Newsletter of the Michigan Entomological Society

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58th Annual MES Meeting: June 22-23, 2012

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Come meet up with other entomologists and learn about new professional developments in gorgeous northwestern Lower Michigan! There will be a variety of presentations and our keynote speaker will speak about how progress in modern taxonomic techniques can help preserve insect faunas. Enjoy your time surrounded by a beautiful lake and forest environment.

The 2012 MES conference will take place at the G.H. Gordon Biological Station and Rockwell Lake Lodge (http://www.therockwelllakelodge.com), located in Lake County approximately 25 miles southeast of Cadillac. The largest private college biological station in Michigan, it combines an active research station with a functioning resort and conference center.

The property features a completely contained 50-acre lake with outstanding bass and bluegill fishing. There are kayaks, canoes, and other boats available free for attendee use. In addition, there is a small creek which supports native brook trout and over 100 species of caddisflies, including 6 species found nowhere else in Michigan. Upland forest, meadow, and various types of wetland habitats are found throughout the property, and several miles of interpretive hiking trails highlight the natural and human history of the area. Insect collecting is encouraged and we would love to hear about any interesting species that you find.

Elegant rooms for 1–2 people at the Lodge are available at a discounted rate of $79.00 per night, which includes breakfast prepared by our professional chef. Beds in the cabins are available for $15.00 per night. All attendees will have access to a full communal kitchen with ample refrigerator space if they wish to prepare their own meals at no additional cost. Meals can also be purchased in any combination from the Lodge. All lodging options include free Wi-Fi. Registration details will be provided in the Spring 2012 issue of the MES Newsletter.

Our keynote speaker, Dr. Ralph W. Holzenthal—Professor of Entomology and Distinguished Teacher at the University of Minnesota—is one of the preeminent insect taxonomists in the world, having described over 500 new species. He will speak about the status of insect biological diversity and how the 'digital revolution' can help overcome

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the concerns of describing an enormous and still mostly unknown fauna faced with a rapid extinction rate. He will also show some amazing digital illustrations.

We encourage submission of oral and poster presentations on any topic related to entomology. Students are especially welcome and there will be cash awards for the top student presentations.

For more information, contact: David C. Houghton by phone at (517) 607-2394 or by Email at <david.houghton@hillsdale.edu >.

Martinoptera

The Names Have Been Changed to Protect the Innocent

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"Tapestry woven in rich colors and graphic patterns, two moths create an unexpected display of beauty to rival any butterfly. Loomed from smooth cotton yarns and backed in beige cotton velveteen. Hidden zipper. Polyfill. 12" square. Made in France. Dry-clean. Blue Moth Tapestry Pillow $95.00. Orange Moth Tapestry Pillow $95.00."

So reads the copy for a pair of pillows in an exclusive, high-brow and pricy gift catalog of exquisite taste. We'll call them, Catalog "Urania Fulgens*." They're in San Francisco. Their store is fabulous. Stop in if you have a chance but you'll shop long and hard and never find the above mentioned moth pillows.

As chi chi as Catalog Urania Fulgens is, they made a profound and embarrassing boo boo. The person who wrote this flowery copy did an excellent job, save one tiny and important detail that proves beyond a doubt two points. The first, they are not a member of the Michigan Entomological Society and second, they are not apparently as chi chi as we.

Sadly, they ran this copy for over a year, and over many catalog mailings. I was hoping that perhaps other Catalog Urania Fulgens shoppers, especially those with a healthy obsession with bugs might set them straight. They did not; the pillows were finally run on a closeout sale for $75.00 each and have not been back since.

You see, neither the Blue Moth or the Orange Moth, so skillfully crafted in thread by the French, are not moths at all. They are both butterflies, which means, once known, the remaining copy quickly gets into deep water, especially the part about, "rival any butterfly."

Blue Moth is actually *Inachis io* (Peacock Butterfly) and Orange Moth is actually *Papilio machaon hudsonianus* (Old World Swallowtail). Both common European butterflies. I agree with the copy, they do possess "an unexpected display of beauty," but they are still not moths. Originally I thought that maybe this might have been a translation problem, as the manufacturer is in France. Butterfly in French is papillon (we all know that from the Steve McQueen, Dustin Hoffman movie of the same name. No excuse for bungling that one). Moth is a bit trickier, papillon de nuit. The literal translation is butterfly of the night; so there might be a sliver of a scape-moth lurking in the lost-in-translation argument. Instead I uneasily settled into the unlikely theory that most Americans, especially catalog writers don't know basic entomology from toaster ovens. Shameful I know.

Now comes the December issue of a Catalog Urania Fulgens's competitor, we'll call them Catalog Bombylius Major,"* who clearly has identified the marvelous design trend of using bugs to add both visual weight and interest to almost any interior worth designing. Not to be outdone by Catalog Urania Fulgens, who apparently own the category "Bug Chic," Catalog Bombylius Major offers a super huge print of a Saturniidae with the following copy

"SILK MOTH ART *New!* Catalog Bombylius Major, Exclusive! Glossy plexi-glass over print, with white backing. (36"w x 1.5" d x 24" h) $99.00."

So far so good. They haven't flubbed it up by getting all scientific, or by making any outlandish claims. The specimen shown is indeed a silk moth, *Attacus atlas* in fact and I feel a wellspring of hope. After all Catalog Bombylius Major's motto on the cover of this particular catalog is "Gifts to make them go bonkers*."

I was almost bonkers, but then a few pages further into the catalog, my bonkers up and went when I read the following copy:

"G-I. A STUDY OF INSECTS. Catalog Bombylius Major Exclusive! From the 1861 French [*Oh no! Not the French again! Author*] Book Dictionnaire Universel D'History Naturelle. Intricately detailed images with French text. G. Bee; H. Beetle; I. Midge Fly. Each (25.5"w x 0.75"d x 39.5" h). $249.00. ($25 additional shipping)

The copy was for an elegant and refined set of three nicely colored insect plates, tastefully framed and shown hanging above a rustic stretcher table, complemented with sage Chinese ceramics, an assortment of cheeses and a glass of white wine. All very nice, but none of us would ever want to live there as the entomological crimes committed on the walls are just too egregious to overlook.

These items are featured in two different catalog mailings, and each one has a crafty little literary blurb, written to draw you into the main item copy. The first one claims, "Notice the rich colors and lovely French entomology terminology." I couldn't agree more with the first clause about the rich colors, as they are quite striking. However, the second clause is a bit of a stretch. Now I'm only looking at their catalog shot, not the actual item, but it is pretty clear to me that the "lovely terminology" is mostly about genitalia. Lovely indeed.

I'll save the second morsel for later.

Let's take a look at the prints. I want to start with. "H. Beetle." No problem there. This is a finely executed drawing of a Coleopteran of the Scarabaeidae group. He's huge, blocky and a pleasure to gaze upon, even better with cheese and wine.

"I. Midge Fly." Here is where the wheels fall off for Catalog Bombylius Major, as it is painfully clear that this is a print of three very handsome Orthopterans and their privates. Those nice showy ones from the tropics with rosy hind wings and elongated thoraxes. But things are just beginning to go sour and Catalog Urania Fulgens is looking all the less buffoonish.

"G. Bee." Gosh I feel bad for Catalog Bombylius Major. There are five immaculate specimens featured on this plate. From what I can tell just five bugs and some French notes, no embarrassing organs this time. But there is trouble. With my naked eye I can plainly count the wings on each "bee." No matter how many times I count, I still come up with only two, which place these "bees" squarely into the order of Diptera and as so are not bees but flies.

Although admittedly not an expert on midges, it seems the simple explanation would be that the copy for "G. Bee," and "H. Midge Fly, " were switched (let's leave aside the confounding evidence that the midge flies are actually grasshoppers and there are no Hymenopterans figured anywhere.) Except for the second morsel I referred to earlier.

The president of Catalog Bombylius Major is apparently a guy named Norbert*, who according to several other passages in the catalog is purported to be a beekeeper. Enter the second morsel which hilariously says: "No offense, Beetle and Midge Fly, but as a beekeeper, Norbert has a personal favorite."

Now this keeps getting curiouser and curiouser and begs the question of Norbert's acumen as a beekeeper. He either doesn't know the difference between bees and midge flies (actually grasshoppers) or Norbert is not a beekeeper at all but a midgeflykeeper (actually grasshoppers), which is kind of creepy since some midges, like the Ceratopogonidae carry horrid livestock diseases like Blue Tongue and African Horse Sickness. Hardly the kind of condiment I want to spread on my warm toast, nor the kind of art I want over my rustic trestle table with cheese and wine.

Perhaps a simpler explanation is that Norbert never proofed his copy, or maybe he will have the last laugh, as he might just have an apiary of exotic locusts that produces a honey that is more exquisite than ambrosia. Maybe Norbert refers to them as Honey Locusts and sells their honey exclusively in France…the apparent source of all of this confusion in the first place.

* The actual catalog faux pas depicted in this essay are real and exactly as they appeared in print, except for the names of course, as they have been changed to protect the innocent

Fall 2011 Governing Board Meeting – 1 November 2011

Present: Toby Petrice, Ron Priest, Ted Herig, Mark O'Brien, Adrienne O'Brien, David Houghton, Sarah Smith and Therese Poland

Reports. Journal: Therese Poland – Vol 44(1,2) was published in August and Therese, Ron and Anthony are working on Vol 44(3,4) - 5 papers accepted, 7 accepted with revisions and 4 out for review. It typically takes 10-12 papers for 100 pages of the journal. More submissions are needed for Vol 45. Back issues of the journal are being scanned in and Vol 1-20 are on the MES website.

Newsletter: Bob Haack – Bob will be working on the newsletter in late November. He has several articles but always needs more.

Secretary: Adrienne O'Brien – Current membership stands at 388, with 258 being individuals and 130 institutions. Members lapsed prior to 2008 have been changed to inactive status.

Treasurer: Tina Ciaramitaro – still working on regaining tax-exempt status. Account balance is currently $22,146 and has been fairly stable.

