Revision of the Genus *Haploa* Hübner (Lepidoptera: Arctiidae)". However, in 1970, Julian left MSU before completing his Ph.D. to take his "dream job" as curator of Lepidoptera at the Natural History Museum of Los Angeles County in California. While a graduate student at MSU, Julian served as MES Executive Secretary (1964-1968), Newsletter Editor (1964-1968), Founding Editor of THE MICHIGAN ENTOMOLOGIST (1966), member of the Journal's Editorial Board (1966-1975), President (1970-1971), and MES Governing Board member (1964-1968; 1970-1972). He retired from in 1993, and in 2015, he and his wife moved from Los Angeles to Tucson, Arizona. For more early history of MES see the 1979 story by George Steyskal that was prepared for the 25th anniversary of MES. George was the first President of MES. Also, view the MES historical notes from 1955 (Haack 2005).

Donahue, J. 2004. Recollections of the early history of MES. Newsletter of the Michigan Entomological Society 49 (3-4): 8-9.

Haack, RA. 2005. MES historical notes. 1955 – 50 years ago. Newsletter of the Michigan Entomological Society 50 (3-4): 24-25.

Steyskal, G. 1979. Early history of the Michigan Entomological Society. Newsletter of the Michigan Entomological Society 24 (4): 1, 8-9.

Insect collecting in Panama

Mark H. Evans, morpho6@tds.net

This presentation shared some experiences while insect collecting for 3 weeks in western Panama in June 2023. Traps used and field curating methods were described and some representative material was brought for viewing. (Some material for this trip has already been delivered to the NYS Museum in Albany, NY, in July.)

Insect Armageddon

Mark H. Evans, morpho6@tds.net

This presentation shared recent global concerns based on what biologists have been observing: drastic declines in insect numbers and diversity, and thoughts on the potential impacts on life on earth and leading causes.

Phylogenomics Resolves Major Relationships of *Catocala* Underwing Moths

Nicholas T. Homziak, Caroline G. Storer, Lawrence F. Gall, **Robert J. Borth**, and Akito Y. Kawahara

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Underwing moths in the genus *Catocala* Schrank are among the most charismatic and diverse genera of Lepidoptera worldwide. Here we reconstruct the first comprehensive molecular phylogeny for the genus based on 685 anchored hybrid enrichment loci sampled from 161 *Catocala* species (99 Nearctic, 62 Palearctic), four species of *Ulotrichopus* Wallengren and 33 outgroups. Phylogenetic analysis recovers *Catocala* and *Catocala* + *Ulotrichopus* as monophyletic. Mapping of larval host plant use onto the tree shows Fabaceae to be the likely ancestral host plant family. Larval host plant use has likely played an important role in the evolutionary history of *Catocala* with at least 18 independent larval host plant shifts to nine plant families.

Eye of the storm nigh
Dragonflies holding on
Heads still on straight

a haiku by
Ken Tennessen, Wautoma, WI
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The vascular flora of Ludington State Park, Michigan

David C. Dister, david.dister@gmail.com

The vascular flora of Ludington State Park, Mason County, Michigan, was inventoried and additional historical taxa were noted. Ludington State Park borders Lake Michigan along the western boundary of Mason County and lies wholly within Hamlin Township. A total of 444 taxa of vascular plants in 101 families and 281 genera are now documented for Ludington State Park, including 102 non-native taxa, which constitute 23 percent of the total. The Park includes a diversity of natural communities, including Open Dunes, Great Lakes Barrens, Dry-Mesic Northern Forest, and three types of Palustrine Wetlands. Typical taxa associated with each plant community were described. During the course of this study, 112 taxa were collected that were new to Mason County, including *Corispermum pallasii* (a Michigan Special Concern species). Several taxa that are at or near the limits of their known ranges in the Park include *Andropogon virginicus*, *Bidens discoidea*, *Boechera laevigata*, and *Goodyera oblongifolia* (Dister 2017).

Dister, D. C. 2017. The vascular flora of Ludington State Park, Mason County, Michigan. The Great Lakes Botanist 56: 52-90.

Cirsium pitcheri
Pitcher's Thistle

***Corispermum pallasii,* Pallas' Bugseed**

***Eriocaulon aquaticum*, seven-angled pipewort**

Dragonflies and damselflies of Northwest Michigan

David C. Dister, david.dister@gmail.com

After researching and photographing the Odonata of northwest Michigan (primarily Mason County) for 15 years, a draft list was developed that combines the author's observations and photographs (accepted at Odonata Central) with specimens documented on the Michigan Odonata Survey website. Thereafter a PPT slide program was developed and presented during the MES/WES annual meeting in Ludington. The draft list includes 46 species of dragonflies and 20 species of damselflies. Additional Mason County species are expected pending review of the Bortell family Odonata collection.

Racket-tailed emeralds in wheel formation. Amber Twp, Mason Co., MI 6.2.18 (DCD)

River jewelwing, male, Custer Twp., Mason Co., MI 7.6.20 (DCD)

Unraveling the Evolutionary Origins of Anti-bat Sonar Jamming in Tiger Moths (Lepidoptera: Erebidae: Arctiinae)

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Head of Zoology & Director of Collections Informatics, Milwaukee Public Museum

It has been over a decade since laboratory experiments demonstrated that tiger moths, specifically *Bertholdia trigona* (Grote, 1879), are capable of thwarting bat predation by disrupting, or "jamming", bat sonar. How widespread this unique anti-predator defense is and its evolutionary origins have remained a mystery. To answer these questions, we used phylogenomics to resolve a nearly complete genus-level phylogeny of the subtribes Phaegopterina (~175 genera; >1800 species) and Pericopina (~41 genera; >360 species). Using both direct observations and museum specimen-based morphometric inference, we characterized the acoustic behaviors for hundreds of taxa. Our results support the hypothesis that sonar jamming has independently evolved numerous times from aposematic origins within this diverse clade of Neotropical moths. Significant problems were discovered with the current classification of many arctiines, particularly at the subtribal and genus level. I will conclude with an overview of these issues and discuss some future directions of our work. Special emphasis on the current knowledge of systematics and sound production of Michigan arctiines will be provided.

LEPIDOPTERA OF WISCONSIN Highlights of 50 Years in the Field

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Wisconsin, like it's neighboring Great Lakes states, has outstanding biodiversity, with elements of the eastern deciduous forest region, the boreal forest region and the prairie region meeting and intermingling. Examples of native habitat types in each of the state's natural divisions have been systematically inventoried, with many uncommon and habitat restricted Lepidoptera species found in unique and often limited natural communities. Acid Peatlands (or "Bogs") support isolated populations of arctic and boreal Lepidoptera that have persisted far south of their main area of distribution. Among these are the Jutta Arctic (*Oeneis jutta*), Freija Fritillary (*Boloria freija*), Bog Fritillary (*Boloria eunomia*) and the Frigga Fritillary (*Boloria frigga*).

