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68th Annual Meeting Highlights

President-elect Brian Scholtens did a fine job of planning and facilitating our 68th annual meeting at North Central Michigan College in Petoskey. Thanks to fewer Covid-19 concerns in 2022, this meeting was a nice return to near-normal for our society.

A field trip to Wilderness State Park on June 11 gave us a look at one of Michigan's finest dune habitats.



A number of very interesting papers were presented on June 10. "Self-Medication in Monarch Butterflies" was the topic of our plenary speaker, Dr. Mark Hunter.



Spotted Lanternfly Found in Michigan

The first occurrence of the spotted lanternfly (*Lycorma delicatula*) in the state was recorded in Oakland County, according to an August 10 news release from the state of Michigan.

The Michigan Department of Agriculture and Rural Development quickly responded with a "See it. Squash it. Report it." program!

Identify spotted lanternfly

Michigan Department of Agriculture and Rural Development
www.Michigan.gov/spottedlanternfly

	<ul style="list-style-type: none"> About 1 inch long Folded wings are gray to brown with black spots Bright red head wings
	<ul style="list-style-type: none"> Looks like chewing gum or sooty with a waxy coating 1.5 inches
	<ul style="list-style-type: none"> 1/2 to 3/4 inch long Winged and beetle-like White spots

See it. Squash it. Report it.

Presentation Abstracts from the 68th Annual Meeting

Where to Set Heat Treatment Requirements for Domestic Firewood and Wood Packaging Materials Used in International Trade?

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Bark- and wood-infesting insects (which we'll refer to as borers) can be transported in solid wood to new areas both domestically, especially in firewood, and internationally, especially in wood packaging material (WPM) like crating and pallets (Haack 2006). Borer generation times range from months to multiple years, and as wood dries, such as with stacked firewood, generation times can be extended (Haack and Slansky 1987, Petrice and Haack 2007). The current international standard for heat treating WPM, known as ISPM 15 (IPPC 2019), requires that the wood be heated to at least 56°C for 30 continuous minutes throughout the wood, including the core. For interstate movement of firewood in the US, regulations vary from state to state. Some have no restrictions at all, while others require 56°C for 30 min, 60°C for 60 min, or 71.1°C for 75 min (Downs and Greenwood 2022).

People commonly move firewood in the US, especially when going on camping trips (Haack and Petrice 2021). In surveys of firewood that was confiscated from the public at Michigan's Mackinac Bridge, when firewood

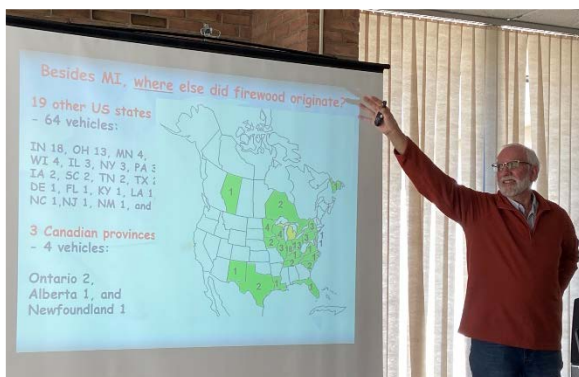


The Asian longhorned beetle (left) and emerald ash borer (right) are examples of borers that likely first entered the USA from Asia in wood packaging material and later moved domestically in firewood.

was prohibited from entering Michigan's Upper Peninsula to slow the spread of emerald ash borer (*Agrilus planipennis*), we found that 23% of the firewood pieces had live borers, and another 41% had signs of past borer infestation, e.g., larval galleries and adult exit holes (Haack et al. 2010).

We conducted studies to assess the survival of borers in heat-treated wood. To accomplish this, we heat-treated bolts of wood cut from the trunks of naturally infested, small diameter ash, birch, oak, and pine trees. The hardwood tree species were infested with various *Agrilus* species (Buprestidae), whereas the pine was infested with various Buprestidae, Cerambycidae, and Curculionidae (both bark beetles and weevils).

We treated the wood in a high-temperature chamber, and monitored the core temperature of each bolt individually. We assessed borer mortality in bolts that were heated to core temperatures of 50, 53, 56 and 60°C for 30 min. We also evaluated differences in mortality if the core temperatures were reached by setting the inside air temperature of the chambers to 60, 65, 70, and 75°C. We did this because most large commercial heat-treatment facilities can easily attain chamber temperatures of 75°C or higher, but many small operations cannot.



Briefly, and just focusing on the target core-temperature of 56°C for 30 min, we found complete mortality of *Agrilus anxius* in birch and *Agrilus planipennis* in ash at all chamber temperatures. However, on oak, a few *Agrilus bilineatus* emerged from bolts heated to 56°C core temperature at lower chamber temperatures (60 and 65°C), whereas a few *Agrilus sulcicollis* emerged from bolts at all four chamber temperatures. For pine, all weevils died, some bark beetles and cerambycids survived the lower chamber temperatures, and a few buprestids survived all chamber temperatures. However, there was complete mortality in all hosts when bolts were heated to a core temperature of 60°C for 30 min, regardless of chamber temperature. These results were discussed in terms of current firewood and WPM heat-treatment requirements and will be published in a forthcoming paper (Haack and Petrice 2022).

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Singing Insects: Some Recent Advances

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Last year’s emergence of Brood X periodical cicadas (*Magicicada* spp.), and the upcoming emergence of Brood XIII in 2024, offer the opportunity to resolve part of a confusing boundary between the two broods. Glacial geology appears to play a role in this. Clarification of the insects’ decision on when to emerge has opened the possibility that a few of them live to be 21 years old.



Several species of crickets and katydids have extended their ranges northward in the past century. Some species that have reached Michigan are the Japanese burrowing cricket (*Velarifictorus micado*), jumping bush cricket (*Orocharis saltator*), Cuban ground cricket (*Neonemobius cubensis*), broad-winged tree cricket (*Oecanthus latipennis*), slow-tinkling trig (*Anaxipha tinnulenta*), handsome trig (*Phyllolopus pulchellus*), slightly musical conehead (*Neoconocephalus exiliscanorus*), and round-tipped conehead (*Neoconocephalus retusus*).