New Business:

Journal: Receiving enough manuscripts is the main factor limiting timely publication of the journal. **How can we attract more publications**? One way is to increase the impact factor of the GLE so that more authors cite the papers. We should increase visibility and accessibility on line - posting pdf's of each issue in a timely manner. Logistics will be worked out by Sarah, Therese and Mark. **Page charge waiver policy** proposed for students and non-supported research: 1) must be an MES member in good standing; 2) must make the request at time of submission; 3) must indicate that there is no source of funding and would be an out-of-pocket expense; 4)MES has sufficient funds to cover the cost.

Newsletter: looking at the possibility of offering a digital version of the newsletter. For the next renewal, Adrienne will include a check box for members to choose digital and/or printed copies of the newsletters.

Membership: In order to attract more students, it was proposed to expand the "Student Member" category to include undergraduate and graduate college students – it formerly was offered to high school and younger only. The dues would be $12/year.

2012 Annual Meeting: President-elect David Houghton announced that the 58th annual meeting will be held at Hillsdale College's 700 acre G.H. Gordon Biological Station near Luther, MI. In order to attract more students, presentations will be judged and awards given. In addition, there will be a bioblitz, mixer, and evening blacklighting. Sounds like lots of fun (and science, too).

Adrienne O'Brien, Secretary

MES Historical Notes

Robert A. Haack, Newsletter Editor

1986 – 25 years ago. In early 1986, Dave Cowen was President; Mark O'Brien was President-Elect; Dave Evans was immediate Past-President; Mo Nielsen was Executive Secretary; Robert Husband, Gary Simmons, and Glenn Belyea were the three Members-at-Large; Dave Gosling was Journal Editor; and Lou Wilson and George Heaton were the Newsletter Editors. The 32nd MES Annual Meeting was held at the University of Michigan's Matthaei Botanical Gardens in Ann Arbor, MI, on 6 June 1986. The keynote address was made by Bob Matthews, Department of Entomology, University of Georgia. He spoke on "competition and cooperation in wasps," which was a study based on his recent field work in Costa Rica. There were 18 additional talks at the annual meeting on everything from gypsy moth and mites to longhorned beetles and thrips. The 16th MES "Entomology Notes" was published in 1986 by Sigurd Nelson on pseudoscorpions. The State of Michigan discussed adopting a state insect in 1986. There was considerable push to adopt the honeybee as Michigan's state insect in 1986; however, MES supported the tiger swallowtail. In the end, no official state insect was adopted. Mo Nielsen led a collecting trip after the meeting in search of bog Lepidoptera. Annual dues were $8 per year for active members, and $15 per year for libraries. Journal page charges were $30/page. There were 413 members in good standing and 172 library subscriptions in 1986. Peter Lisk, former MES member from Dearborn, MI, published three poems in the MES Newsletter in 1986. Here is one of Peter's poems from 1986.

Give Me Entomology
By Peter Lisk

Give me entomology,
And oh I'll keep happy,
As I crawl 'bout the field,
Collecting my insect yield.
Then it's anticipation;
Homeward bound my collection.

A little work need be done,
But I will call it insect fun,
As my spreading board I grab,
And I write up a little tab;
Then it's time they meet the rest,
And the time I feel the best.

My display case overloads,
I think of all the episodes,
I have had catching my thrills,
And the little joys it instills,
So if you want good company,
Consider entomology!

1961 – 50 years ago. In early 1961, Warren Wagner was President, David Cook was President-Elect, Roland Fischer was immediate Past-President, and Stanley Gangwere was the Executive-Secretary. The 7th annual meeting was held at Wayne State University, in Detroit, Michigan. There were seven presentations. Henry Townes spoke about the number of insect species in the tropics vs. temperate areas; Virendra Gupta on dispersal and evolution of the genus *Theronia* (Ichneumonidae); Laurence Levine on crickets as tools in cellular biology; Warren Wagner on insect-flower relationships; George Steyskal on niche theory; Harold Rossmoore on preservatives; and Stan Ganwere on the feculae (= feces) of Orthoptera. In addition, Ralph Beebe reported that he was developing a list of Michigan's Microlepidoptera, which stood at about 1100 species. The MES membership dues were $2 per year in 1961 and MES posted a balance of $344.42 in December 1961. I found no records on the number of MES members in 1961, but there were 76 members in 1964.

57th Annual Meeting of the Michigan Entomological Society. June 24-25, 2011, Pierce Cedar Creek Institute for Environmental Education, Hastings, Michigan

Business Meeting Minutes – 12:00-12:30

Governing Board Members Present: Ethan Bright, Bob Haack, Adrienne O'Brien, Tina Ciaramitaro, Ron Priest, Toby Petrice

Reports: Treasurer: Tina reports that we are in good financial health. She is still dealing with regaining the tax exempt status

Journal: Therese Poland via Bob Haack - Journal is back on schedule volume 44(1-2) is due out in a month. Therese has some papers for Volume 44(3-4)

Newsletter: Bob Haack noted that he has been editing the newsletter since 1988, WooHoo!! If anyone is eager to take over, he would be glad to step aside. As usual, he is eager for articles and interesting stories.

Secretary: Adrienne O'Brien gave the numbers for each member category as follows – Active: 192, Subscriptions (journal only): 68, Student: 1, Gratis: 10, Honorary: 2, Sustaining: 34, Lapsed/Inactive: 150, Institutional (newsletter + journal): 60, Lifetime: 24. This translates to 263 "Human" and 128 Institutional or Subscription memberships. As of June 24th, there have been 170 renewals and new members for 2011 ("Humans" only)

Old Business: Status of bylaws – no changes for now. Ron Priest and Bob Haack will review before next year.

New Business: Institutional and Subscription members: should we charge more for overseas members – because of higher postage fees.

Newsletter and Journal issues – should we give the option for subscribers to receive electronic copies? Motion passed to explore this option.

Elections: Outgoing president Ethan Bright passed the gavel to incoming 2011/12 president Toby Petrice. Thank you, Ethan, for serving as president during this significant time of change. Welcome to Dave Houghton as our President Elect for 2012/13 and Sarah Smith as the latest Member-at-Large for 2011-14. Hooray!!

Thank you to Toby Petrice for organizing this year's Annual Meeting. The site and the presentations were most excellent.

Adrienne O'Brien, Secretary

57th MES Annual Meeting

The 2011 MES Annual Meeting was held 24-25 June 2011 at the Pierce Cedar Creek Institute for Environmental Education near Hastings, MI. Many thanks are extended to Toby Petrice for organizing this year's Annual Meeting. Our featured speaker was Dr. Daniel Herms from The Ohio State University. Abstracts of the papers and posters are presented on the next several pages.

Mitochondrial Gene Order and Pygmy Grasshoppers (Orthoptera, Tetrigidae)

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Mitochondrial gene order is a valuable character for use in phylogenetic reconstruction. Changes in gene order are rare and can thus help to define monophyletic clades. Although most insects display the ancestral gene order shared by most crustaceans, a few exceptions have been identified. For example, long-horned grasshoppers in the suborder Ensifera have the ancestral gene order KD at the gene junction of cytochrome oxidase 2 and ATPase 8, while several species of short-horned grasshoppers in the suborder Caelifera and the family Acrididae display the derived order DK. This derived gene order is also shared by the most basal group of Caelifera the Tridactyloidea or pygmy mole crickets. However, no gene order information is available concerning the family Tetrigidae containing the pygmy grasshoppers, which is basal relative to the Acrididae but more derived than the Tridactyloidea. In order to determine the timing of the gene rearrangement event, two species of pygmy grasshoppers were collected in Saginaw County, MI, in the spring of 2011, *Tettigidae lateralis* and *Paratettix cucullatus*. DNA was extracted and the appropriate gene junction was amplified by PCR using primers designed to conserved regions flanking the gene junction. Amplification was successful for several species of long-horned and short-horned grasshoppers, but not successful for pygmy grasshoppers. Several different exraction protocols were tried, including DNeasy and chelex methods. Several different body regions were also extracted separately and still no amplification was successful. It is possible that primers designed specifically for Orthoptera might be more successful. Alternatively, it is possible that more significant mitochondrial gene rearrangements are preventing amplification in pygmy grasshoppers.

Abrupt Changes in Biological Continuity in an Otherwise Undisturbed First-Order Stream due to Riparian Habitat Loss

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River continuum theory predicts a gradual change in both water physicochemistry and organismal assemblages as a river widens downstream. I assessed the continuity of Fairbanks Creek, Lake County, in northwestern Lower Michigan. It is a first-order stream with an abrupt change in terrestrial habitat—near complete loss of riparian canopy—and an otherwise undisturbed watershed. I measured assemblages of benthic invertebrates and adult caddisflies, as well as temperature, dissolved oxygen, pH, and conductivity at three sites, all within 800 m of each other. Benthic invertebrates were sampled via Hess sampler in late May and early June 2010. Adult caddisflies were sampled via blacklight approximately weekly from May to October 2010. Sites 1 and 2 had heavy riparian canopy, whereas site 3 was barren of canopy due to a previous history of agriculture. Although there were no appreciable differences in water chemistry between the three sites, both of the overall macroinvertebrate assemblages were quantifiably different at site 3 than at the other two sites as determined by detrended correspondence analysis. Specifically, both assemblages of site 3 were more indicative of large rivers, containing a significantly higher abundance of filtering collectors and a significantly lower abundance of shredders. Due to the short distance between sites, similar physicochemistry, and lack of current anthropogenic disturbance between sites, differences in invertebrate assemblages are attributed to the simple lack of canopy cover at site 3. My results suggest that an abrupt change in riparian canopy can lead to a similarly abrupt change in invertebrate assemblages, even without a corresponding change in water chemistry.

Phenology and Plant-Insect Interactions in a Changing Climate

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Earth's climate has warmed markedly since the dawn of the industrial revolution, and the warming has accelerated over the last 30 years. A powerful convergence of independent lines of evidence link most of this warming to anthropogenic activities, primarily greenhouse gas emissions and to a lesser degree deforestation. Alternative hypotheses focused on natural causes of warming, including increased solar activity, have been closely examined and rejected. Global warming and increased concentration of atmospheric CO_2 are already having perceptible impacts on interactions between plants and insects, including plant and insect phenology, species distributions, and host plant quality, and will certainly affect longer-term evolutionary changes on insect life histories and trophic interactions.