Extensive surveys found the Columbia Silkmoth (*Hyalophora coumbia*) in the northern third of the state. The general term "wetlands" encompasses a variety of habitat classes supporting a great diversity of Lepidoptera, with the Swamp Metalmark (*Calephelis muticum*) and the Buck Moth (*Hemileuca maia* Great Lakes complex) being notable. Numerous species of *Papaipema* moths occur, with larvae boring in the stems and roots of wetland plants. Remnants of Bluff Prairie, Sand Prairie and Mesic/Wet Prairie have been surveyed, with some associated species, such as the Powesheik Skipper (*Oarisma powesheik*), Ottoe Skipper (*Hesperia ottoe*) and Byssus Skipper (*Problema byssus*) all but vanished from historic sites. Pine and Oak Barrens support a number of species also found on Sand Prairies. Notable species include the Karner Blue (*Plebejus melissa samuelis*), the Northern Blue (*Plebejus idas*), Persius Duskywing (*Erynnis persius*), Leonard's Skipper (*Hesperia leonardus*), Cobweb Skipper (*Hesperia metea*) and Chryxus Arctic (*Oeneis chryxus*). Several of these have sharply declined. Limited Beach and Dune habitats occur on the shores of Lakes Michigan and Superior, with several habitat-restricted moths present, including *Copablepharon michiganensis*, which is endemic to Lake Michigan shoreline. Eleven introduced species of moths have spread into Wisconsin.

Six Years as a Bumble Bee Citizen Scientist

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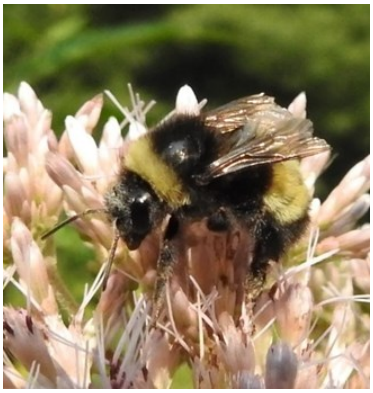
The abundances and ranges of some North American Bumble Bees have precipitously declined in recent decades. Citizen science affords an opportunity for detecting remnant populations, and for identifying landscape and ecological features that sustain current populations. The Xerces Society (Bumble Bee Watch; www.xerces.org/volunteer/bbw) and recently the Michigan Natural Features Inventory (Michigan Bumble Bee Inventory; mnfi.anr.msu.edu/programs/michigan-bumble-bee-inventory) offer citizen scientists the means to record observations and ancillary data in a coordinated manner. This talk described six years of my observations as a Bumble Bee citizen scientist in the northwestern Lower Michigan (Antrim County) and eastern Upper Peninsula (Drummond Island) of Michigan, with comments on the distributions of two species of Special Concern.

In Antrim County, I've recorded *Bombus bimaculatus, B. borealis, B. citrinus, B. fervidus, B. griseocollis, B. impatiens, B. perplexus, B. ternarius, B. terricola*, and *B. vagans*.

On Drummond Island, I've recorded *B. bimaculatus, B. borealis, B. fernaldae/flavidus. B. griseocollis, B. impatiens, B. perplexus, B. ternarius, B. terricola*, and *B. vagans.*



Bombus terricola

Collecting Caddisflies in Northern Michigan: Highlights from 2021-2022 and Plans for 2023

Robert A. Haack and David C. Houghton
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During May to October 2021 and 2022, we collected adult caddisflies at five sites along Finch Creek (Antrim County) and at 12 sites on Drummond Island (Chippewa County). At Finch Creek, we collected 98 species (15 families & 49 genera), including two new state records. Species of the spring, summer, and fall months all constituted distinct assemblages. Shredders dominated the assemblages of nearly all sites and seasons, with 60–90% of assemblage total organic biomass. Changes in caddisfly functional feeding group biomass approximated those predicted by the river continuum concept. On Drummond Island, we collected 89 species (12 families & 37 genera) with confirmation of one species known from Michigan from only unconfirmed reports. Species assemblages between lakes, vernal pools, and the stream were distinct from each other, but with no difference between inland lakes and Lake Huron sites. Based on total organic biomass, all four habitat types were dominated (60–90%) by shredders, particularly those in the family Phryganeidae. In 2023, we studied the nocturnal flight periodicity of caddisflies at Drummond Island at one site on Lake Huron in June and July by making collections at 15-minute intervals from about 30-min before dusk to 1 am and then again at 3 and 5 am. At the same location on Drummond, a long-term study was initiated in 2023 with collections made in May, July, and September along with records of changes in Lake Huron water levels and shoreline vegetation.

One of the Finch Creek sampling sites

One Drummond Island sampling site used in 2021-2023

Houghton DC and RA Haack. 2023. The caddisflies (Trichoptera) of Drummond Island, Michigan, with an assessment of lake assemblage biomass. The Great Lakes Entomologist 56: 32-48.

Houghton DC and RA Haack. 2023. The caddisflies (Trichoptera) of Finch Creek, Antrim County, Michigan. The Great Lakes Entomologist 56: 49-64.

Incomplete Barriers to Heterospecific Mating Among *Somatochlora* Species as Revealed in Multi-gene Phylogenies

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Somatochlora dragonflies, commonly known as the striped emeralds, occur in fens, bogs, and forest streams, with many North American species found in the northern latitudes, but some occur in the South as far as Florida. Because of strict ecological requirements and sensitivity to anthropogenic disturbance, *Somatochlora* dragonflies are an enigmatic group whose systematics have lagged behind other Odonata genera. Males have elaborate claspers which are species-specific and often provide a barrier to heterospecific matings but exceptions have been observed. Mitochondrial DNA sequences are a source of data that systematists use for studying species and population relationships. Compared to nuclear genes (nDNA), mitochondrial genes (mtDNA) mutate at an accelerated rate, thereby allowing for the genetic discrimination of populations and species. Monophyly is expected for closely related species because ancestral mtDNA lineages go extinct after a speciation event four times faster than nuclear genes. The objective of this project is to investigate the occurrence of heterospecific mating between North American *Somatochlora* species as inferred from multi-gene phylogenies. Observation of non-monophyletic mtDNA lineages but monophyletic nDNA lineages between *Somatochlora* sister-species would indicate mtDNA introgression and suggest heterospecific matings. These multi-gene phylogenies of *Somatochlora* will be some of the first, providing a foundation for future ecological and evolution studies and knowledge for effective decision-making and public policy, which is especially important for the endangered species, *Somatochlora hineana*.