Others, for example the confused ground cricket (*Eunemobius confusus*), long-spurred meadow katydid (*Orchelimum silvaticum*), and Nebraska conehead (*Neoconocephalus nebrascensis*), have remained remarkably stable.

Florida Human & Frog Exposure Assessment for Naled and Temephos, Mosquito Control Insecticides

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A hotspot of frog abnormality is currently present in a highly populated suburban SW Florida USA landscape (Anzaldua Pratt & Goldberg, 2019, 2020). The important questions such as pollutant identity causing the frog illness, if humans are being poisoned also, how widespread is the problem and can we provide a diagnostic for the illness are important questions to be addressed and answered in this

study. The SW Florida USA suburban environmental pollutant is an Endocrine Disrupting Chemical (EDC) (Anzaldua Pratt & Goldberg, 2019, 2020). The EDC is a synthetic compound that targets both the endocrine and central nervous system brain. This study will use the described and quantified hotspot of frog abnormality to identify the neuroendocrine-disrupting pollutant. A bioassay will be run in the laboratory subjecting a control wild *O. septentrionalis* wild population frog (EVER) never exposed to any pollutant to a short list of suspect ecotoxins used in the suburban frog's landscape by the State of Florida County Mosquito Control Program.

It is highly likely that the ecotoxin that is poisoning both the suburban populations of wild frogs, toads and possibly humans will be the Mosquito Control insecticide Organophosphate (OP) considering the frog illness matches the Organophosphate's mode of kill action for the eradication of the mosquitoes being neurotoxin acetylcholinesterase (AChE) inhibition with the neuropathy. A Florida suburban Statewide survey conducted in this study will collect frogs and human participants that will have their blood drawn for mass spectrometry analysis detection of Naled and Temephos chemical in the bloodstream. The mass spectrometry analysis will positively identify the presence of the identified ecotoxin in the identification of agent bioassay and also link the chemical with the wild population abnormality on a Florida State-wide basis which will provide us with important epidemiological data to determine spread of illness and a location. The highest frequency amphibian abnormality for our pollutant is the male frog testicular abnormality at 92% (Anzaldua Pratt & Goldberg, 2020).

We will use this knowledge of highest frequency abnormality induced by the ecotoxin to quickly identify the problem areas using the frog involving a rapid gross examination of the adult male frog to expose the testes. Confirmation of the disease caused by the pollutant will follow by the testing for chemical in human and frog blood and semen.

Collecting Caddisflies in Northern Michigan and other Tales from a Retired Forest Entomologist

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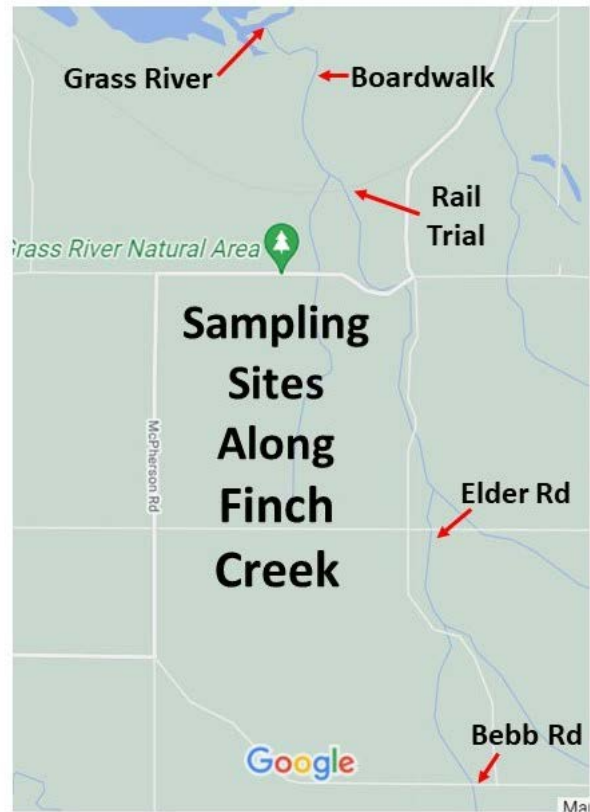
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More than 300 caddisfly (Trichoptera) species have been reported from Michigan (Houghton et al. 2018, Houghton 2020). Starting in 2021, we used UV-lights laid over a pan of 80% ethanol to collect adult caddisflies at five sites along Finch Creek (Antrim County) and at 12 sites on Drummond Island (Chippewa County). Collecting occurred three times in 2021 along Finch Creek (June, July, and September) and twice on Drummond Island (June and September). So far in 2022, collecting has occurred in May at all sites and at Finch Creek in June.

Sampling occurred along a 5 km stretch of Finch Creek, starting where it is only a few meters wide to where it is over 30 m wide and empties into the Grass River. The three most downstream sites are within the Grass River Natural Area, a nearly 600 ha preserve (<https://www.grassriver.org/>), which was the location of a recent beetle survey (Haack and Ruesink 2020).

Through May 2022, 77 species have been identified, representing 15 families. The five families with the most species were Limnephilidae (16), Leptoceridae (13), Polycentropodidae (9), Phryganeidae (7), and Hydropsychidae (6). Collections of *Pycnopsyche circularis* (Limnephilidae) and *Wormaldia moesta* (Philopotamidae) represent the first known captures of these species in Michigan's Lower Peninsula. Three other noteworthy species, which have not been collected since the 1940s, were *Lepidostoma prominens* (Lepidostomatidae), *Limnephilus externus* (Limnephilidae), and *Limnephilus parvulus* (Limnephilidae); the last species was also collected on Drummond Island.



Sampling Sites on Drummond Island



The 12 sampling sites on Drummond Island represented 1 stream, 3 shoreline locations, and 8 inland lakes. Including all 2021 but only some May 2022 collections, 73 caddisfly species have been identified, representing 11

families.



Hesperophylax designatus (Limnephilidae) was found in abundance at Finch Creek in May 2022.

The five families with the most species were Leptoceridae (19), Hydroptilidae (13), Phryganeidae (10), Polycentropodidae (10), and Limnephilidae (8). Collections of *Agrypnia colorata* (Phryganeidae) from several Drummond Island lakes represent the first collections in Michigan since the 1950s. In addition, a single specimen of *Holocentropus (Polycentropus) milaca* (Polycentropodidae) was collected, which is a species that has been found worldwide from only six total sites in Michigan and Minnesota.