Effects of global warming on the length of the growing season are evident in long-term records of plant phenology compiled by prominent naturalists including Thoreau and Leopold, as well as more recent satellite images and data sets compiled by the National Phenology Network. There are also numerous examples of seasonal advancements in the phenology of animals including insects, amphibians, and birds, as well as shifts in the distributions of numerous species to more northern latitudes and higher altitudes. Integration of climate change and insect phenological models predicts that key insect pests of agronomic crops will continue to increase their northward distribution and number of generations per year in Midwestern United States, resulting in increased pest pressure. Chronic drought and warmer winter temperatures in western North America, which are consistent with predictions of climate change models, have contributed to widespread bark beetle outbreaks.

The 'phenological window hypothesis' postulates the existence of a narrow temporal window when host plant traits are most suitable for the insect herbivores, and predicts that insect growth and survival will decline as host-insect synchronicity is altered. Substantial evidence supports this hypothesis, especially for leaf-feeding and gall-making insects. If interacting organisms exhibit differential physiological responses to variation in temperature, then climate change has the potential to create phenological asynchrony between interacting organisms, including plants and their herbivores and pollinators, as between predator and prey. There are a few examples supporting this hypothesis. However, a long-term study in Ohio involving more than 50 species of phytophagous insects and 70 species of plants indicates that the phenological sequence is quite robust to variation in weather, suggesting that the phenology of

many interacting plant and insects may respond in tandem to a warming climate.

A warming climate may also alter selection pressures experienced by herbivorous insects and thus the direction of evolutionary trajectories. For example, increased degree-day accumulation at the northern reaches of an insect's distribution may relax selection on traits that increase growth rate and decrease developmental time, as a longer season results in more time to complete their life cycle. Conversely, selection pressure on other traits may become more important. For example, herbivores may shift their host preference to plants of lower host quality if their risk of predation is also decreased, or they may increase their fecundity at the expense of smaller eggs, but with the cost of producing smaller larvae that take longer to develop.

Global warming is largely the result of increased atmospheric CO_2 concentration, which also has important indirect effects on the performance of phytophagous insects by altering host quality. Elevated CO_2 generally decreases plant nitrogen concentration, and often increases concentrations of secondary metabolites. Associated insect responses include decreased growth rate and/or increased consumption. However, these responses are not universal; some studies have found insect performance to increase on plants grown in elevated CO_2 environments, while other studies have shown that abiotic factors such as temperature, air pollution, and nutrient availability can interact with atmospheric CO_2 to impact host quality and herbivore performance in complex ways.

Direct and indirect effects of global warming and elevated CO_2 on specific organisms and interactions will be complex and idiosyncratic, and thus difficult to predict. However, it is clear that anthropogenic changes to the atmosphere and climate will have pervasive effects on the physiology, ecology, and evolutionary trajectories of phytophagous insects, thereby affecting their phenology and voltinism patterns, species distributions, population dynamics, trophic interactions, and community composition.

The Asian Chestnut Gall Wasp: A Threat to Michigan's Chestnut Industry and Worldwide

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The Asian chestnut gall wasp [ACGW; *Dryocosmus kuriphilus* (Yasumatsu) (Hymenoptera: Cynipidae)] is native to China. The galls of ACGW interfere with normal shoot development, twig elongation, flowering, and nut production, and can lead to twig dieback and even tree death (Kato and Hijii 1997, Rieske 2007). Apparently, the ACGW can infest all species of chestnut (*Castanea* spp.). ACGW was first reported in the United States in Georgia in 1974 (Payne et al. 1975; Payne et al. 1976), and subsequently has spread to several US states including Alabama (first reported in 1983), Tennessee (mid 1980s), North Carolina (1998), South Carolina (late 1990s), Virginia (2001), Ohio (2002), Kentucky (2003), Pennsylvania (2006), Maryland (2006), and West Virginia (2010) (Rieske 2007, 2011). Connecticut was added to the list of infested states in 2011 (Anagnostakis, personal communication).

ACGW is parthenogenetic (all adults are female) and has a one year life cycle. Adults become active in early summer and lay eggs in the newly developed buds of chestnut trees. Larvae feed briefly after hatching and then enter diapause within the buds and overwinter. When budbreak occurs the next spring, larvae initiate development and galls form on the infested buds. Each gall will contain one or more chambers with a single larva in each chamber. Fully formed galls are often 2-3 cm in diameter, and can include leaf, petiole, and twig tissue. Pupation occurs within the galls in early summer, after which the adults emerge and seek out newly developed chestnut buds for oviposition. After adult emergence, the galls become woody and can be retained on infested trees for years.

Various Asian parasitoids of ACGW were released in Georgia in the 1970s. One of these parasitoids, *Torymus sinensis* Kamijo (Hymenoptera: Torymidae), became established and has spread to several US states (Payne et al. 1983, Cooper and Rieske 2011). In addition, several native parasitoids attack

ACGW in the United States (Cooper and Rieske 2007, 2011). Despite these natural enemies, ACGW still causes severe losses in some chestnut orchards, especially when few biocontrol agents are present (Rieske 2011).

As of 2011, the ACGW has not been detected in Michigan, which has an active and growing chestnut industry (CGI 2011). Given that ACGW has been detected in the neighboring state of Ohio, and that ACGW can be easily transported in nursery stock and scionwood, the Michigan Department of Agriculture enacted a chestnut gall wasp quarantine in 2010 (MDA 2010). The quarantine prohibits entry into Michigan of all living plants and scionwood of all *Castanea* species from all US states known to be infested with ACGW, unless the nursery conducts annual inspections for ACGW and has had two consecutive years of negative finds.

Gall with two exit holes

ACGW was recently discovered in Europe as well. The initial discovery of ACGW in Europe was in Italy in 2002, followed by France and Slovenia in 2005, Hungary and Switzerland in 2009, and Croatia in 2010 (Gibbs et al. 2011). Long-distance movement of ACGW in Europe has likely resulted from human-assisted transport of infested nursery stock from Italy. Crop losses have been severe in some heavily infested chestnut orchards, especially in Italy. A large-scale biological control program, using *Torymus sinensis*, has been initiated in Europe to combat ACGW (Aebi et al. 2007, Gibbs et al. 2011).

References

Aebi A, Schönrogge K, Melika G, Quacchia A, Alma A, Stone GN. 2007. Native and introduced parasitoids attacking the invasive chestnut gall wasp *Dryocosmus kuriphilus.* EPPO Bulletin 37: 166–171.

CGI (Chestnut Growers Inc.). 2011. CGI: Chestnut Growers, Inc. Michigan growers producing, harvesting, and processing sweet chestnuts. Online at: www.chestnutgrowersinc.com

Cooper WR, Rieske LK. 2007. Community associates of an exotic gallmaker, *Dryocosmus kuriphilus* (Hymenoptera: Cynipidae), in eastern North America. Annals of the Entomological Society of America 100: 236-244.

Cooper WR, Rieske LK. 2011. A native and introduced parasitoid utilize an exotic gall-maker host. BioControl DOI 10.1007/s10526-011-9350-1

Gibbs M, Schonrogge K, Alma A, Melika G, Quacchia A, Stone GN, Aebi A. 2011. *Torymus sinensis*: a viable management option for the biological control of *Dryocosmus kuriphilus* in Europe? BioControl 56: 527–538.

Kato K, Hijii N. 1997. Effects of gall formation by *Dryocosmus kuriphilus* Yasumatsu (Hym, Cynipidae) on the growth of chestnut trees. Journal of Applied Entomology 121: 9-15.

MDA (Michigan Department of Agriculture). 2010. Chestnut gall wasp quarantine. http://www.mi.gov/documents/mda/mda_Chestnut_Gall_Wasp_Quarantine_321905_7.pdf

Payne JA, Menke AS, Shroeder PM. 1975. *Dryocosmus kuriphilus* Yasumatsu, (Hymenoptera: Cynipidae), an oriental chestnut gall wasp in North America. USDA Economic Insect Report 25: 903-905.

Payne JA, Green RA, Lester, CD. 1976. New nut pest: An oriental chestnut gall wasp in North America. Northern Nut Growers Association Annual Report 67: 83-86.

Payne JA, Jaynes RA, Kays SJ. 1983. Chinese chestnut production in the United States: Practice, problems, and possible solutions. Economic Botany 37: 187-200.

Rieske LK. 2007. Success of an exotic gallmaker, *Dryocosmus kuriphilus*, on chestnut in the USA: a historical account. EPPO Bulletin 37: 172-174.

Rieske LK. 2011. Can our chestnut survive another invasion? Research on the Asian chestnut gall wasp in eastern North America. Northern Nut Growers Association Annual Report 101(2): 22-25.

Relationship between Mycangia and Symbiotic Fungi of the Ambrosia Beetles in the USA

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Primary symbiotic fungi associated with wood-boring ambrosia beetles (Coleoptera: Scolytidae and Platypodidae) must be isolated from the adult beetles' mycangia during the period of adult flight or in the early phases of gallery construction and should be observed and isolated in the presence of active feeding larvae. To date, the primary symbiotic fungi have been placed in two anamorphic (asexual) genera*: Ambrosiella* and *Raffaelea.* (Batra 1967, Harrington et al. 2010, Roeper et al. 1980. Roeper and French 1981, Six et al. 2009). These ambrosia fungi lose their ability to sporulate and change in cultural characteristics when in culture, which causes difficulty in their taxonomic identification. Over the last two decades numerous studies using molecular DNA sequencing techniques have been applied

Table 1. Summary data for the type of mycangia and the associated primary symbiotic fungi found in selected ambrosia beetles in the United States. Note: The families Platypodidae and Scolytidae are now considered subfamilies of the Curculionidae.