My buggy career as told through talks at MES Annual Meetings

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USDA Forest Service, Northern Research Station, East Lansing, MI (Emeritus)

I arrived in Michigan in spring 1984 after earning my Ph.D. in Florida. I soon joined MES and attended the 1984 MES annual meeting that June at the Kellogg Biological Station, but for some reason I did not give a talk that year. Since then, I have attended every MES Annual Meeting and also given at least one talk at every meeting except once. That year was 2004, when MES had its 50th anniversary and all talks were given by a few of our founding or very early members. Overall, if I counted correctly, I was first author on 47 talks and co-author on 17 other talks during the 39-year period from 1985 – 2023. I presented the talks in groups under different topics to show how the course of my career changed over time, and continues to change in retirement. Initially, I worked in the area of tree-stress -insect interactions, and then moved mostly into exotic forest insects, and the pathways by which they are moved (firewood and wood packaging material). Also, as a result of serving as a Peace Corps Volunteer in Guatemala during 1975-1977 and becoming fluent in Spanish, I had several opportunities to consult on forest insect pest problems in Latin America. Now in retirement, I have gotten involved in studies of aquatic insects.

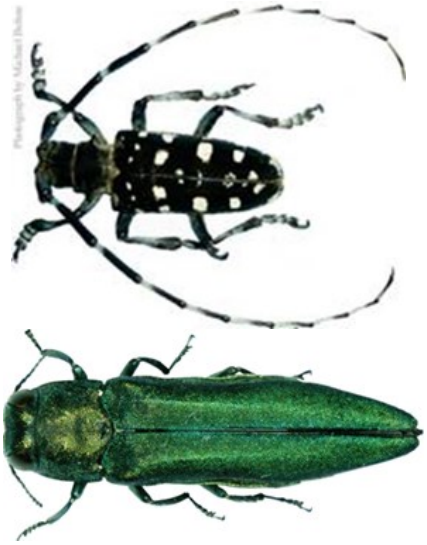
Outbreaks of pine bark beetles in Guatemala made me decide to study forest entomology in Grad School

The twolined chestnut borer was one of many beetles I studied at the MSU Kellogg Forest

Pine bark beetle outbreak in Belize

Carabids were used as bioindicators to assess various forest management practices

In retirement, now trapping caddisflies with UV lights and studying alderflies



Above (T to B) are the 3 major exotic forest pests I worked on: pine shoot beetle (discovered in US in 1992), Asian longhorened beetle (1996), and emerald ash borer (2002)

Inspecting firewood for borers that was dropped off by motorists at the Mackinac Bridge

Crating infested with wood borers

Burying beetle (Silphidae) Occurrence in Association with Soil Types in Wisconsin

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American burying beetle (USFWS)

Factors that affect and control species distributions are critical for conservation biology. Some species, such as burying beetles, have specific environmental requirements for persistence. For the eight silphid species found in Wisconsin, including the threatened American Burying Beetle (*Nicrophorus americanus*), we compared county-level occurrence data with percent sandy and loamy soil types. For three of the eight species, a positive association was found between beetle presence and soil type. Such associations can be important for conservation plans including reintroduction efforts and habitat preservation.

Lepidoptera Adventures Across the Northern Great Lakes and Beyond

Kyle E. Johnson, kejohnson4@wisc.edu

Kyle spoke about several Lepidoptera surveys he's been involved in during the past several years. The goals of the surveys were generally to 1) document biodiversity at different scales, 2) document habitat use, 3) document natural histories, and 4) assess conservation concerns. He then presented details of his surveys and key findings for projects that took him to several Michigan parks & preserves, Wisconsin prairies & barrens, peatlands of Minnesota, and lastly to Alaska.

***Copablepharon michiganensis*, a Lake Michigan dune endemic (found at Ludington State Park, 9 Aug. 2015).**

Restoring Savannas, Barrens, and Openings on the Baldwin/White Cloud Ranger District of the Huron-Manistee National Forest

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The Huron-Manistee National Forests' Baldwin/White Cloud Ranger District is working to restore, maintain, and improve connectivity within openland complexes comprised of oak savannas, barrens, upland openings, and lowland scrub habitats on the Manistee National Forest in the Lower Peninsula of Michigan. These habitats have vigorously growing grasses, wildflowers, shrubs, and trees which provide excellent food and cover, as well as habitat edge for wildlife, but need disturbance to be maintained. Many of these habitat types have declined over the past century due to reforestation, fire control efforts, the process of natural succession, and human development. In particular, oak savannas are now estimated to cover less than 1% of their historic extent. Plants and animals that are dependent on or seasonally utilize these habitats have decreased in numbers, including the Federally Endangered Karner blue butterfly. The District's efforts to restore openland complexes have increased by 15-fold over the last decade. Whereas an average of 190 acres per year was managed historically, the District now annually manages 2,850 acres of oak savannas, barrens, upland openings, and lowland scrub habitats. This work is paying ff! Management activities are improving the status of a diversity of at-risk species.

Karner blue butterfly

Insect Responses to Habitat Management in Southwest Michigan: Observations and Preliminary Findings

William P. Westrate and **Kenneth S. Kesson**
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The Michigan Department of Natural Resources, Wildlife Division, has partnered with Circle Pines Center and the Pierce Cedar Creek Institute of Barry County, Michigan, to conduct observational analysis on insect responses to habitat management. The study is in its third year. The objectives of the project are to establish baseline insect biomass data, as well as numerical data, on at least 30 insect families to assess potential changes from land management practices on two sites: one being treated organically, and one being treated using traditional methods of vegetation management (*i.e.*, spraying and mechanical removal), and comparing these findings to a control site on Barry State Game Area.

Mothing Tools: Light traps and a New Book

Alan Macnaughton

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My approach to mothing is to use light traps rather than the light-on-sheet method. I do catch-and-release, as my goal is to take photos for posting to iNaturalist rather than specimens. So, my light traps have a tub where the moths can rest on egg cartons instead of going into a container with a killing agent. The moths can be photographed as they rest on the egg carton if one uses egg cartons that have sloping sides rather than vertical sides.

I value portability highly. In my experience, to get the most diversity of species one needs to go where the moths are and try a variety of habitats. Moths often do not stray far from their larval foodplants.

I use light traps of the Robinson design, which was created in the UK in the 1940s. This design is especially good for retaining moths in the trap as moths tend to fly up into an area from which there is no exit. I buy these traps commercially from UK suppliers without the electrics and then add the light source (as discussed below). The traps have a high moth-containing capacity but are lightweight and stackable, with a rain drain. I can carry half a dozen in the back seat or trunk of my car.

For people looking for traps that can go on a plane, I would recommend either a Skinner trap (basically a box with the flaps partially folded down, with a light suspended over it) or a trap sold by LepiLED in Germany (basically a combined light and funnel with a bag of netting hanging from it to contain the egg cartons).