One other record of note was the collection of *Glyphopsyche irrorata* (Limnephilidae) at both Finch Creek and Drummond Island in May 2022. This species emerges in autumn and overwinters as an adult (Berté and Pritchard 1983). The adults become active again in spring and are seldom collected after mid-May.



Ptilostomis semifasciata (Phryganeidae) is a common species found at both study areas.

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New Observations Concerning the Rare Wasp *Lycogaster pullata* (Hymenoptera: Trigonalidae) - Poster

Rodney D. Kroll



A female specimen of *Lycogaster pullata* (Shuckard, 1841) was reared from a sumac stem trap nest that was suspended under the eaves of a garage near

Fremont, Michigan during the summer of 2020. After overwintering, this trigonalid emerged from a cocoon of *Chrysis coerulans*, a cuckoo wasp which had attacked a mason wasp

(*Euodynerus hidalgo*) in the first brood cell of the nest. Trigonulids are known to be parasitoids or hyperparasitoids of flies (tachinids), sawflies, ichneumonids, and both solitary and social wasps (vespids). However, no other reports are known to the author of any trigonalid acting as a hyperparasitoid upon a cuckoo wasp. Additionally, four other dipteran and hymenopteran species inhabited the two brood cells of the nest.

Reviving and Reimagining “The Michigan List”

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Robert Dreisbach first envisioned putting together a comprehensive list of Michigan insects before the Michigan Entomological Society was formed. Shortly after *The Michigan Entomologist* started publication the society worked toward such a list, but the effort floundered after good progress. I am proposing a new effort (and perhaps a reimagining of the effort) to put together a comprehensive list of insects in Michigan. We have very good, pre-existing information for many groups and some efforts already underway. I suggest some possible outcomes of the effort, potential funding sources, and open a discussion for members about the possibilities.



Student Papers

Differences in the critical thermal maximum between early and late instars of *Stenonema femoratum* (Ephemeroptera: Heptageniidae)

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Temperature is one of the most important variables affecting the behavior and survival of aquatic organisms, nearly all of which are ectothermic. While many studies on aquatic insect thermal tolerance have been conducted, none has addressed the effects of specimen size on such tolerance.

In this study, the critical thermal maxima (CTM) of large (3.2–3.8 mm) and small (1.7–2.2 mm) *Stenonema femoratum* were tested at three different temperature increase rates (0.1, 0.3, and 0.5° C per minute) to determine the difference in thermal tolerance based on specimen size and rate of heat absorption. Four trials of each size class and temperature rate combination were conducted. For each trial, four specimens were placed on a substrate in a water bath that increased in temperature until each specimen released its grip on the substrate, thus demonstrating its CTM. A two-way Analysis of Variance determined a higher CTM in small specimens relative to large, and no difference

among the three different temperature increase rates.

This result suggests higher physiological robustness in the smaller specimens that appears to decline as they grow. Preparation for undergoing larger thermal extremes or being farther from the adult metamorphosis are both possible explanations for this phenomenon, but the exact cause is currently unknown.

Go with the flow: changes in food resources and aquatic insect assemblages in three habitats of a northern Michigan stream

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The abstract of this talk has not yet been received.

The effects of thermal stress and supplemental aeration on the chronic mortality of *Pycnopsyche guttifer* (Trichoptera: Limnephilidae)

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The prevalence of thermal pollution in shallow water aquatic environments necessitates temperature tolerance studies that include observance of lethality over 72-hour periods. In this experiment utilizing *Pycnopsyche guttifer*,

a tubular case constructing caddisfly commonly found in North America, elevated temperature and supplemental aeration were tested to determine the effect of heat stress and oxidative stress on the experimental specimens. Specimens were gathered from the Little Manistee River at Carrieville Campground in Luther Michigan and trials were performed at G.H. Gordon Biological Station in Luther MI.

Specimens were placed in one of 5 temperature treatment groups (16°, 23°, 25°, 27°, 29°) with each group containing two tanks, one aerated and one non-aerated. Analysis of the resulting data using a 2-way ANOVA demonstrated temperature elevation correlated significantly with lethality rate whereas oxidative stress did not. Performance of a 1-way ANOVA with a Tukey Range Test indicated that elevated temperature had a significant effect on lethality only when that temperature had achieved a level of 29° C. These results define a clear threshold for temperature related lethality in *P. guttifer* at 29° C.

MES Business Meeting and Election Results

Unofficial meeting notes (full minutes to be made available at a later date)

President Mark Vanderwerp called the meeting to order on the afternoon of Friday, June 10. Treasurer's report (Angie Pytel) noted that the MES had lost tax exempt status due to paperwork issues. She will work on reinstating our 501(c)(3) designation. Bob Haack reported on proposed MES constitutional changes. Approval will be determined via email.

Please NOTE: Members who may not yet have received an electronic ballot, itemizing proposed changes for the MES Constitution & Bylaws, are encouraged to check their inboxes under "Promotions" and "Spam": the ballots were sent to everyone on August 28, with September 30 as the stated deadline for receipt of votes.

Discussion on the Great Lakes Entomologist followed based on reports from Alicia Bray. Crystal Dailey provided a social media report. The Outreach Committee led a discussion and those in attendance agreed that the MES should engage the public with more public projects, presentations, etc. Other discussion topics included renewing and effort to create and publish a "Michigan List" of insect species known to occur in the state, as well as revising how MES handles making its membership list available to its members.

Elections were simple, as only two positions were filled, and the people ran unopposed. Bill Ruesink and Martin Andree were elected to the two member-at-large positions. At the time of the 2022 business meeting, a candidate for President-Elect had not yet been identified.

At the close of the meeting Mark passed the gavel to incoming President Brian Scholtens.



More Election Results

John Douglass agreed to be nominated for MES President-Elect, and the governing board unanimously approved his appointment to this office in late August.