Family Tribe	Genus Species	Type of mycangia (Sex of beetle)	Primary symbiont	Host
Playtypodidae	*Platypus*	Pronotal pits (female)		
	P. wilsoni		*Raffaelea canadensis*	Conifers
	P. compositus		*R. ambrosiae*	Hardwoods
Scolytidae				
Corthylini	*Monarthrum*	Coxal (female)		Hardwoods
	M. dentigerum		*R. (Ambrosiella) brunnea*	
	M. fasciatum		*R. brunnea*	
	M. mali		*R. brunnea*	
	M. scutellare		*R. brunnea*	
	Gnathotrichus	Coxal (female)		Conifers
	G. retusus		*Raffaelea (Ambrosiella) gnathotrichi*	
	G. materiarus		*R. gnathotrichi*	
	G. sulcatus		*R. sulcati*	
			R. (Ambrosiella sulcati) canadensis	
	Corthylus	Prothoracic tubular with coxal opening (male)		Hardwoods
	C. columbrianus		*Ambrosiella xylebori*	
	C. punctatissimus		*A. xylebori*	
Xyleborini	*Xyleborus*	Oral (female)		Usually hardwoods
	X. glabratus		*Raffaelea lauricola*+ 5 other *Raffaelea* species	
	X .affinis		Undefined *Raffaelea* species	
	X. ferrugineus		Undefined *Raffaelea species*	
	Xyleborinus	Elytral sac (female)		
	X. saxeseni		*Raffaelea* (*Ambrosiella*) *sulphurea*	
	Xylosandrus	Pro-mesonotal sac (female)		Hardwoods
	X. compactus		*Ambrosiella xylebori*	
	X. crassiusculus		*A. xylebori*	
	X. germanus		*A. hartigii*	
	X. mutilatus		*A. beaveri*	
	Anisandrus	Pro-mesonotal sac (female)		Hardwoods
	A. dispar		*Ambrosiella hartigii*	
	A. sayi		*A. hartigii*	
Xyloterini	*Trypodendron*	Pleural prothoracic tubular (female)		
	T. betulae		*Ambrosiella ferruginea*	Hardwoods
	T. lineatrum		*A. ferruginea*	Conifers
	T. retusum		*A. ferruginea*	Hardwoods
	T .rufitarisis		*A. ferruginea*	Conifers
	T scabricollis		*A. (Phialophoropsis) trypodendri*	Conifers
	Xyloterinus politus	Oral (male and female) Prothoracic plerual cavity (female)	Undefined *Raffaelea* Undefined *Ambrosiella*	Hardwoods

to the study of ambrosia fungal systematics (Cassar and Blackwell 1996, Harrington et al. 2010, Jones and Blackwell 1998, Massoumi Alamouti et al. 2009). *Ambrosiella* was found to be the asexual form of *Ceratocystis* and *Raffaelea* an asexual form of *Ophiostoma*. Harrington et al.(2010) formally moved several *Ambrosiella* species to *Raffaelea* based on molecular data and morphological conidial types. These changes are noted in the following Table by placing the old name in parenthesis.

The selective function of the mycangia appears to control which fungal genus is associated with which beetle rather than which tribe the beetle belongs to or the woody host in which the beetle breeds. This pattern becomes evident from the data presented in Table 1. For example, the *Ambrosiella* species are associated with more well developed mycangia (prothoracic tubular and cavity types and pro-mesonotal sac type), while *Raffaelea* species are found associated with oral, coxal, and elytral sac types of mycangia.

References

Batra LR. 1967. Ambrosia fungi: a taxonomic revision and nutritional studies of some species. Mycologia 59: 976-1017.

Cassar SC, Blackwell M. 1996. Non-monophyly of ambrosia fungi in *Ambrosiella*. Mycologia 88: 596-601.

Harrington, TC, Aghayeva DN, Fraedrich, SW. 2010. New combinations in *Raffaelea*, *Ambrosiella*, and *Hyalorhinocladiela*, and four new species from the redbay ambrosia beetle, *Xyleborus glabratus*. Mycotaxon 111: 337-361.

Jones KG, Blackwell M. 1998. Phylogenetic analysis of ambrosial species in the genus *Raffaelea* based on 18S rDNA sequences. Mycological Research 102: 661-665.

Massoumi Alamouti S, Tsui CKM, Breuil C. 2009. Multigene phylogeny of filamentous ambrosia fungi associated with ambrosia and bark beetles s Mycological Research 113: 822-835.

Roeper RA, Hazen CR, Helsel DK, Bunce MA. 1980. Studies on Michigan ambrosia fungi. Michigan Botantist 19: 69-73.

Roeper RA, French JRJ.1981. Ambrosia fungi of the western United States and Canada-beetle associations (Coleoptera: Scolytidae), tree hosts, and distributions. Northwest Science 55: 306-309.

Six DL, Stone WD, de Beer ZW, Woolfolk SW. 2009. *Ambrosiella beaveri*, sp. nov., associated with an exotic ambrosia beetle, *Xylosandrus mutilatus* (Coleoptera: Curculionidae, Scolytinae), in Mississippi, USA. Antonie van Leeuwenhoek 96:17-29.

A Comparison of Trap Type and Location for Capturing Cerambycid Beetles

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Wood-boring beetles in the family Cerambycidae (Coleoptera) play many important roles in forest ecosystems worldwide but several invasive cerambycid species threaten forest health globally. Our goal was to identify effective detection tools for a broad array of cerambycid species by evaluating trap designs and placement in a range of habitats in Michigan. We compared cerambycid beetles captured with cross-vane panel traps and 12-unit Lindgren multiple-funnel traps placed 1.5 m above-ground (base level) and 3-10 m high in the canopy at eight sites classified as either residential, industrial, deciduous forest, or conifer forest. Traps were baited with the racemic blend of 3R-hydroxyhexan-2-one, a pheromone lure that is attractive to many hardwood-feeding cerambycid species or the host volatiles α-pinene and ethanol, which are attractive to many conifer-feeding species. Trapping took place at eight Michigan sites located in Oakland, Ingham, and Kalamazoo Counties between 10 June and 16 July 2010.

We captured 3721 beetles, representing 72 Cerambycidae species. Species richness was highest for the subfamilies Cerambycinae (33%) and Lamiinae (46%), while fewer Lepturinae (17%), Aseminae (3%), Parandrinae (1%), and Prioninae (1%) were collected. Overall, the cross-vane panel traps captured significantly more beetles, approximately 1.5 times more, than funnel traps. The species composition of traps located at the base level (68 species) differed significantly from the species composition of traps located in the canopy (64 species). Twenty-one species were captured exclusively in traps placed either in the canopy or at base level. More species were captured in hardwood sites (59 species) than in conifer (34 species), residential (41 species), or industrial (49) sites. Low numbers of beetles ($n < 5$) were recorded for 28 of the 72 beetle species collected. Number of species captured per week ranged from a high of 49 species on 21 June to 37 species on 12 July. Our findings suggest that installing cross-vane panel traps across a vertical gradient (at least 2 heights) should increase the number of cerambycid species captured.

Elizabeth E. Graham (Left) and Tina Marie Ciaramitaro (Right)

MES Financial Update

MES is currently in good financial standing, with a checking balance of $22,146.40 as of Nov. 2011. Publishing expenses for Vol. 44 no. 1&2 of the GLE were $4847.35. Other expenses included paying for the annual meeting facilities ($1522) and the yearly insurance bill ($400), and the printing and mailing of this newsletter (TBD). Page charges for the GLE and institutional subscription renewals are rolling in.

Tina Ciaramitaro, Treasurer

Material Preference and Emergence Success of *Pycnopsyche guttifer* (Insecta: Trichoptera) After Forced Case Reconstruction

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The emergence and case-building activity of *Pycnopsyche guttifer* (Walker) (Trichoptera: Limnephilidae) was studied in a non-flow laboratory environment, a flowing laboratory stream (Living Stream), and an *in situ* stream in Michigan. After collecting specimens from the Little Manistee River in Luther, Michigan, and removing the larvae from their cases, the larvae were given various building materials including ground minerals, commercial wood mulch (chopped and untreated), and aquarium rocks to construct new cases. In the non-flow laboratory study, *P. guttifer* larvae were successful in constructing a new case when given wood as a material. The new cases were flimsy, lacking in shape, and larger than those made in the field. This pattern remained constant over multiple trials. Larvae constructed mineral cases when placed in the Living Stream or *in situ* in a natural stream in the absence of wood. No cases were built in non-flow environments with only mineral materials. In the Living Stream, the adult emergence success of *P. guttifer* specimens that were forced to build mineral cases (due to lack of the wood option) was significantly higher than for those that built wood cases, possibly due to fungal infection of larvae in the wood cases. These results demonstrate a scenario where a non-preferred case construction material appears to increase survival. Specimens in the *in situ* stream that built wood cases had a higher emergence rate than those using other materials, though results were not significant due to expected predation and escape of specimens throughout the study. The results of the study overall suggest that the less natural the emergence environment, the more likely emergence success will occur with non-preferred cases.

Inverted River Continuity in a Michigan Stream Due to Upstream Terrestrial Habitat Loss

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The river continuum concept is a model that describes changes in river systems as they widen and interact with the surrounding terrestrial habitat. Changes in this model are often found in streams disturbed by pollution. I assessed the changes in the continuity of the Little Manistee River, an unpolluted stream in Luther, Michigan that had a known disturbed terrestrial habitat in its upper headwaters. I collected adult caddisflies (Trichoptera) from June through August 2010 and assessed family richness and feeding group composition at three sites. Site 1, the most upstream site, was devoid of canopy cover. Site 2 was downstream of site 1 and, likewise, lacking in canopy. Site 3 was farthest downstream but remained densely forested. Family richness significantly increased downstream, while a reversal in feeding group composition occurred between sites. Specifically, sites 1 and 2 had a caddisfly assemblage indicative of larger rivers, while site 3 had fauna commonly found in small streams. Thus, continuity was inverted. Due to a perceived lack of chemical pollution throughout the watershed, this discontinuity in the river is attributed to the simple loss of canopy cover at the upstream sites. My results indicate the importance of terrestrial habitat in structuring the biota of aquatic ecosystems.

Tiny Allies: The Effect of Coprophilous Beetles on *Brassica rapa* and *Lolium perenne* Growth and Biomass

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Coprophilous beetles play an important role in pasture ecosystems and can contribute to nutrient cycling through dung burial. But do these beetles benefit plant growth and biomass? This question was addressed by constructing an experiment using three types of coprophilous beetles collected at the Michigan State University Lake City Experiment Station: *Onthophagus taurus*, *Onthophagus nuchicornis* and *Sphaeridium lunatum*. It was hypothesized that *Onthophagus taurus* would have the greatest effect on plant growth and biomass. To test this hypothesis, six different treatments were prepared using coprophilous beetles, chemical fertilizer, dung only and a control (no dung, beetles or fertilizer). After ten days, the surface dung was removed, the beetles released and the two species of plants were planted into the treatment soils. *Brassica rapa* was included to study the effect that coprophilous beetles might have on a plant with a rapid life cycle. *Lolium perenne* was used to study the impact on grass grown in the pasture. Results showed that the *Onthophagus nuchicornis* treatments appeared to have some positive effect on the *Lolium perenne's* dry weight. The author's discovery of the exotic species *Onthophagus taurus* during this study was the first record of this species in Michigan, which demonstrates a substantial northward range expansion for this species.