For a light source for the traps (which can also be used for sheeting), I use mercury-vapour (MV) bulbs where AC power is available. For a more portable light source, I used LEDs powered by lithium batteries. Because LEDs are much more efficient in generating light than MV bulbs, only a low-wattage light source is required. I recommend 5-volt 4-watt LEDs with a USB plug, as they can be powered all night with a 26,800 mAh battery commonly used as a phone or laptop charger. Niermann and Brehm (2022) find that the trap catch is no different from a more powerful 13-watt LED in most habitats, and the 13-watt LED requires a much heavier and more expensive battery (see picture at right comparing the batteries.

Black light LEDs sold by retailers for about US$15 are suitable for many purposes. However, the best moth nights are often rainy or threatening-rain nights, and for that one may wish to purchase the much more expensive LepiLED from Germany (gunnarbrehm.de/en/lepi-led). I have not had any lamp failures in three years of field operation of LepiLEDs.

Adding the light source to the Robinson trap is the only complication with this setup. (Unfortunately, there seem to be no suppliers of Robinson traps with the light source included that are appropriate for North American use.) For MV bulbs, one needs to attach a 110-volt rainproof bulb base to the funnel, which requires some electrical expertise (see photo below – the rain shield above the bulb comes with the trap purchase).

On the other hand, if an LED is the light source, all that is needed is coat-hanger wire bent into an inverted-U shape to suspend the light over the funnel (see photo below).

Michigan moth-ers may be interested in a new book (Beadle, King and Holder, 2023). This is the first volume, covering primarily Noctuidae, of a planned 4-volume set covering all of the moth species found in Ontario. One of the co-authors is also a co-author of the well-known Peterson Field Guide (Beadle and Leckie, 2012). The new book covers 643 species, with each species represented by a picture of the adult moth in its natural resting position. Roughly one-fifth of the species have additional pictures showing common variations.

References

Beadle D, King M, Holder P (2023). *Ontario Moths: A Photographic Guide, Volume 4*. Hawk Owl Publishing (mattholderfund.com). 168 pages, spiral bound.

Beadle D, Leckie S. (2012). *Peterson Field Guide to Moths of Northeastern North America*. Houghton Mifflin Harcourt.

Niermann J, Brehm G (2022) The number of sampled moths is more affected by microhabitat choice than by UV lamp type in a grassland habitat. *European Journal of Entomology* 119: 36-42.

Comparing Insect Biodiversity Between Curb-cut Rain Gardens and Residential Lawns

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Global insect biodiversity is at a major decline. Between 1985 and 2018, the terrestrial insect population has decreased by an average of 10.5% each decade. The drop in population can largely be attributed to a loss of natural habitat through conversion into urban and agricultural land. In the city of Grand Rapids, Plaster Creek Stewards have implemented many green infrastructure projects, including more than 200 rain gardens. These curbside gardens benefit the watershed by soaking up rainfall, reducing flash flooding, but they also bring a native landscape to urban areas. The purpose of this project is to compare insect biodiversity between the native rain gardens and grass lawns. Seven sites were chosen at random from a list of rain gardens that had been planted by Plaster Creek Stewards at least two years ago. So far, there have been three data collections, each about three weeks apart. Insects were collected using pitfall traps and insect netting. Caught insects were then brought to the lab and identified to family. Non-insect arthropods that were collected, including spiders and isopods, were identified to order. After the collections are complete, we plan to compare the overall biodiversity of the insects found in the lawns with those found in the gardens by quantifying biodiversity using Simpson's Biodiversity Index and the Shannon Index. Temperature, plant density, shade coverage, garden health, and plant species present were all recorded, and we plan to use these data to look for possible correlations between these variables and types of insects present. So far, the data indicate that curb-cut rain gardens are inhabited by more unique families of insects than the lawns.

Lepidoptera of Outagamie County, Wisconsin, and Adjacent Areas

Hugo L. Kons, Jr., hkonsjr@yahoo.com

I have conducted extensive Lepidoptera surveys in Outagamie County, Wisconsin, and adjacent areas, especially from 1989-1996 and 2016-2022. I have computerized over 110,000 unique records for over 560,000 individuals representing over 2,111 species. The most intensively studied site is a suburban yard in Appleton (1309 species), followed by three sites with a diverse assortment of natural habitats: Mosquito Hill Nature Center (1575 species), Fallen Timbers Environmental Center (1325 species), and the Navarino Wildlife Area in southern Shawano County (1432 species). Seasonal species diversity of adults is unimodal with a peak in early July; however, seasonal species diversity patterns differ among major taxonomic groups. I hypothesize that at least 222 of the species recorded are strays or ephemeral migrants outside of their permanent ranges, and that 90.5% are of southern origin, 3.2% of western origin, and 6.3% of northern origin. The survey period from 2016-2022 has produced higher species diversity and abundance of southern strays and ephemeral migrants than surveys from 1989-1995 (175 versus 60 species). Subsequent to the 1989-1996 study interval, 183 Macrolepidoptera and Rhopalocera species have been newly recorded from Outagamie County, including 173 species added from 2015-2022. I hypothesize that 96 of these new records are strays or ephemeral migrants outside of their permanent ranges, 85 of which are of southern origin. Thirty-two of the newly recorded species appear to be new colonizations, as is also the case for four species historically recorded from single specimens. The new colonizations are primarily southern species moving their ranges north (22 species) and Palearctic species expanding their ranges in the Nearctic (8 species).

Micromanaging Midges: Utilization of Stem Removal in the Soybean Gall Midge Colony

Christina Manna (Hillsdale College), **Molly Darlington**, and **Anthony McMechan** (both University of Nebraska)
Contact: mannamantis@gmail.com

The soybean gall midge (SGM, *Resseliella maxima* Gagné) is a recently identified pest of soybean across the Midwestern United States. SGM adults emerge each spring to lay eggs in natural fissures of V2-stage soybean, where larvae feed on the stems, potentially leading to plant death. After completing three instars, larvae move into the soil, pupate, and emerge as adults. This cycle is repeated every ~30 days until entering diapause in the fall. It can cause up to 100% yield losses on the edges of the field and 31% yield losses on the interior of the field. Due to the economic value of soybean in the US markets, the soybean gall midge threatens soybean production in the Midwest. Currently, the SGM research can only be conducted during the summer after it has emerged. Methods are needed for consistently producing a lab colony of SGM.

To maintain a colony, the SGM infested stems must be replaced as frequently as possible. This project was designed to discover how long the larvae stay in the stem of the soybean plant and the rate of adult emergence in relation to that time. Soybean stems infested with SGM larvae were cut from the field, placed in a bucket, allowed to pupate, and emerge as adults. Adults were collected from each of the buckets every two days. The results found that removing the stems between 21-28 days is ideal to maximize larval development and adult emergence. These methods will allow researchers to better rear SGM in the lab.