Remembering Ranger Steve

On June 16, 2022, we lost a legend. After a long battle with multiple myeloma, Steve Mueller, known to all as "Ranger Steve" passed away. This comes from his obituary in the Grand Rapids Press:



"He considered people "a part" of nature and not "apart" from nature. In 1970, he wrote that, "people are made of the environment and are born into it; therefore, they cannot be divorced from it, even by death." More recently, he said that when he dies, he will flutter away on the gossamer wings of a butterfly and will be among us when we commune with and protect nature. May those who loved him find joy in this communion. His parting thought was that 1,000 lifetimes are inadequate to provide service for the benefit of others or for project completion, so carry on his efforts to ensure future generations inherit a sustainable planet. Make your actions for "we" and not "me" and you will enjoy a prosperous purpose and meaning for your life.

Donations in his honor may be made to the Lepidopterists' Society, the Howard Christensen Nature Center, the Southern Utah Wilderness Alliance, or organizations of your choice that actively promote Creation Care."

New Beetle Species Records

Beetle species in the MSU-ARC not previously reported from Michigan: Contribution #2

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In conjunction with the preparation of a list of the beetles known to occur in Michigan, we are going through the A.J. Cook Arthropod Research Collection at Michigan State University (MSU) and checking identifications of holdings for which we have found no published record. This is an ongoing project, and the list here represents only a few of the families that need to be checked.

Most of these species are not recent introductions but have actually been in the MSU collection for years. However, in the 500+ literature sources that we have examined, these species have apparently never been recorded from Michigan, and represent **new state records**. Many of these species have been recorded from some or most of the US states and Canadian provinces surrounding Michigan, so it is somewhat unusual that they have not been previously recorded from Michigan. We also had species in the collection that were identified in the past for which Michigan records had to be dubious or incorrect according to recent catalogs and lists. Thus, we have been checking those species in the collection for their validity. To be sure, we have found many species that had been misidentified. We have been correcting the identifications of those to the best of our abilities: some of which have also added new species names to the collection and to our Michigan beetle list (see <http://michiganbeetles.org/>).

This second contribution includes an addendum listing additional species found in the MSU collection which were reported for Michigan by Hubbard and Schwarz (1878), Wolcott

(1909), Andrews (1916), Andrews (1923) and/or Hatch (1924) but have not been reported since and have been excluded from or doubted in most recent compilations.

New state records are hereby presented for 94 species from 12 families. IDs for all of these have been verified by WGR except as noted.

Buprestidae (1 species)

Dicerca dumolini (Laporte & Gory):
3 specimens, Marquette Co. (1992)

Cantharidae (1 species)

Tryptherus blaisdelli Fender: 1 specimen,
Monroe Co. (1965)

Carabidae (7 species)

Bembidion viridicolle (LaFerté-Sénéctère):
ID by Peter Messer, 3 Dreisbach specimens, Midland Co. (1944) and Montcalm Co. (1942)

Oxycrepis velocipes (Casey): ID by Peter Messer, 1 specimen coll. by C. Brivio E. at Memphis, Macomb Co. (1963)

Dyschirius affinis Fall: 1 specimen, original ID by G. Parsons, confirmed by Peter Messer, E. of Memphis, Macomb Co. (1963)

Elaphropus capax (LeConte): 1 specimen, original ID by W.C. Stehr, confirmed by Peter Messer, Midland Co. (1937)

Scaphinotus elevatus flammeus Haldeman: 1 specimen, original ID by W.C. Stehr, confirmed by Peter Messer, E. Lansing, Ingham Co. (1938)

Schizogenius lineolatus (Say): 8 specimens, all coll. by C. Brivio, 7 of them E. of Memphis & 1 E. of Romeo, IDs confirmed by Peter Messer, Macomb Co. (1963, 1964, 1966, 1969)

Scarites vicinus Chaudoir: 25 specimens, originally IDed as *S. quadriceps*. *S. vicinus* was resurrected from synonymy by Bousquet and Skelley (2010).

Chrysomelidae (14 species)

Altica fuscoaenea (Melsheimer): 5 specimens, Ingham Co. (1890, 1954) and Muskegon Co. (1945); original IDs of the Ingham specimens by L.G. Gentner.

Altica kalmia (Melsheimer): 10 specimens, Arenac Co. (1910), Bay Co. (1946), Cheboygan Co. (1931), Ingham Co. (1939, 1947), Isabella Co. (1949), Lake Co. (1945), Missaukee Co. (1945) and Ot-tawa Co. (1945)

Altica viatica Blatchley: 2 specimens, An-trim Co. (2017); previously reported in Haack and Ruesink (2020) as *A. glori-osa* but upon re-examination they appear to be instead this species

Bassareus clathratus (Melsheimer): 1 speci-men, Oakland Co. (1911)

Cryptocephalus tinctus (LeConte): 1 old specimen labeled only "Mic"

Distigmoptera apicalis Blake: 1 specimen, Kalamazoo Co. (1970) and 8 from Wex-ford Co. (1964, 1965, 1973), 7 of the lat-ter taken in pitfall traps in a young *Pinus sylvestris* plantation

Graphops varians LeConte: 1 specimen, E. Lansing, Ingham Co. (1947)

Phratora frosti remissa Brown: 5 speci-mens, Dickinson Co. (1983), Emmet Co. (1960) and Marquette Co. (1977)

Phratora hudsonia Brown: 1 specimen, Marquette Co. (1982); possibly instead an undescribed species as *P. hudsonia* has not been reported this far south.

Psylliodes elegans Horn: 10 specimens coll. by L.G. Gentner at Lawton, Van Buren Co. (1924)

Coccinellidae (3 species)

Hyperaspis disconotata Mulsant: 4 speci-mens, original IDs by W.C. Stehr, from Alger Co. (1959), Crawford Co. (1954), Livingston Co. (1944), and Schoolcraft Co. (1952)

Hyperaspis inflexa Casey: 2 specimens, Marquette Co. (1936) and Midland Co. (1936?)