Native Bee Diversity of Pierce Cedar Creek Institute in Southwest Michigan

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Bees provide essential pollination services to a wide range of plants in natural and managed landscapes. North America boasts over 4000 species of native bees, many of which have the potential to serve as crop pollinators. Habitat alteration, pesticide use, and the introduction of competitors and pathogens, however, can negatively impact native bee populations and the ecosystem services they provide. With recent declines in managed honey bee populations, studies documenting native bee diversity, abundance and behavior are needed in different regions of the country, and globally, in order to assess the status, nesting requirements and pollination abilities of bees. Accordingly, we surveyed the bee fauna on the 661 acre property of the Pierce Cedar Creek Institute in southwest Michigan on a monthly basis between May and October 2008. We sampled a total of 10 sites categorized as "Open Field," "Mixed," or "Woody" habitat, using bee bowls and aerial netting. Our survey yielded over 1000 specimens representing 5 families, 21 genera and 73 species. The Open Field habitat yielded the largest number of species and individuals, followed by Mixed habitat, and finally Woody habitat. The most abundant and most widely occurring species were *Augochlorella aurata* (Halictidae), *Ceratina dupla* (Apidae), and *Lasioglossum* species (Halictidae). Bee abundance and diversity was greatest in May, then declined and remained constant for the remaining months that were sampled. This survey establishes a baseline dataset for a long-term bee monitoring program in the area.

Nocturnal Flight Periodicity of the Caddisflies (Insecta: Trichoptera) in a Large Michigan River

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While caddisflies (Trichoptera) have been collected in many studies, ranging from biodiversity catalogues to biomonitoring indices, few have attempted to determine the optimal time to collect caddisflies with respect to both greatest abundance and diversity. This study determined the flight periodicities for nocturnal caddisflies in a northern Michigan river in July 2010. Between 5-16 July 2010, a UV light trap was used to collect caddisflies (N = 18,203) representing 12 families and 23 genera along the Manistee River near Luther, MI, between dusk and dawn. Caddisflies were sampled using a single trap placed at the same location each night, approximately 1 meter from the river's edge. The UV light trap was turned on for 5 minute intervals (18 intervals/samples per night). Examination of the flight periodicities of the caddisflies revealed that a general "peak" in activity was seen around 1 hour and 20 minutes after sunset for the most abundant families (Leptoceridae and Hydroptilidae). In contrast, for the other families (Glossosomatidae, Polycentropodidae, and Psychomyiidae) where fewer were captured, peak flight occurred somewhat later, but no family peaked later than 2 hours after sunset. A few families (Helicopsychidae, Hydropsychidae, and Philopotamidae) did not exhibit any distinct peak in flight activity, but rather had a more persistent period of flight activity beginning around an hour and a half after sunset and lasting until several hours after sunset. The remaining families (Brachycentridae, Lepidostomatidae, Limnephilidae, and Phyrganeidae) were not collected in sufficient abundance to reveal distinct flight patterns. These data suggest that the optimum time to sample caddisflies, with respect to both greatest abundance and diversity, is about one to two hours after sunset.

Spotted Wing Drosophila Update

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During 2011, over 300 monitoring traps were deployed in Michigan for detection of spotted wing Drosophila, *Drosophila suzukii*. These were deployed by MSU extension and research staff, as well as by crop consultants. This new invasive insect and fruit pest was first detected in Michigan in late September 2010 and it has now been detected in all of the main fruit-producing regions of the state. First fly captures were in the first week of July in 2011, with activity increasing in August and peaking in September.

There have been detections in almost all Michigan counties where monitoring traps were deployed. These include the primary production regions for blueberry, cherry, raspberry, and strawberry production. These crops are the most at risk from this pest, and there have been some detections of larvae in fruit, particularly in late-harvested raspberries, during 2011. Research projects are underway to compare baits and monitoring methods, to understand phenology and distribution of this pest, and to test potential control tactics to prevent fruit infestation. MSU has also developed a trap data entry system online that can be accessed at <www.misin.msu.edu/>, and this can be used by volunteers who wish to enter data on their own monitoring for SWD. Learn more about ongoing activities related to SWD at <www.ipm.msu.edu/SWD.htm>. Spotted wing Drosophila has also been detected in nearby areas such as Indiana, Wisconsin, Ontario, and also Pennsylvania and New York.

Map. Current known distribution of SWD in Lower Michigan from samples that have been confirmed by USDA-APHIS. Dark shaded counties had first detections in 2010, those in lighter shading had first detections in 2011.

Collections of Non-biting Midges (Diptera: Chironomidae) from Center Lake, Osceola County, Michigan, Including New State Records

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There have been few recent collections of chironomids, or non-biting midges, from Michigan inland lakes that have appeared in print, with the number of researchers actively collecting and identifying this group becoming ever smaller. This is unfortunate, given the wealth of different, interesting lake types to be found in the state.

The period during the 2010 annual meeting of the Michigan Entomological Society, which was held at the Kettunen Center located next to Center Lake in Osceola County, provided an opportunity to quickly sample midges from this beautiful lake. Center Lake (44.1075°N 85.3864°W) is a medium-sized mesotrophic body of approximately 16 hectares in size, located in an area of glacial-outwash topology surrounded by predominately northern hardwoods forest. Information from the Michigan DNR (Mark Tonello, pers. comm. 2011) describes Center Lake as "two-story," with shallower waters supporting warmwater fish such as bass and bluegill, and deeper, colder and well-oxygenated waters capable of supporting trout. Waters tend to be slightly acidic (pH 6.0-7.3), low alkalinity (10-23 ppm $CaCO_3$), with secchi disk transparencies ranging from 2.5-5.2 meters. Lake substrates are a combination of sand and pulpy peat, with the littoral surrounded by grasses, rushes and some floating aquatic vegetation. Adult chironomids were collected by sweeping foliage with a 12-inch diameter collapsible pocket net during the evening on June 25 and 26, 2010. The original coarse aerial netting attached to the spring steel net ring was replaced with a very fine gauge soft nylon curtain material. During the ca. 20 minute collecting period the contents of the net was aspirated into 70% ethyl alcohol every few minutes. A total of approximately 150-200 adult midges of both sexes were collected. In the lab, specimens were visually examined under a dissecting microscope for females, which were not identified. Of the remaining adults, obvious – often larger - species (e.g., *Einfeldia pagana* (Meigen), *Dicrotendipes fumidus* (Johannsen), *Dicrotendipes modestus* (Say) were selected out and 2 or 5 representative individuals mounted for verification. These, together with the remaining individuals were slide-mounted for identification, with a total of 75 individuals selected for identification. The process of slide mounting consisted of clearing the specimen with 10% NaOH overnight at room temperature, then rinsing (10 min.) with glacial acetic acid, dehydrating with 70% (10 min.) and 95% (10 min.) ethyl alcohol, and finally slide-mounting adults in Euparol. (Wings and a single foreleg and antenna were removed prior to clearing and were dehydrated as indicated above and directly mounted in Euparol). Prepared specimens (Figure 1) were then identified to the lowest practical level, with an emphasis often placed on detailed examination of imago genitalia for species-level identification (Figure 2).

A total of 75 individuals were slide-mounted and examined, from which 36 species from 23 genera and 3 subfamilies were identified (Table 1). The following taxa appear to be the first collection records from Michigan:

- *Cladotanytarsus elaensis* Bilyj, 1989; Species with previous regional records from Ontario
- *Chironomus* (*Lobochironomus*) *dorsalis* Meigen, 1818; Nearctic distribution [note: some publications erroneously place this species in *Einfeldia*; see Martin 2010 for a discussion of this problem]
- *Corynoneura oxfordana* Boesel and Winner, 1980; Nearctic species that was described by Boesel and Winner (1980) from specimens collected in Ohio.
- *Lauterborniella agrayloides* (Kieffer, 1911); Widespread species with a Holarctic distribution
- *Micropsectra xantha* (Roback, 1955); Widespread species with a Holarctic distribution
- *Nilothauma mirabile* (Townes, 1945); Nearctic distribution, previous regional records from Ohio and Ontario
- *Paramerina fragilis* (Walley, 1926); Species with a distribution in the northern Nearctic
- *Polypedilum angustum* Townes, 1945; Nearctic distribution, previous regional records from Minnesota, Ohio and Ontario
- *Polypedilum tritum* (Walker, 1856); Widespread Holarctic distribution, previous regional records from Ohio
- *Stenochironomus* (*Petalopholeus*) *cinctus* Townes, 1945; Species principally from the eastern Nearctic, this collection locality represents a westward extension from previous records in eastern Ontario. There are also specimens of this species collected in 2007 by the senior author from Hemlock Lake (42.0637 °N 85.8061°W), Cass County, in southwestern Michigan
- *Stenochironomus* (*Stenochironomus*) *macateei* (Malloch, 1915); Widespread eastern Nearctic, with records from Manitoba south to Texas, eastward Quebec and Florida
- *Tanytarsus brundini* Lindeberg, 1963; Holarctic distribution, previous record from New York
- *Tanytarsus buckleyi* Sublette, 1964; Nearctic distribution, regional records from Illinois and Ohio
- *Tanytarsus inaequalis* Goetghebuer, 1921; Nearctic distribution

The above species are generally widespread in occurrence, and their collection in Michigan was expected. Currently, there are now 252 species of Chironomidae with records from Michigan, with at least another 277 existing species (not including undescribed forms) also likely to be found in the state (EB, unpublished information).

All specimens have been deposited in the care of the senior author at the US Geological Survey, Great Lakes Science Center, Ann Arbor, Michigan.