Figure 1. (a) Adult SGM, **(b)** third instar SGM, **(c)** impact of SGM infestation on soybean.

Color Pattern Does not Associate with Species Boundaries of Most North American (North of Mexico) *Paranthrene* Hübner Clearwing Moths (Lepidoptera: Sesiidae) as Inferred from a Multi-gene Phylogeny

William H. Smith III, William H. Taft, and Anthony I. Cognato

Contacts: <smithw33@msu.edu>, <cognato@msu.edu>

Dept. of Entomology, MSU, East Lansing, MI

Paranthrene species are day flying moths that mimic wasps in both appearance and behavior. The genus has several species with diverse color patterns that are restricted geographically. Many of these color forms were originally described as species before becoming synonymized with each other due to similar behavior and morphology. To date, there have been no molecular multi-gene phylogenetic studies that investigate the monophyly of North American *Paranthrene* species boundaries. We reconstructed a phylogeny using partial DNA sequence from COI, EF-1alpha and wingless genes with # specimens representing all North American *Paranthrene* species, subspecies, and variants. Monophyly of any *P. simulans* color forms was not recovered in parsimony and Bayesian analyses. The results also suggest the synonymy of *P. simulans*, *P. pellucida*, and *P. hilairemontis*. Interestingly, the two-color forms of *P. tabaniformis* comprised two clades, one which was sister to a clade including *P. dolli*. Individuals of this clade also have a different flight period than *P. tabaniformis* which suggests the recognition of the clade as a species.

Activities of the Toronto Entomologists' Association

Alan Macnaughton, amacnaughton@uwaterloo.ca

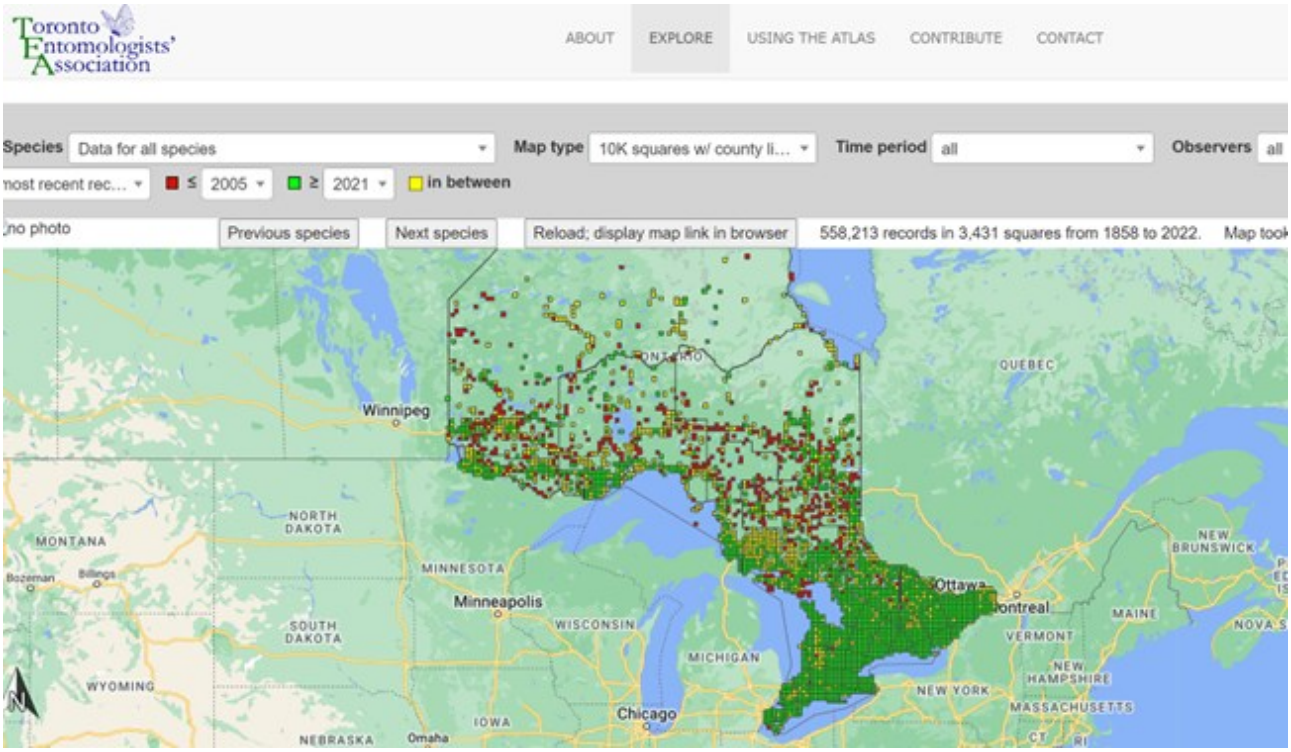
In 1967 a need was seen for an organization directed at amateur entomologists, to be based in Toronto. This was to be distinguished from the existing organization of professional entomologists, the Entomological Society of Ontario (ESO). Originally this new organization was planned to be a branch of the Michigan Entomological Society, but those plans were never carried out. In 1970 the club became the Toronto Entomologists' Association (TEA). Fifty years later, in-person monthly meetings continue to be held in Toronto, but now more than two-thirds of the 230 members are from other parts of Ontario and can only attend our Zoom meetings. I am vice-president. In that role I hope to bring about an ongoing flow of information between the MES and the TEA.

A newsletter of about 30 pages is published 3 times per year, which members can receive in either print form or pdf. The newsletter is posted on the TEA's website (ontarioinsects.org) after 2 years have elapsed. A seasonal summary of butterfly observations was published annually from 1970 to 2019, and the club is currently struggling to revive it. It is called "Ontario Lepidoptera," and moth observations appear in some years. There are also occasional monographs, most notably a book entitled the "Ontario Butterfly Atlas" published in 1991. The TEA does not publish an academic journal.

In 2011, with the advent of better technology, the "Ontario Butterfly Atlas" was launched as an online resource (ontarioinsects.org/atlas). The goal of the online Atlas is to combine butterfly data for all years and all sources (iNaturalist, eButterfly, museum records, and records submitted directly to the TEA) to produce a map of each species and allow display of the underlying observations. There are 560,000 records, and about 30,000 are added each year. The TEA would welcome the use of its Javascript/PHP software to produce web-based maps of other species and from other localities – perhaps Michigan butterflies. All that is required is a database of observations with latitude and longitude for each. An ongoing commitment to keep the database up to date would make these maps especially helpful.

The TEA is a registered charity, and donations and bequests are in some years as large as membership revenue. An annual lecture series, the Hess lecture, has been sponsored by the family of a long-time member and is held in collaboration with the Royal Ontario Museum. Similarly, family and associates of a former president have contributed donations to greatly expand the TEA's program of research grants for students (currently about US$600 per year for each of two students). Donors have also supported an Ontario butterfly conservation fund.