Hyperaspis troglodytes Mulsant: 1 specimen coll. by R.R. Dreisbach, Lake Co. (1940)

Corylophidae (3 species)

Arthrolips decolor (LeConte): 3 specimens coll. by R.R. Dreisbach, Midland Co. (1947, 1959)

Clypastraea ornata (Casey): 1 very old specimen labeled only Detroit, Mich/Hub'rd

Gloeosoma hesperum (Casey, 1900): 1 very old specimen, Detroit, Wayne Co. (no date)

Cryptophagidae (2 species)

Antherophagus convexulus LeConte: 1 spec-imen coll. by R.R. Dreisbach, Midland Co. (1946)

Henotiderus centromaculatus Reitter: 3 specimens coll. by R.R. Dreisbach, Mid-land Co. (1945)

Curculionidae (37 species)

Amalus scortillum (Herbst): 2 specimens, 1 w/ID by Sleeper, from Clinton Co. (1954) and Midland Co. (1955)

Aphrastus taeniatius Say: 3 specimens, Barry Co. (1959), Berrien Co. (1968) and Kent Co. (1938)

Apinocis deplanatus (Casey): 8 specimens, Allegan Co. (1928), Ingham Co. (1974) and Saginaw Co. (1938)

Aulobaris scolopax (Say): 1 specimen coll. by R.R. Dreisbach, Montcalm Co. (1948); also a new genus for Michigan

Baris deformis Casey: 1 specimen coll. by R.R. Dreisbach, Midland Co. (1951)

Conotrachelus aratus (Germar, 1824): 3 specimens, Clinton Co. (2002) and Newago Co. (1974, 1975)

Conotrachelus buchanani Schoof: 8 speci-mens, Ingham Co. (1969, 1970, 1977), Kalamazoo Co. (1966) and Lenawee Co. (1972)

Conotrachelus corni Brown: 5 specimens, Emmet Co. (1943), Ingham Co. (1963, 1967), Macomb Co. (1978) and Oakland Co. (1947)

Conotrachelus pusilla LeConte: 2 speci-mens, Lake Co. (1974) and Manistee Co. (1974); IDs accepted with some doubt as the MSU specimens measure 2.9-3.1 mm (i.e., larger than the 2.5-2.7 mm range given in the literature for this species)

Conotrachelus recessus (Casey): 2 speci-mens, Oakland Co. (1947)

- Cophes obtentus* (Herbst): 4 specimens, original IDs by Sleeper, Oakland Co. (1929, 1931)
- Cossonus corticola* Say: 1 specimen, coll. by Bruce Wilde, Gull Lake Biol. Sta., Kalamazoo Co. (1970)
- Cylindrocopturus nanulus* (LeConte): 3 specimens, original IDs by R.A. Scheibner (2) and Sleeper (1), Montcalm Co. (1948) and Wayne Co. (1959)
- Geraeus penicillus* (Herbst): 2 specimens, original IDs by R.A. Scheibner, Berrien Co. (1959) and Kalamazoo Co. (1957)
- Himantium errans* LeConte: 3 specimens, 1 with original ID by Green, Lenawee Co. (1974) and Missaukee Co. (1945)
- Idiostethus tubulatus* (Say): 5 specimens, original IDs by Green (4) and R.A. Scheibner (1), Cahoun Co. (1941), Eaton Co. (1955) and Ingham Co. (1932)
- Larinus carlinae* (Olivier): 1 specimen, Grand Traverse Co. (2022); until 2016 this species went under the name *L. planus* (Fabricius)
- Linogeraeus neglectus* (LeConte): 1 specimen coll. by R.R. Dreisbach, Berrien Co. (1942)
- Listronotus filiformis* (LeConte): 1 Driesbach specimen, Montmorency Co. (1948), original ID by Sleeper. A poorly known species.
- Lixus caudifer* LeConte: 2 specimens, original ID of one by Green, Livingston Co. (1940, 1944); IDs accepted with some doubt as the caudal elongations seem too short
- Myrmex myrmex* (Herbst): 3 specimens, Kalamazoo Co. (1980), Oakland Co. (1924) and Van Buren Co. (1947)
- Nicentrus lecontei* Champion: 14 specimens, 2 with original IDs by Green, Allegan Co. (1972), Lake Co. (1941, 1974), Manistee Co. (1974), Montcalm Co. (1973), Muskegon Co. (1945) and Newaygo Co. (1974)
- Onychobaris subtonsa* LeConte: 1 specimen coll. by R. & J. Matthews at Jackson, Jackson Co. (1963). Usually considered a Great Plains species, however the Univ. of Arizona insect collection also has a specimen identified as this species that was collected in East Lansing by D.M. Tuttle in 1939.
- Pelenomus fuliginosus* (Dietz): 2 specimens, 1 with original ID by Sleeper, Oakland Co. (1926?) and St. Joseph Co. (1919)
- Pheloconus cribricollis* (Say): 1 specimen, Gull Lake Biol. Sta., Kalamazoo Co. (1958)
- Plocamus echidna* (LeConte): 10 specimens, Saginaw Co. (1968, 1969); ID verified by GLP
- Psomus armatus* (Dietz): 1 specimen coll. by R.R. Dreisbach, Midland Co. (1945)
- Rhinocyllus conicus* (Froelich): 4 specimens, original IDs by G. Parsons, Lenawee Co. (2008); introduced for bio-control of thistles
- Rhinoncus pericarpus* (Linnaeus): 49 specimens, original IDs by Sleeper (1) and R.A. Scheibner (35), Alcona Co. (1951), Calhoun Co. (1959, 1972), Clinton Co. (1967), Gladwin Co. (1950), Kalamazoo Co. (1959), Ingham Co. (1962), Macomb Co. (1968, 1970), Mason Co. (1973), Oakland Co. (1979), Osceola Co. (1953) and Wayne Co. (1975)
- Rhinoncus triangularis* (Say): 33 specimens, 5 with original IDs by Sleeper, Bay Co. (1951), Gladwin Co. (1949), Grand Traverse Co. (1950), Huron Co. (1950), Ingham Co. (1963, 1964), Ionia Co. (1951, 1960), Kalamazoo Co. (1963), Midland Co. (1946, 1949, 1951), Oakland Co. (1979) and Wayne Co. (old, no date)
- Rhinusa antirrhini* (Paykull): 18 specimens, Barry Co. (1964), Ingham Co. (1947, 1948, 1963, 1964, 1967, 1977, 1979), Jackson Co. (1963), Kalamazoo Co. (1964), Marquette Co. (1981) and Presque Isle Co. (1962)
- Rhysomatus aequalis* Horn: 24 specimens, original ID of 1 by Green, Macomb Co.