Acknowledgments

We wish to thank the management of the Kettunen Center (Michigan 4-H Foundation) in Tustin, Michigan for access to, and permission to collect from, their property area around Center Lake. We also thank Drs. Martin Spies (Zoologische Staatssammlung München, Germany) and Torbjørn Ekrem (Museum of

Natural History and Archaeology, Trondheim, Norway) for verifications and additional taxonomic assistance for a number of specimens.

References

Boesel, M.W., and R.W. Winner. 1980. Corynoneurinae of northeastern United States, with a key to adults and observations on their occurrence in Ohio (Diptera: Chironomidae). Journal of the Kansas Entomological Society 53(3): 501-508.

Ekrem, T. 2007. A taxonomic revision of the genus *Stempellinella* (Diptera: Chironomidae). Journal of Natural History 41: 1367-1465.

Martin, J. 2010. North American cytospecies of the genus *Chironomus* (includes *Chaetoblabis*, *Lobochironomus*, and some *Einfeldia* (s.l.)). Web address (as of February 2011): http://www.genetics.unimelb.edu.au/martin/NACytfiles/Sp4n.htm

Reiss, F., and E. J. Fittkau. 1971. Taxonomie und Ökologie europäisch verbreiteter *Tanytarsus*-Arten (Chironomidae, Diptera). Archiv für Hydrobiologie, Supplement 40: 75-200.

Note: Except where noted, the collection and identification information for all specimens should read as:

USA: Michigan, Osceola Co.
Center Lake, along east shore
44.1075°N 85.3864°W
26-June-2010
leg. Patrick Hudson
det. Patrick Hudson and Ethan Bright 2011

Tanypodinae

Ablabesmyia mallochi (Walley 1925)
Ablabesmyia monilis (Linnaeus, 1758)
Labrundinia pilosella (Loew, 1886)
Larsia decolorata (Malloch, 1915)
Paramerina fragilis (Walley, 1926) - NEW STATE RECORD
Tanypus punctipennis Meigen, 1818

Orthocladiinae

Corynoneura oxfordana Boesel and Winner, 1980 - NEW STATE RECORD
Limnophyes minimus (Meigen, 1818)

Chironominae

Cladopelma viridulum (Linnaeus, 1767)
Cladotanytarsus elaensis Bilyj, 1989 - NEW STATE RECORD
Chironomus (*Lobochironomus*) *dorsalis* Meigen, 1818 - NEW STATE RECORD
Dicrotendipes fumidus (Johannsen, 1905)
Dicrotendipes modestus (Say, 1823)
Einfeldia pagana (Meigen, 1838)
Endochironomus nigricans (Johannsen, 1905)
Lauterborniella agrayloides (Kieffer, 1911) - NEW STATE RECORD
Micropsectra xantha (Roback, 1955) - NEW STATE RECORD
Nilothauma mirabile (Townes, 1945) - NEW STATE RECORD
Parachironomus sp. [note: the two specimens in our sample have several characters appearing intermediate to *P. hazelriggi* Spies and *P. gillespieae* Spies, and probably represent a newspecies (Martin Spies, pers. comm.). Fig. 2]
Paratanytarsus nr. *recens* (Sublette & Sublette, 1964)
Paratendipes albimanus (Meigen, 1818)
Polypedilum (Tripodura) scalaenum (Schrank, 1803)
Polypedilum (Tripodura) simulans Townes, 1945
Polypedilum (Pentapedilum) tritum (Walker, 1856) - NEW STATE RECORD
Polypedilum (Polypedilum) angustum Townes, 1945 - NEW STATE RECORD
Polypedilum (*Polypedilum*) *braseniae* (Leathers, 1922)
Polypedilum (Polypedilum) nebeculosum (Meigen, 1804)
Polypedilum (*Polypedilum*) *trigonus* Townes, 1945
Stempellinella fimbriata Ekrem, 2007
Stenochironomus (*Stenochironomus*) *macateei* (Malloch, 1915) - NEW STATE RECORD
Stenochironomus (*Petalopholeus*) *cinctus* Townes, 1945 - NEW STATE RECORD
Tanytarsus brundini Lindeberg, 1963 - NEW STATE RECORD [note: *T. brundini* may represent a species complex requiring further revision (Torbjørn Ekrem, pers. comm. 2011)]
Tanytarsus buckleyi Sublette, 1964 - NEW STATE RECORD
Tanytarsus inaequalis Goetghebuer, 1921 - NEW STATE RECORD
Tanytarsus neoflavellus Malloch, 1915
Tanytarsus nr. *palettaris* Verneaux, 1969 [note: this specimen closely resembles *palettaris*, a species in the *T. chinyensis*-group as defined in Reiss and Fittkau (1971). However, the shape and size of hypopygial structures do not match and probably represents a new species (Torbjørn Ekrem, pers. comm. 2011)]

Figure 1. Example of a prepared slide mount.

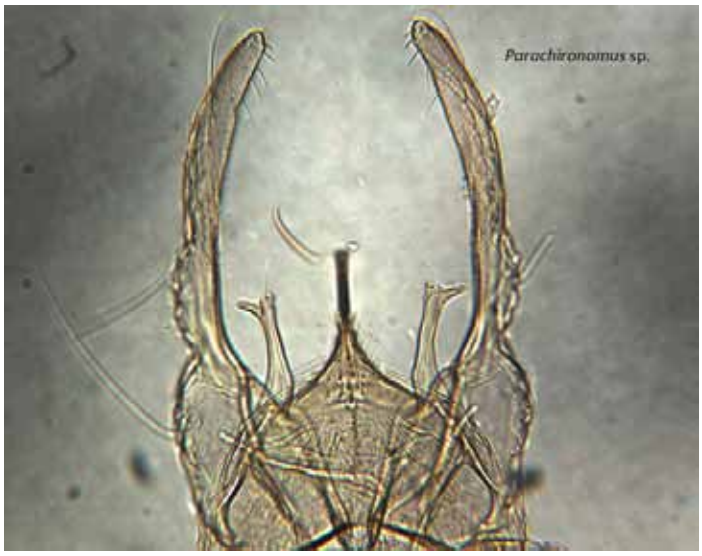

Figure 2. Genitalia of a male *Parachironomus* (? n. sp., see above), showing magnification at approximately 40x.

UMMZ Fluid Collections on the Move

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Many people have heard that the UMMZ (University of Michigan Museum of Zoology) collections are moving off-campus. This is only partly true, as it is currently the *wet collections* that are moving. Over the past few years, we have been preparing to move the specimens stored in ethanol (and to a lesser extent, formalin) that have been housed at the UMMZ's Ruthven Museums Building on the main campus in Ann Arbor. The Ruthven Museums Building has housed the fluid collections since it opened in 1927, but due to changing fire codes, less than ideal environmental conditions, and space considerations involving the quantity of materials in our fluid collections, efforts to prepare for the move began in 2007. The resulting studies and solutions involved two projects which have been managed by SmithGroup, Inc. (Detroit, MI).

1. Construction of a new, smaller wet-storage facility in the basement of the Ruthven Museum Building to store fluid collections that are currently being worked on by curators, students, and staff.

2. Construction of a modern facility on Varsity Drive (next to the UM Herbarium) that will hold the fluid collections, along with contemporary prep labs and research space.

Taken in its entirety, the nearly 6 million specimens in the wet collections at the UMMZ (Insects, Mollusks, Fishes, Reptiles and Amphibians, Birds and Mammals) are stored in about 53,000 gallons of ethanol, which naturally, is something that fire marshals don't like in mixed-use buildings. The wet collections at UM are second only in size to that of the Smithsonian (which has also moved into a new, safe facility). While the insect wet collections are large (165,000 vials and jars in 1700 linear feet of shelving), fishes and herps account for the bulk of the wet collections, accounting for approximately 24,000 linear feet of shelving. Four-dram vials account for most of the containers in the Insect Division, and while our largest jar is a quart, metal tanks in the Fish Division hold 18 gallons or 35 gallons.

Figure 1. Some of the wet collection that is being housed in the new space at the Ruthven Museums Building.

Construction of the new Varsity Drive facility is one part of the plan. Another significant task is the transfer of many thousands of containers (mostly glass jars) from Ruthven to the new site. Obviously, such a large move involved representatives from various agencies, since we will be transporting large quantities of ethanol. Moving the specimens isn't just simply loading them into a truck and carting them away. All materials and containers used in the move must meet Federal DOT (Department of Transportation) and NFPA (National Fire Protection Association) requirements, and the handling procedures must be in compliance with UM's Occupational Safety and Environmental Health (OSEH) guidelines. It is imperative that the items to be moved also be moved from point A to B with great accuracy and without breakage. The move of specimens has been coordinated by outside consultants (Design Partnership, Inc., Dearborn, MI and Moveplan USA, Inc Chicago, IL). This has resulted in a detailed inventory and tagging of all containers (or in the case of insects, vial racks) so that the collections can be mapped to the new storage shelving at Varsity Drive. Corrigan Moving (Ann Arbor, MI) was selected as the vendor for the packing and transport of the specimens, and we have been through some dry runs with their procedures to work out any impediments to a smooth operation.

At this time (November 2011), we are just weeks away from being able to start moving the collections to the new Varsity Drive Facility. It's estimated that the move will take 9 months (yes, there are a LOT of fish), but as significant parts of the collections are moved, we will be able to work with the specimens as the facility will be functional from January 2012 onwards.

The new facility at Varsity Drive (we have yet to come up with a new name!) has about 30,000 linear feet of compacted shelving and 2400 linear feet of static shelving in 9 collection rooms. All of the collection rooms will be a vast improvement over current conditions in Ruthven. Aside from being as safe as possible for the storage of flammables, they will be well-lit, with the environmental controls keeping the rooms at ca. 65° F year-round. In addition, the preparation lab, research space, dispensing area, and other ancillary rooms will be a welcome improvement for anyone working with the wet collections. The total Varsity Drive space that is being renovated is 26,146 square feet.

Figure 2. Checking out the new compacted shelving units at the Varsity Drive wet collections facility.

The improved space at Ruthven was finished in September, and has 2,226 linear feet of static shelving. Improvements were made to the space that includes many fire-safety features, explosion-proof windows, lighting, as well as alarm systems to alert of significant spills. We have moved in the specimens to the new rooms, and it's amazing how much space a few million mites can take up. (Figure 1). It is also rather exciting to see the new space in Ruthven and know that the Varsity Drive collection space will be a good place to work.