In the last couple of years, many people have joined the TEA for the purpose (at least initially) of being part of the TEA's group permit for the rearing of Monarch and swallowtail butterflies. Ontario law requires a permit for this activity, although the vast majority of people are unaware of this law. This law has indirectly become a gateway through which the large community of people rearing Monarch butterflies has developed a broader interest in insects.



How the Streams of Inquiry Flow from Hilsenhoff through to the Construction of a Canadian Biomonitoring Program

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[4] Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany

William L. Hilsenhoff (1929-2011; University of Wisconsin;) made enormous contributions to aquatic ecology throughout his career, from well-cited papers in large, peer-reviewed journals through to the detailed natural history descriptions of specific aquatic insect taxa in Michigan and Wisconsin. Throughout the development of biotic indices for pollution and notes on distribution, habitat, and identification, he relied on The Great Lakes Entomologist as a repository and outlet for his findings, and the contribution of these articles from TGLE cannot be overstated for developing biomonitoring programs elsewhere in North America. For example, the recent completion of the Saskatchewan Condition Assessment of Lotic Ecosystems for the Northern Great Plains in Canada has relied on these original ideas, and the philosophy underpinning larger landscape-scale ecosystem health assessments with sound aquatic entomology such as what was provided through TGLE has been an inspiration to the development of more accurate tools in condition determination there. My presentation provided insights learned on how to use aquatic entomology for ecosystem health assessment in the Northern Great Plains, but also provided a characterization of how the lessons I feel have been provided by Dr. Hilsenhoff's career and produced through TGLE have benefited the field of aquatic entomology.

Hilsenhoff, W. L. 1987. An improved biotic index of organic stream pollution. The Great Lakes Entomologist 20: 31-39.

Hilsenhoff, W. L. 1988. "Seasonal correction factors for the biotic index. The Great Lakes Entomologist 21: 9-13.

Hilsenhoff, W. L. 1998. A modification of the biotic index of organic stream pollution to remedy problems and permit its use throughout the year. The Great Lakes Entomologist 31: 1-12.

Singing Insects: Some Things to Listen For

Carl A. Strang, wildlifer@aol.com

Independent Researcher, Warrenville, IL

This presentation featured singing insects in one or more of the following categories: species extending their ranges northward toward Michigan and Wisconsin; recently described species; and relatively poorly known species with songs that are difficult to distinguish.

Japanese burrowing crickets (*Velarifictorus micado*) are spreading north from their probable introduction at Mobile, Alabama. They are in southern Berrien County, Michigan, and within a few miles of Kenosha County, Wisconsin. Jumping bush crickets (*Orocharis saltator*) are established in southern Berrien and are in two counties immediately south of Kenosha, having expanded half a state north from where they were known in 1969. Cuban ground crickets (*Neonemobius cubensis*) are in Berrien County, Michigan, and Walworth, Kenosha and Racine Counties, Wisconsin. Their previously known range was not north of Tennessee, but the question is open whether this represents a range extension or simply an overlooked species in past surveys. The broad-winged tree cricket (*Oecanthus latipennis*) is half a state north of its previously established range, now found in Berrien and Kenosha Counties. The slow-tinkling trig (*Anaxipha tinnulenta*) represents another half-state extension based on museum collections, now occurring in Berrien County and still two counties south of Wisconsin. The handsome trig (*Phyllopalpus pulchellus*), another species half a state north of its previously known range, is now abundant in southern Berrien and is approaching Kenosha County. The slightly musical conehead (*Neoconocephalus exiliscanorus*) likewise is half a state north of its previously known range, and has reached the southern edge of Berrien County. The round-tipped conehead (*N. retusus*) now is in Berrien, Walworth, Kenosha and Racine Counties, having expanded its range by half a state. The swamp cicada (*Neotibicen tibicen*) had been known in Michigan, but is turning up at an increasing number of sites in northeast Illinois, the northernmost a few miles south of Kenosha County.

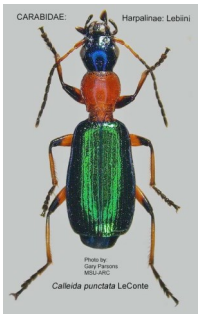
Two species newly described in 2014 are the slow-tinkling trig, mentioned earlier, and the spring trig (*Anaxipha vernalis*). The latter as yet is well south of Michigan and Wisconsin.

Two species pairs whose similar songs need to be identified via computer analysis are, first, the slow-tinkling trig and tinkling ground cricket (*Allonemobius tinnulus*); and second, the Cuban and variegated (*Neonemobius variegatus*) ground crickets. In each case, pulse rate is the main difference.

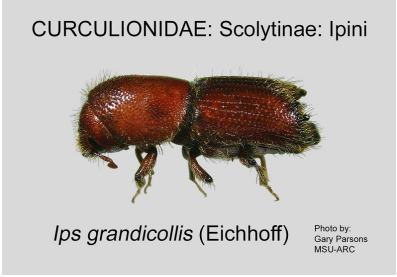
Beetles of Michigan Project

William G. Ruesink, Gary L. Parsons, Robert A. Haack & Mark A. Ruesink

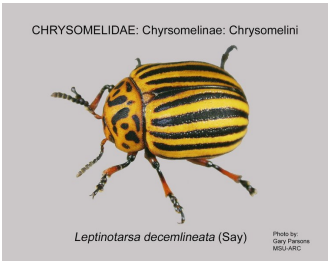
wruesink@ruesink.org, parsonsg@msu.edu, robert.haack@usda.gov, mark@ruesink.org



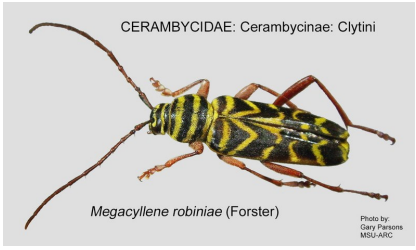
Various lists of Michigan beetles (Coleoptera) have been published since the late 1800s, but most of those dealt with only one family. Until now the only state-wide list of all beetles for Michigan was published by Hubbard and Schwarz (1878). At that time, they listed 2,073 species in 78 families. In this project we have greatly expanded that initial list and as of August 1, 2023, our list included 118 families and 4,179 species that we accept as fully reliable records for the state plus an additional 210 species which, although reported in less reliable sources, we feel are very likely to be here. These 4,389 species represent about 18% of the U.S. total of nearly 25,000 beetles.