(1963, 1964, 1965, 1967), Midland Co. (1944) and Oakland Co. (1939)

Rhysomatus annectans (Casey): 5 specimens, Clinton Co. (1956), Ingham Co. (1959), Macomb Co. (1963), Oakland Co. (1965) and Ogemaw Co. (1957)

Smicronyx amoenus Say: 2 specimens, original ID of 1 by Sleeper, Kalamazoo Co. (1959) and Midland Co. (1952)

Smicronyx lineolatus Casey: 1 specimen coll. by and original ID by R.A. Schreiber, Onsted, Lenawee Co. (1959)

Smicronyx pinguis Blatchley: 3 specimens, Detroit, Wayne Co. (very old, no dates)

Sphenophorus callosus (Olivier): 1 specimen coll. at the MSU Muck Farm in Clinton Co. (1978)

Trichalophus alternatus (Say): 1 specimen, Isle Royale, original ID by R.A. Scheibner, Keweenaw Co. (1957)

Dermestidae (1 species)

Dermestes undulatus Brahm: 2 specimens coll. by Brivio, Wayne Co. (1979)

Dytiscidae (7 species)

Agabetes acuductus (Harris): 14 specimens, Chippewa Co. (1914), Ingham Co. (1938), Jackson Co. (1964), Kalamazoo Co. (1963), Midland Co. (1946), Ottawa Co. (1963) and Van Buren Co. (1947); IDs by R.B. Willson and F.N. Young

Coptotomus loticus (Hilsenhoff): 12 specimens, Bay Co. (1951), Berrien Co. (1960), Genesee Co. (1963), Midland Co. (1949), Missaukee Co. (1963) and Schoolcraft Co. (1964); IDs by W.L. Hilsenhoff and R. Gunderson

Coptotomus venustus (Say): 2 specimens, Kalamazoo Co. (1958); IDs by W.L. Hilsenhoff

Graphoderus occidentalis Horn: 2 specimens, Isle Royale, Keweenaw Co. (1964) and Houghton Co. (1964); IDs by R.B. Willson, no published record has been found but previously reported by Ethan Bright on the Aquatic Insects of Michigan website (<http://www.aquaticinsects.org/>) based on the NMNH online database

Heterosternuta pulchra (LeConte): 1 specimen, Oakland Co. (1923); ID by A.W. Andrews

Heterosternuta wickhami (Zaitzev): 1 old specimen labeled only "Mic"; no published record has been found but previously reported by Ethan Bright on the Aquatic Insects of Michigan website (<http://www.aquaticinsects.org/>) based on specimen(s) at UMMZ

Laccophilus undatus Aubé: 3 specimens, Stevensville, Berrien Co. (1963); IDs by J.R. Zimmerman

Elateridae (21 species)

Lacon marmoratus (Fabricius): 4 specimens, "Northwood" (1911, 1913), Ingham Co. (1938) and Saginaw Co. (1950); some w/IDs by Andrews or Knull

Horistonotus curiatus (Say): 2 specimens, Berrien Co. (1965) and Roscommon Co. (1946); 1 w/ID by Knull

Limonius ectypus (Say): 13 specimens, Berrien Co. (1938), Clare Co. (1949), Gladwin Co. (1959), Ingham Co. (1889, 1961), Midland Co. (1935, 1955, 1958), Osceola Co. (1950) and Wayne Co. (1917); some w/ID by Knull or Stibick

Corymbitodes dorotheae Knull: 39 specimens, Charlevoix Co. (1960), Clinton Co. (1957), Eaton Co. (1959), Ingham Co. (1923, 1924, 1926, 1938, 1954, 1959), Ionia Co. (1959), Keweenaw Co. (1957), Lake Co. (1946, 1955), Lapeer Co. (1939), Mackinac Co. (1959, 1960), Marquette Co. (1957), Newaygo Co. (1959) and Schoolcraft Co. (1959, 1960); 25 w/IDs by Knull

Eanus maculipennis (LeConte): 1 specimen, Alger Co. (1910)

Strophenron hamata (Say): 3 specimens, Ingham Co. (1940, 1974) and Van Buren Co. (1891)

Selatosomus appropinquana (Randall): 14 specimens, Cheboygan Co. (1917, 1985), Chippewa Co. (1914), Keweenaw Co. (1936, 1957), Marquette

Co. (1920) and Wayne Co. (1909); 7 w/IDs by Knull

Agriotes collaris (LeConte): 3 specimens, Mason Co. (1968); all IDed by F.B. Ramberg

Dalopius cognatus Brown: 10 specimens, Clare Co. (1935), Livingston Co. (1935), Mackinac Co. (1921, 1922), Marquette Co. (1920) and Roscommon Co. (1936); 7 w/IDs by W.J. Brown

Ampedus deletus (LeConte): 2 specimens, Antrim Co. (1959) and Mackinac Co. (1971); 1 ID by F.B. Ramberg

Ampedus evansi Brown: 11 specimens, Crawford Co. (1956), Marquette Co. (old, no date) and Schoolcraft Co. (1960); 10 w/IDs by F.B. Ramberg

Ampedus impolitus (Melsheimer): 5 specimens, Ingham Co. (1945), Midland Co. (1945) and Wayne Co. (1909); all IDs by F.B. Ramberg

Ampedus melantoides Brown: 3 specimens, Kalamazoo Co. (1959), Livingston Co. (1944) and Midland Co. (1937); all w/IDs by Knull

Ampedus protervus (LeConte): 7 specimens from Clinton Co. (1964), Ingham Co. (1928, 1967), Kalamazoo Co. (1970), Midland Co. (1937), Osceola Co. (1952) and Wexford Co. (1952); all w/IDs by F.B. Ramberg

Ampedus sayi (LeConte): 3 specimens, Ingham Co. (1937), and Oakland Co. (1910); all IDs by F.B. Ramberg

Melanotus trapezoideus (LeConte): 17 specimens, Clinton Co. (1956), Kalamazoo Co. (1956, 1957, 1958), Oakland Co. (1932), Owasco Co. (1953), Sanilac Co. (1926) and Wayne Co. (old, no date); 10 w/IDs by Knull