Some of us visited Varsity Drive back in early October (Figure 2.), when the compacted shelving was being installed. It was quite amazing to see the difference from what used to be an empty warehouse that once housed University Stores. The new collection rooms will offer us great storage space and the ability to grow our collections into the future, while offering researchers and students a proper place to work with wet collections. It's not hard to be excited about this transition as the move date approaches.

Recognition of Mogens C. Nielsen at MSU

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If you've been to the Michigan State University, Department of Entomology Museum in the Natural Science Building, you probably know "Mo." He's been volunteering his time and donating specimens for over 40 years. Mo is always eager to assist all that come to search the collection. Always with a smile, he welcomes students and researchers and gives them any assistance they need. Mo has spent much of his adult life collecting moths and butterflies throughout Michigan. There may not be a more persistent and thorough collector of Michigan Lepidoptera than Mo. Thousands of Mo's specimens are in the MSU insect collection. The great majority of the 400 drawers of Lepidoptera contain specimens that Mo has either collected or curated.

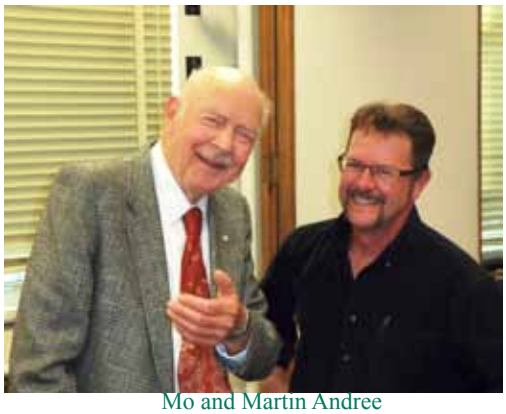
Mo began coming in evenings and weekends to work on the MSU insect collection long before being appointed Adjunct Curator in 1973. He retired from the Michigan Department of Natural Resources in 1988. In 1999, Mo published "Michigan Butterflies and Skippers, A Field Guide and Reference" through Michigan State University Extension. This was the first and still the most accurate field guide to this fauna with range maps and colored photos of all known species. It is because of such a focused effort and so much devotion to Michigan Lepidoptera and the A. J. Cook Arthropod Research Collection that the Lepidoptera room is now named, **"The Mogens C. Nielsen Lepidoptera Collection"**.

David Wagner, Mo, and Bob Kriegel

The venue selected for Mo's recognition was the date and time immediately preceding a Department seminar on Lepidoptera given by Dr. David Wagner from the University of Connecticut. Dave, a friend of Mo's for many years, was very happy to share the afternoon. During the day, and preceding his presentation, Mo was at the museum early in the morning. Throughout the day a parade of people came to congratulate him on this well deserved award. His special friends, John and Ruth Ann Peacock, made the trip from Marion, Ohio to enjoy much of the day with him.

Fred Stehr giving plaque to Mo

The meeting was brought to order by Department Chairman, Dr. Ernest Delfosse, who congratulated him for his tireless work and well deserved recognition. Thereafter, Dr. Fredrick Stehr, retired museum curator and Mo's longest friend in the Department, gave a very interesting history of Mo and presented him with the first of 2 plaques and dedicated the Lepidoptera collection in his honor. The first plaque was presented to Mo for his personal remembrance and the second, in bronze, will be installed in the Lepidoptera room.



Mo and Martin Andree

Over 30 people attended this recognition. Numbers would have been much higher had friends from a wider geographic area been included. Since space was needed for staff and students attending the seminar, the size of the room imposed a severe limitation. As it was, there was standing room only at this double event.

Following Mo's presentation, 29 family, friends, and members of the Michigan Entomological Society gathered at the Coral Gables Restaurant to celebrate with Mo at dinner. Though unplanned, three of Mo's friends, George Ayres, Anthony Cognato, and Martin Andree, each gave their thanks for Mo's long years of effort with examples they remembered of his helpfulness. We all enjoyed the day, especially Mo who continues to inspire us all.

An Entomological Collectible: Beetle Wing Artwork

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In October 2011, I delivered a presentation about exotic forest insects to the Petoskey Audubon Society. The connection between birds and exotic insects, such as the emerald ash borer, is that infestations can ultimately kill trees and in turn affect bird nesting and foraging activity. The meeting was held at the Independence Village retirement complex in Petoskey, MI. After my presentation, Mary-Martha Beierwaltes, who was in the audience and lived at Independence Village, spoke with me about a length of fabric she inherited from her grandmother, which had beetle wings (elytra) embroidered onto the fabric. After retrieving the fabric from her room, she showed it to me. Sure enough, there were dozens of beetle elytra sewn to the fabric, well over 100 elytra. It was beautiful! I guessed the elytra were from some species of tropical beetle in the family Buprestidae (the jewel beetles). The piece of fabric appeared as light-green netting, embroidered with gold thread, and was about 9 inches wide and 64 inches long. Mary-Martha insisted that I accept the fabric, and so I did, and then on her behalf, donated it to the Michigan State University Museum textile collection, where it can be cared for properly and shown to the public on occasion.

As for the history of this fabric, Mary-Martha told me that her grandmother, Mary Smith Nichols, acquired it in Europe, probably in France, during one of her visits to Europe in the late 1800s, likely in the 1880s or 1890s. Mary Smith Nichols lived in New Haven, CT, in the late 1800s, and was the daughter of Jeremiah Smith, who owned an oyster shipping business in New Haven called "Jeremiah Smith & Sons Inc. Oyster Growers." Mary Smith Nichols first gave the fabric to her daughter-in-law, Grace Nichols, and then in the 1930s, Grace gave it to her daughter Mary-Martha.

Sternocera aequisignata
Photo reprinted with permission of The Evolution Store (www.theevolutionstore.com)

Before moving to Petoskey, Mary-Martha and her husband, William Beierwaltes, lived in Ann Arbor, MI, for many years, where he was on the faculty of the University of Michigan's Medical School. Although Mary-Martha grew up in New Haven, she spent many summers of her childhood (ca. 1920-1930) at the University of Michigan Biological Station on Douglas Lake, where her father, botanist George E. Nichols of Yale University, taught and conducted research during the summer months on Bryophytes (Anonymous 2006, La Rue 1944, Steere 1939).

As for the beetle elytra, after searching the internet with keywords such as "beetle, wing, elytra, fabric and textile," I found several websites that described the art of using elytra to adorn fabrics as well as many other items of clothing, jewelry, and artwork. The practice of using elytra in artwork dates back hundreds of years. The metallic green elytra, such as those in the fabric donated by Mary-Martha Beierwaltes, likely came from a species of *Sternocera* (Buprestidae), possibly *Sternocera aequisignata* Saunders, which is native to southeastern Asia. There are some very interesting examples online of "beetle wing" artwork. For example, over one million *Sternocera* elytra were used to adorn some of the ceiling panels in the Royal Castle in Brussels, Belgium (Lennon 2009). Another example is the recent restoration work of an 1888 stage costume worn by the Shakespearean actress Ellen Terry in her portrayal of Lady Macbeth. The dress has over 1000 *Sternocera* elytra, and required about 1300 hours of restoration work over two years (Past Horizons 2011).

Life history studies have been reported for only a few *Sternocera* species (Pinkaew 2001, Rojanavongse 2008). Apparently, *Sternocera* species have a 2-year life cycle. Unlike most buprestids that I'm familiar with, whose larvae develop inside leaves, cones, branches, and tree trunks, *Sternocera* lay eggs in the soil near the base of their host plants, and the larvae develop in the soil and feed both externally on plant roots as well as within rhizomes (Pinkaew 2001). Pupation occurs in the soil. Currently, there are 26 species of *Sternocera* recognized worldwide (Bellamy 2011). They are found in sub-Saharan Africa and in Asia from India to Vietnam. In both Africa and Asia, adult *Sternocera* are collected and consumed by humans (De Foliart 2002, Watanabe and Satrawaha 1984). Apparently, since the elytra are not eaten, they are often saved in many countries and then sold to locals or abroad for use in various art and craft projects. In fact, you can buy packages of *Sternocera* elytra on eBay in quantities of 50 to 200.

So thanks to Mary-Martha Beierwaltes of Petoskey for donating her beetle-wing bedecked family heirloom. Hopefully it will be on display often at the Michigan State University Museum so that everyone can enjoy it.

References

Bellamy CL. 2011. The world of jewel beetles. Online at: http://www.fond4beetles.com/Buprestidae/index.html

De Foliart GR. 2002. The human use of insects as a food resource. Online at: http://www.food-insects.com/book7_31/The%20Human%20Use%20of%20Insects%20as%20a%20Food%20Resource.htm

La Rue GR. 1944. The Biological Station. Pages 761-769 in WB Shaw (Ed.), The University of Michigan: An Encyclopedic Survey. Vol. 4. University of Michigan Press, Ann Arbor. Online at: http://um2017.org/2017_Website/Surveying_Camp_Biological_Station.html

Lennon S. 2009. Royal Belgian ceiling glows with Flemish sculptor's beetles arrangement. Online at: http://shenews.projo.com/2009/09/royal-belgian-c.html

Past Horizons. 2011. The archaeology of a dress. Online at: http://www.pasthorizons.com/index.php/archives/03/2011/the-archaeology-of-a-dress

Pinkaew N. 2001. Some biological aspects of *Sternocera ruficornis* Saunder, 1866 in dry dipterocarp forest at Sakaerat Environmental Research Station. The Kasetsart Journal - Natural Sciences 35(2): 132-138. Online at: http://pindex.ku.ac.th/file_research/KU35(2).pdf#page=22

Rojanavongse V. 2008. The life cycle of the rounded jewel beetles, *Sternocera* spp. Online at: http://www.malaeng.com/blog/?p=4262

Watanabe H, Satrawaha R. 1984. A list of edible insects sold at the public market in Khon Kaen, northeast Thailand. Southeast Asian Studies 22(3): 316-325. Online at: http://repository.kulib.kyoto-u.ac.jp/dspace/bitstream/2433/56179/1/KJ00000131173.pdf

Additional Records and Corrections of Lepidoptera Reported from Cook County, Minnesota

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This note records 7 additional species of butterflies and skippers and 123 species of moths to the list published by MacLean (2006) for Cook County, Minnesota. The total number of new lepidopteran species by family are: Hesperiidae (3), Lycaenidae (1), Nymphalidae (3), Drepanidae (1), Geometridae (42), Sphingidae (1), Notodontidae (2) and Noctuidae (77). Specimens reported by DBM are housed in the Grand Portage Monument (U.S. Park Service), Grand Portage, Minnesota Insect Collection and the author's private collection. Those collected by RPD are housed in the University of Minnesota Entomology Collection, and those by KEJ in the University of Wisconsin Insect Research Collection, with some duplicates in the University of Minnesota Entomology Collection.