After extracting Michigan records from about 600 published sources and from the Michigan State University Arthropod Research Collection (MSU-ARC), a Beetles of Michigan website (http://beetlesofmichigan.org/) was created that includes the name as well as source citations for every species ever reported as occurring in the state. In addition to the 4,389 species mentioned above, 544 species reported in published literature were marked as either outright rejected or as unlikely to occur here; still they are included on the website but marked as unaccepted. Also included are high resolution photos of many species (about 400 as of August 1, 2023). We plan to illustrate the range of appearances found in each family, although at present this aspect is far from complete, especially for species under 5 mm long.



For species in the MSU-ARC but not reported in any publication that we found, we confirmed the identifications and published the results in previous issues of this Newsletter before including them in our list. Nearly all the 288 species listed in those reports have been in the state for many years, with some specimens collected over 100 years ago (Ruesink and Parsons 2021, 2022, 2023a, 2023b).



We plan to update the website as new results are obtained. We are now searching for additional records in the University of Michigan Museum of Zoology Insect Collection and plan to look more carefully for missed records in the MSU-ARC. An important future need is to arrange for long-term maintenance of the website.

References

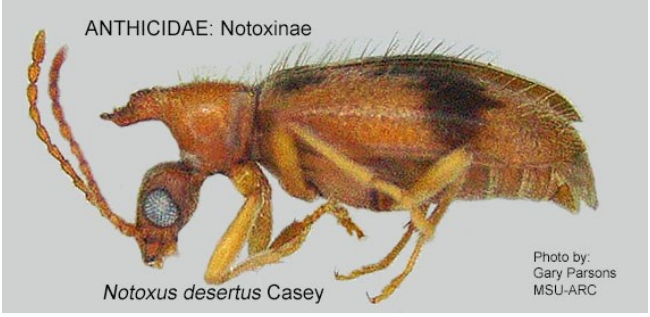
Hubbard, H. G., and E. A. Schwarz. 1878. The Coleoptera of Michigan. Proceedings of the American Philosophical Society 17: 593-669.

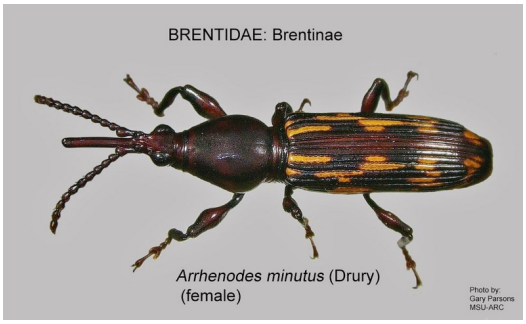
Ruesink, W. G., and G. L. Parsons 2021. Beetle species in the MSU-ARC not previously reported from Michigan: Contribution #1. Newsletter of the Michigan Entomological Society 65(3): 14-17.

Ruesink, W. G., and G. L. Parsons 2022. Beetle species in the MSU-ARC not previously reported from Michigan: Contribution #2. Newsletter of the Michigan Entomological Society 66(3): 10-17.

Ruesink, W. G., and G. L. Parsons 2023a. Beetle species in the MSU-ARC not previously reported from Michigan: Contribution #3. Newsletter of the Michigan Entomological Society 67(1): 3-11.

Ruesink, W. G., and G. L. Parsons 2023b. Beetle species in the MSU-ARC not previously reported from Michigan: Contribution #4. Newsletter of the Michigan Entomological Society 67(2): 4-13.





Perspectives on Over 20 Years of Benthic Macroinvertebrate Monitoring on the Oneida Nation Reservation [Wisconsin]

James L. Snitgen, jsnitgen@oneidanation.org

Environmental Quality Manager; Oneida Environmental Health, Safety, Land and Agriculture Division; Oneida, WI

Biological monitoring using benthic macroinvertebrates has been conducted for over 20 years on the Oneida Nation Reservation. During that time, it has been used for the determination of baseline communities, documentation of trends and gauging the success of lake, stream, and wetland restoration projects. Concentrating that effort in a limited area has produced some notable finds and valuable perspectives. The pictures below show aerial vies of stream restoration projects. Sampling of macroinvertebrates was conducted before and after stream restoration .

Two photos of the Silver Creek Restoration Project after completion

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A Partial Inventory of Michigan Entomological Society Publications in Storage at MSU

Ralph Gorton, ralphgorton@gmail.com

For many years, additional copies of the MES Newsletter, *Entomology Notes*, *The Michigan Entomologist*, and *The Great Lakes Entomologist* (TGLE) have been stored at the A. J. Cook Arthropod Research Collection (ARC), Department of Entomology at Michigan State University. During the September 2023 MES Board meeting in Ludington, MI, it was suggested that a more complete inventory of what journals were in storage would be useful.

At that board meeting, I offered to begin the inventory. On October 31, I made a brief visit to the ARC and present here an overview of those holdings. I hope to make subsequent visits to MSU and prepare a more complete inventory if necessary. There are stacks and stacks of all the MES Newsletters (really too many to actually count). However, note that all MES Newsletters (Vols. 1 – 67) are available for downloading on the MES website.

There are also quite a few copies of all 31 issues of the *Entomology Notes*. The final issue of the *Notes* was published in April 2008. All 31 issues of *Notes* are also available on the MES website and can be downloaded and printed as PDF documents.

As for *The Michigan Entomologist,* I found one box labeled Volumes 5 – 9, which contained 24 copies. Other volumes will likely be found on another visit. As for *The Great Lakes Entomologist*, there were labeled stacks for every year, but due to time constraints I only counted the more recent volumes (2002 - 2016). For these volumes 35 – 49, the counts ranged from 16 – 40 copies, with most counts being around 20 – 25. It's worth noting that Vol. 37 (3&4, 2004) only had one copy, Vol. 45 (3&4, 2012) had just 4 copies, and Vol. 45 (1&2, 2012) just 9 copies. All issues of the MES journals through 2016 can also be downloaded as PDF files from the MES website, with all issues available on the Valparaiso University at:
https://scholar.valpo.edu/tgle/

If you wish to obtain a complete set of some of these hardcopy publications, or need to fill some gaps in your library, let members of the MES Governing Board know and arrangements will be made.