Drapetes quadripustulatus Bonvouloir: 7 specimens, Ingham Co. (1979, 1980, 1981)

Oedostethus femoralis LeConte: 5 specimens from Ingham Co. (1890), Isabella Co. (1941), Midland Co. (1944, 1958) and Oakland Co. (1931); 3 w/IDs by Knull

Melanactes puncticollis (LeConte): 3 specimens, Wayne Co. (1911), all collected at Rockwood 26 May

Melanotus pertinax (Say): 4 specimens, Kalamazoo Co. (1949) and Sanilac Co. (1920)

Erotylidae (1 species)

Languria angustata (Palisot de Beauvoir): 3 specimens, Gratiot Co. (1944), Livingston Co. (1944) and Midland Co. (1936); 2 w/IDs by Horn

In addition to the above new state records, the MSU collection holds specimens of the following 36 species which were reported for Michigan by Hubbard and Schwarz (1878), Wolcott (1909), Andrews (1916), Andrews (1923) and/or Hatch (1924) but have not been reported since and have been excluded from or doubted in most recent compilations.

Carabidae

Omophron nitidum LeConte: 1 specimen, original ID by S.W. Nichols, coll. by R. & K. Dreisbach in Muskegon Co. (1959); previously reported by Andrews (1916)

Tachys (Paratachys) proximus (Say): 24 specimens, Kalamazoo Co. (1958, 1960, 1964), Livingston Co. (1944), Midland Co. (1940, 1944, 1945, 1946, 1949, 1956), Van Buren Co. (1891) and Wayne Co. (old, no dates); previously reported by Hubbard and Schwarz (1878)

Chrysomelidae

Altica carinata Germar: 19 specimens, Alpena Co. (1948), Ingham Co. (1952), Ionia Co. (1959) and St. Clair Co. (1949), all IDed by Balsbaugh, Gentner or Wilcox. We are unable to verify these IDs but accept them as correct. This species occurs from Florida and Louisiana north to New Brunswick and Manitoba. Previously reported by Hubbard and Schwarz (1878)

Capraita thyamoides (Crotch): 4 specimens, Ionia Co. (1959), Lake Co. (1974),

Wayne Co. (1909) and "Nottawa" (1941); previously reported by Hubbard and Schwarz (1878)

Cleridae

Enoclerus nigripes nigripes (Say): 100+ specimens, one from Roscommon Co. (2002), all others from Saginaw Co. to Clinton Co. to St. Joseph Co. and southward (1909-2000); previously reported by Andrews (1923); also reported by Gosling (1980) and Downie and Arnett (1996) without designating subspecies

Coccinellidae

Diomus terminatus (Say): 4 specimens, Iosco Co. (1951), Livingston Co. (1944), Mason Co. (1951) and Midland Co. (1952); IDs by Greene and W.C. Stehr; previously reported by Hubbard and Schwarz (1878)

Corylophidae

Arthrolips misella (LeConte): 4 specimens, Detroit, Wayne Co. (very old specimens, no date); previously reported by Hubbard and Schwarz (1878)

Orthoperus glaber (LeConte): 9 specimens, IDs by G.L. Parsons, from Allegan Co. (1959), Arenac Co. (1952), Clinton Co. (2000), Gladwin Co. (1952), Ionia Co. (1952), Isabella Co. (1955) and Midland Co. (1945, 1952); previously reported by Hubbard and Schwarz (1878)

Orthoperus scutellaris LeConte: 3 specimens coll. by R.R. Dreisbach, IDs by G.L. Parsons, Midland Co. (1952, 1957, 1959); previously reported by Hubbard and Schwarz (1878)

Cryptophagidae

Ephistemus globulus (Paykull): 4 specimens coll. by R.R. Dreisbach, Midland Co. (1945); previously reported by Hubbard and Schwarz (1878)

Curculionidae

Cleopomiarus hispidulus (LeConte) 29 specimens, Barry Co. (1964), Bay Co. (1973), Calhoun Co. (1927), Cheboygan Co. (1962), Ingham Co. (1943), Macomb Co. (1963, 1964, 1965), Midland Co. (1939, 1941) and Muskegon Co.

(1945); previously reported by Andrews (1923)

Rhodobaenus tredecimpunctatus (Illiger): 6 specimens, Calhoun Co. (1930, 1932), Kalamazoo Co. (1936) and Oakland Co. (1947); previously reported by Hubbard and Schwarz (1878) and Andrews (1923)

Rhyncolus brunneus Mannerheim: 2 specimens, 1 from Isle Royale, Keweenaw Co. (1965), the other from Antrim Co. (2017); previously reported by Hubbard and Schwarz (1878) and Andrews (1923)

Dermestidae

Dermestes talpinus Mannerheim: 19 specimens, Barry, Oakland, Macomb, Ingham and Grand Traverse Counties (1889 - 1986); previously reported by Hubbard and Schwarz (1878)

Anthrenus museorum (Linnaeus): 9 specimens, Barry Co. (1977), Dickinson Co. (1984), Ingham (1961) and Wayne Co. (1889); previously reported by Hubbard and Schwarz (1878) and Andrews (1923)

Dytiscidae

Agabus punctulatus Aubé: 2 specimens from Chippewa Co. (1913, 1914) and one specimen labeled only "Mic."; previously reported by Hubbard and Schwarz (1878) and Andrews (1923)

Agabus disintegratus (Crotch): 1 specimen, Detroit, Wayne Co. (1906); previously reported by Hubbard and Schwarz (1878), Andrews (1923), and by Ethan Bright on the Aquatic Insects of Michigan website (<http://www.aquaticinsects.org/>) based on specimen(s) at UMMZ

Elateridae

Lacon auroratus (Say): 7 specimens, Chippewa Co. (old, no date), Ingham Co. (1882), Marquette Co. (old, no date), Montmorency Co. (1957) and Wayne Co. (old, no date); one ID by Andrews; previously reported by Hubbard and Schwarz (1878)

- Lacon discoidea* (Weber): 13 specimens, Clinton Co. (1963), Ingham Co. (1938), Kalamazoo Co. (1963), Lake Co. (1940), Livingston Co. (1933, 1955), Oakland Co. (1927) and Wayne Co. (1906); some w/IDs by Knull or Stibick; previously reported by Hubbard and Schwarz (1878) and Andrews (1916)
- Alaus myops* (Fabricius): 9 specimens, Arenac Co. (1910), Cheboygan Co. (1935, 1943, 1958), Crawford Co. (1956), Otsego Co. (1991, 1998) and Washtenaw (1945); some IDs by Knull; previously reported by Hubbard and Schwarz (1878) and Andrews (1923)
- Aeolus amabilis* (LeConte): 1 specimen, Oakland Co. (1921); previously reported by Andrews (1923)
- Aeolus mellillus* (Say): 55 specimens, Calhoun Co. (1972), Chippewa Co. (1913), Ingham Co. (1881, 1888, 1946, 1969), Kalamazoo Co. (1964, 1969), Manistee Co. (1964), Midland Co. (1935), Van Buren Co. (1891) and Wexford Co. (1965); some w/IDs by Stibick; previously reported by Hubbard and Schwarz (1878)
- Conoderus auritus* (Herbst): 33 specimens, Cheboygan Co. (1962), Clinton Co. (1957), Ingham Co. (1890, 1891, 1892, 1920, 1936, 1940, 1963), Jackson Co. (1963), Kalamazoo Co. (1956), Mecosta Co. (1942), Midland Co. (1934, 1940, 1941, 1945, 1946), Oakland Co. (1921, 1931), Van Buren Co. (1941), Washtenaw Co. (1940), Wayne Co. (old, no date) and Wexford Co. (1964); some w/IDs by Knull; previously reported by Hubbard and Schwarz (1878) and Andrews (1923)
- Limoniuss dubitans* LeConte: 8 specimens, Berrien Co. (1938), Genesee Co. (1947), Monroe Co. (1957), Muskegon Co. (1959), Oakland Co. (1929), Van Buren Co. (1947) and Wayne Co. (1929); some w/IDs by Knull; previously reported by Hubbard and Schwarz (1878) and Andrews (1923)
- Liotrichus falsificus* (LeConte): 4 specimens, Keweenaw Co. (1940, 1957), Mackinac Co. (1960) and Osceola Co. (1950); previously reported by Hubbard and Schwarz (1878) and Wolcott (1909)
- Metanomus insidiosus* (LeConte): 2 specimens, Chippewa Co. (1914) and Marquette Co. (old, no date); previously reported by Hubbard and Schwarz (1878) and Andrews (1923)
- Nitidolimonius resplendens* (Eschscholtz): 8 specimens, Chippewa Co. (1914), Keweenaw Co. (1940, 1957), Mackinac Co. (1957) and Marquette Co. (1920, 1956); previously reported by Hubbard and Schwarz (1878) and Andrews (1923)
- Selatosoma splendens* (Ziegler): 2 specimens from Marquette Co. (old, no date) and Oakland Co. (1931); previously reported by Wolcott (1909)
- Proludius pyrrhos* (Herbst): 18 specimens, Alger Co. (1916), Barry Co. (1955, 1959), Berrien Co. (1917), Clinton Co. (1955, 1956), Ingham Co. (1932, 1956), Kalamazoo Co. (1959), Livingston Co. (1967), Oakland Co. (1932), Owosso Co. (1953), Van Buren Co. (1946) and Wayne Co. (old, no date); previously reported by Hubbard and Schwarz (1878) and Andrews (1916)
- Ampedus melsheimeri* (Leng): 4 specimens, Arenac Co. (1910), Crawford Co. (1955), Kalamazoo Co. (1957) and Oakland Co. (1927); 2 w/IDs by F.B. Ramberg & 1 w/ID by Knull; previously reported Andrews (1916)
- Ampedus rubricollis* (Herbst): 13 specimens, Arenac Co. (1948), Chippewa Co. (1913, 1914), Clare Co. (1929), Ingham Co. (1889), Kalamazoo Co. (1955), Livingston Co. (1933), Midland Co. (1938, 1939), Montmorency Co. (1940) and Oakland Co. (1931); all w/IDs by F.B. Ramberg; previously reported by Hubbard and Schwarz (1878) and Hatch (1924)

Ampedus sanguinipennis (Say): 18 specimens, Berrien Co. (1969), Branch Co. (1942), Cheboygan Co. (1935), Gladwin Co. (1940), Gratiot Co. (1949, 1951), Ingham Co. (1890, 1938, 1963), Lapeer Co. (1945), Midland Co. (1945, 1961), Oakland Co. (1909, 1928) and Saginaw Co. (1968); 17 w/IDs by F.B. Ramberg; previously reported by Hubbard and Schwarz (1878)

Ampedus semicinctus (Randall): 5 specimens, Emmet Co. (1922), Marquette Co. (old, no date), Midland Co. (1930s), Newaygo (1959) and Van Buren Co. (1891); all w/IDs by F.B. Ramberg; previously reported by Hubbard and Schwarz (1878) and Hatch (1924)

Melanotus americanus (Herbst): 5 specimens, Berrien Co. (1917), Kalamazoo Co. (1955) and Oakland Co. (1928); previously reported by Hubbard and Schwarz (1878)

Melanotus depressus (Melsheimer): 1 specimen, Muskegon Co. (1958); previously reported by Hubbard and Schwarz (1878) and Andrews (1916)

Melanotus leonardi (LeConte): 5 specimens, Iron Co. (1955), Keweenaw Co. (1957) and Marquette Co. (old, no date); previously reported by Hubbard and Schwarz (1878) and Wolcott (1909)

Erotylidae

Toramus puchellus (LeConte): 83 specimens, Bay Co. (1951, 1958), Berrien Co. (1963, 1974), Clinton Co. (1956, 1972), Gratiot Co. (1939, 1956), Ingham Co. (1957), Iosco Co. (1951), Isabella Co. (1955, 1956), Jackson Co. (1947), Kalamazoo Co. (1963, 1971), Midland Co. (1945, 1946, 1952, 1956, 1957), Saginaw Co. (1953), Shiawassee Co. (1953) and Wayne Co. (old, no date); previously reported by Hubbard and Schwarz (1878)

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