MES Historical Notes for 2023

Robert A. Haack
Email: robert.haack@usda.gov or haack@msu.edu

1998 – 25 years ago. In 1998, Leah Bauer was President; Ron Priest was President-Elect; Dan Herms was immediate Past-President; Mo Nielsen was Treasurer, Bob Kriegel was Secretary; Dave Cuthrell, Chip Franke, and Tom Wallenmaier were the three Members-at-Large; Mark O'Brien was Journal Editor; and Bob Haack and Therese Poland were the Newsletter Editors. The 44th MES Annual Meeting was held at Hidden Lake Gardens in Tipton on June 5, 1998. There were 10 contributed talks and one invited talk by Ann Hajek of Cornell University, who spoke on the use of *Entomophaga maimaiga* for control of the gypsy moth (now spongy moth). The contributed talks covered topics the American dog tick, northern field cricket, prairie Lepidoptera, pine shoot beetle, forest tent caterpillar, leatherwood leafminer, hydrophilid water beetles, and carabid beetles. Some of the stories contributed by members that appeared in the 1998 MES Newsletters dealt with the biocontrol of leafy spurge, Michigan's Lepidoptera Survey, a checklist of Michigan's butterflies and skippers, exotic bark beetles, the "winged jewels" display at MSU to celebrate publication of Mo Nielsen's Michigan Butterfly Book, Michigan's Microlepidoptera, discovery of Asian longhorned beetle in Chicago, pine bark beetle outbreaks in the Dominican Republic. At the end of 1998, MES had 406 members and 293 institutional journal subscriptions. MES annual dues were $15 per year for active members, $5 for students, and $35 for libraries in 1997. Journal page charges were $35 per page. In addition, Mark O'Brien announced that he would step down as editor of The Great Lakes Entomologist in 1998, so a search began for a new editor.

1973 – 50 years ago. In 1973, Richard Fleming was President; Robert Husband was President-Elect; Dean Dillery was immediate Past-President; Mo Nielsen was Executive-Secretary, Irving Cantrall was the Journal Editor, and Louie Wilson was the MES Newsletter Editor. The 19th annual MES meeting was held at MSU on May 18. Seven talks were presented on topics such as parasitic mites on insects, cereal leaf beetle, European workers on parasitic insects, A. A. Girault - an eccentric Hymenopterist, the digestive tract of syrphid flies, Michigan hornets and yellow jackets, and the nervous system of tiger beetles. The 3rd and 4th MES "*Entomology Notes*" appeared in 1973, with one on rearing isopods and the other on drawing insects from a stereo microscope. Some of the items discussed in the 1973 MES Newsletters included the value of amateur insect collecting, outbreaks of exotic insects in Michigan such as gypsy moth and cereal leaf beetle, and the formation of the Xerces Society. Annual dues in 1973 were $4 per year for active members $2 for students, and $6 for library subscriptions. As of mid-1973, MES had 445 active members and an additional 196 library subscriptions for the journal. Page charges to publish in *The Great Lakes Entomologist* were $18 per page.

2023-2024 Officers of MES

President - John Douglass, jfdouglass7@gmail.com
President-Elect - **open**
Immediate Past President - Brian Scholtens, scholtensb@cofc.edu
Membership Secretary - Adrienne O'Brien, amobrien@umich.edu
Recording Secretary - **open**
Treasurer - Angie Pytel, apytel@hillsdale.edu
Members-at-Large
Martin Andree, martinjandree@gmail.com
Ralph Gorton, ralphgorton@gmail.com
William Ruesink, wruesink@ruesink.org
Robert Haack, haack@msu.edu
Newsletter Editors -
Crystal Dailey, smilingrainbow00@yahoo.co
Duke Elsner, elsner@msu.edu
Webmaster - Mark O'Brien, mfobrien@gmail.com (**now open**)
Social Media - Crystal Dailey, daileybugologist@gmail.com

The Great Lakes Entomologist Team:
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William Ruesink, wruesink@ruesink.org
William Scharf, wcscharf@charter.net
Daniel Swanson, drswanny@gmail.com

MES Membership Annual Dues
Student: $12
Active: $25
Sustaining: $35
Institutional: $45

Philaenus haiku

The spittlebug pumps
its rear with gusto. Voila,
a fine frothy home

Ralph J. Gorton (with apologies to Basho)
Email: ralphgorton@gmail.com

MES 2023 Annual Meeting Minutes – September 16, 2023
69th Annual Meeting – combined meeting of the Michigan and Wisconsin Entomological Societies
Harbor View Marina, Ludington, MI

Present: Les Ferge, Adrienne O'Brien, Mark O'Brien, Bob Haack, Martin Andree, Ralph Gorton, Mark VanderWerp, Angie Pytel, Carl Strang, Dave Dister, Bill Westrate, Bill Ruesink, John Douglass, Kyle Johnson, Pat Hudson, Steve Bransky

Reports:

Treasurer: Angie Pytel - Checking account balance is $41,123.47, up ~$6000 from September 2022. There are some unpaid invoices for articles in The Great Lakes Entomologist. Angie will notify the authors again and then will seek advice from the board on what actions to take.

Secretary: Adrienne O'Brien - Membership is at 192

Newsletter: No report

Journal: Alicia Bray – The Fall/Winter 2022 Volume 55 Nos. 3&4 issue was published in February 2023. The Spring/Summer Spring/Summer 2023 Volume 56 Nos. 1&2 issue was closed on June 30th, 2023 and published in September 2023. The average time between receiving and accepting manuscripts has been about 38 days, ranging from 1 day to over 3 months (depending mostly on the speed of the reviewers). DOI (Digital Object Identifier) numbers were added (at no cost to MES) to all journal articles in the last issue of TGLE as well as to all earlier articles. The author instructions need to be revised. Let Alicia know if you wish to assist. Alicia is having difficulty finding reviewers for some papers, especially those dealing with Hemiptera.

Social media: No report

Webmaster: Mark O'Brien is going to retire as the MES webmaster. The Society is now contracting with someone to update the website. See the exciting news below about these changes.

Old Business: Ralph Gorton will inventory back issues of The Great Lakes Entomologist that are stored at MSU. (see his report on page 15). It was noted that some recently sent email ballots went to spam. Will send ballots as bcc next time.

New Business:

Website: Over the summer, the MES Governing Board decided to contact Gwen Pearson, a former MES member and science writer about options for a new website. The goals for the website are to make it more user-friendly and appealing to online visitors. We are looking to make it easy to update. Gwen has been hired to develop a basic website on WordPress and she is giving us a special discount. We look forward to seeing a new and improved design from Gwen.

Name change proposed: John Douglass proposed that we consider changing our name (MES) to the **Great Lakes Entomological Society**. It would respect sister organizations, such as the Wisconsin Entomological Society and the Toronto Entomologists' Association, and hopefully bring in more membership from nearby states and provinces. Adrienne O'Brien has volunteered to be on a taskforce to contact other societies about their interest and support for this name change. Let Adrienne know if you want to assist.

Secretary position: Currently, the MES Secretary is responsible for membership records and recording minutes at meetings. Adrienne would be very happy to continue as the Membership Secretary, but finds it difficult to take minutes, especially now with living in NC. One suggestion was to record the meetings on a phone, then transcribing, but that has drawbacks. As mentioned on page 1 of this newsletter, we are requesting that a MES member steps forward to take on the Recording Secretary role.

Other comments. Martin Andree is concerned about too many entomologists moving away from collecting of specimens (as opposed to photos only).

Submitted by Adrienne O'Brien, November 12, 2023