Following each species in the table below is the number of localities where specimens were collected in Cook County, and notes on adult phenology, habitats, and collection data. The habitats are coded with letters as follows: A) mesic aspen-birch-spruce-fir dominated forests and openings, B) dry to dry-mesic pine-spruce-fir-aspen-birch dominated forests and openings, C) dry to dry-mesic black spruce-jack pine dominated woodlands and openings, D) Lake Superior shoreline and dry-mesic spruce-fir-aspen-birch dominated woodlands, E) wet meadows and shrub thickets, F) rich peatlands, and G) acid peatlands. Sampling was strongly biased to certain habitats (esp. C & G) and therefore many of the species reported herein undoubtedly occur in a wider variety of habitats.

Poanes massasoit (Scudder) and *Papilio polyxenes* Fabricius are removed as we are not aware of any voucher specimens from Cook County. *Pontia protodice* (Boisduval & Leconte) is removed and replaced by *P. occidentalis* (Reakirt) after reexamination of a specimen collected in 2006 and additional specimens collected in 2011. These additions and corrections bring the number of butterflies and skipper species reported from Cook County, Minnesota to 73 and the number of moth species to 521.

In the table below: DBM = David B. MacLean, RPD = Robert P. Dana, KEJ = Kyle E. Johnson, DRB= Dwayne R. Badgero, and JS = James Sogaard.

Hesperiidae

4096 *Amblyscirtes hegon* (Scudder, 1864): 2, late June, A (DMB, KEJ, RPD); reportedly documented by John Masters in late June, 1971 at Sea Gull Lake (Ron Huber pers. comm.)

4004 *Ancyloxypha numitor* (F., 1793): 1, early August, F (KEJ); reportedly documented by Tim McCabe on July 14, 1970 at Nestor Creek, and by Dick Oehlenschlager in late July at numerous sites (Ron Huber pers. comm.)

3966 *Pyrgus communis* (Grote, 1872): 1, late June, G (KEJ); reportedly documented by Tim McCabe on July 2, 1970 along Lima Mountain Road (Ron Huber pers. comm.)

Pieridae

4194 *Pontia occidentalis* (Reakirt, 1866): 4, August-early September, A-B (DBM, KEJ); invasive in 2006 and 2011

Lycaenidae

4324 *Callophrys polios* (Cook & F. Watson, 1907): 1, mid - late June, C (KEJ); local and difficult to find despite widespread bearberry in the county; reportedly documented by John Nordin on June 13, 1965 at Lima Mountain; by Tim McCabe on June 30, 1975 at Thompson Lake; by Ron Huber on May 28, 1967 at Lima Mountain; and by E. Brackney on May 28-29, 1967 at Lima Mountain and Devil Track Lake (Ron Huber, pers. comm.)

Nymphalidae

4420 *Polygonia interrogationis* (Fabricius, 1798): previously reported by Macy & Shepard (1941); also reportedly taken by Tim McCabe on August 7, 1970 along the Cascade River (Ron Huber pers. comm.)

4422 *Polygonia satyrus* (W. H. Edwards, 1869): reportedly documented by Jackson Boughner on August 24, 1964 along the Gunflint Trail, and by Tim McCabe on June 21, 1969 along Lima Mountain Road (Ron Huber pers. comm.)

4447 *Euptoieta claudia* (Cramer, 1775): reportedly documented an unknown collector at Hovland on August 23, 1998 (Ron Huber pers. comm.)

4463 *Boloria eunomia dawsoni* (Barnes & McDunnough, 1916): 8, mid - late June, F-G (KEJ, RPD); reportedly documented by Tim McCabe at several sites in 1970 (Ron Huber pers. comm.)

4466 *Boloria frigga* (Thunberg, 1791): 1, late May- early June, G (KEJ, RPD); local and difficult to find relative to Minnesota counties farther west; reportedly documented on June 13, 1965 by John Nordin at Lima Mountain, and in late June 1971 at Sea Gull Lake by John Masters (Ron Huber pers. comm.)

4593 *Erebia mancinus* (Doubleday and Hewitson, 1849): 3, late May - early June (advanced season records), G (KEJ); highly local (but may be common) in select types of black spruce bog forests and poor swamps, patchy distribution, found only in even years thus far (flies every year in parts of adjacent Lake County); reportedly documented by John Masters in late June, 1971 at Sea Gull Lake (Ron Huber, pers. comm.)

Drepanidae

6253 *Eudeilinia herminiata* (Guenée, 1857): 1, late June, C (KEJ)

Geometridae

6279 *Speranza andersoni/occiduaria* complex: 6, mid - late July, C-D-G (KEJ, RPD)

6282 *Speranza argilloacearia* (Packard, 1874) complex: 3, late July - early August, G (KEJ, RPD)

6283 *Speranza sulphurea* (Packard, 1873): 6, late July - early August, F-G (KEJ, RPD)

6286 *Speranza brunneata* (Thunberg, 1784): 6, mid June - early August, C-F-G (KEJ, RPD, DRB)

6304 *Speranza bitactata* (Walker, 1862): 2, August, A-C (DBM, KEJ)

6321 *Epelis truncataria* (Walker, 1862): 16, late May-June, F-G (KEJ, RPD)

6330 *Macaria notata* (L. 1758): 2, June, C (KEJ)

6343 *Macaria sexmaculata* (Packard, 1867): 4, late May-early August, C-G

(KEJ)
6349 *Macaria marmorata* Ferguson, 1972: 2, June, C (KEJ)
6350 *Macaria submarmorata* Walker, 1861: 4, late May - August, C-G (KEJ)
6351 *Macaria oweni* (Swett, 1907):3, mid June - August, C-G (KEJ, DRB)
6396 *Digrammia neptaria* (Geunée, 1858): 1, June, C (KEJ)
6428 *Orthofidonia tinctaria* (Walker, 1860): 1, June, G (KEJ)
6584 *Iridopsis humaria* (Guenée, 1858): 1, late May, C (KEJ)
6597 *Ectropis crepuscularia* (Denis & Schiffermüller, 1775): 1, early June, A (DBM)
6620 *Melanolophia canadaria* (Guenée, 1858): 2, June, C-G (KEJ)
6637 *Eufidonia convergaria* (Walker, 1860): 2, June, A-C (DBM, KEJ)
6639 *Eufidonia discospilata* (Walker, 1862): 12, June, B-C-G (KEJ, RPD)
6667 *Lomographa vestaliata* (Guenée, 1858): 1, late May, C (KEJ)
6739 *Euchlaena irraria* (Barnes & McD., 1917): 1, mid June, C (KEJ)
6755 *Pero morrisonaria* (Hy. Edwards, 1881): 6, late May - June, C-D-G (KEJ)
6817 *Selenia alciphearia* Walker, 1860: 1, late May, C (KEJ)
6844.1 *Plagodis pulveraria* (L., 1758): 3, late May - June, C-G (KEJ)
7047 *Nemoria rubrifrontaria* (Packard, 1873): 1, late June, C (KEJ)
7084 *Hethemia pistasciaria* (Guenée, 1858): 7, June, G (KEJ, RPD)
7085 Mesothea incertata (Walker, 1863): 12, late May - mid June, C-F-G (KEJ, RPD)
7164 *Scopula junctaria* (Walker, 1861): 3, late June, C-F-G (KEJ)
7187 *Dysstroma truncata* (Hufnagel, 1767): 1, early June, A (KEJ)
7188 *Dysstroma walkerata* (Pearsall, 1909): 3, June, C-F (KEJ, DRB)
7208 *Eulithis serrataria* (Barnes & McD., 1917): 1, early August, G (KEJ)
7210 *Eustroma semiatrata* (Hulst, 1881): 1, mid August, A (DBM)
7213 *Ecliptopera silaceata* ([Denis & Schiffermüller], 1775): 2, late June, C-G (KEJ, DRB)
7229 *Hydriomena perfracta* Swett, 1910: 2, late May - early June, C (KEJ)
7254 *Hydriomena ruberata* (Freyer, [1831]): 2, late May - early June, C (KEJ)
7285 *Triphosa haesitata* (Guenée, [1858]): 2, early - mid August, C (KEJ, RPD)
7307 *Mesoleuca ruficillata* (Guenée, 1858): 1, late June, B (RPD)
7330 *Anticlea multiferata* (Walker, 1863): 2, late June, C (KEJ, DRB)
7370 *Xanthorhoe abrasaria* (Herrich-Schäffer, 1855): 3, late June, C-G (KEJ, RPD, DRB)
7371 *Xanthorhoe iduata* (Guenée, 1858): 2, late June, C-G (KEJ, RPD)
7419 *Hydrelia lucata* (Guenée, 1858): 1, late June, C (KEJ)
7420 *Hydrelia condensata* (Walker, 1862): 2, late June, C (KEJ, DRB)
7626 *Carsia sororiata* (Hübner, 1813): 8, late July- early August, F-G (KEJ, RPD); *species poorly documented in northern Great Lakes region, apparently peatland restricted

Sphingidae
7817 *Lapara bombycoides* Walker, 1856: 1, late June, C (KEJ)

Notodontidae
7898 *Clostera strigosa* (Grote, 1882): 1, late May, C (KEJ)
8007 *Schizura unicornis* (J.E. Smith, 1797): 1, late June, C (KEJ)

Noctuidae [includes former Arctiidae and Lymantriidae]
8111 *Haploa lecontei* (Guerin-Meneville, 1832): 1, late July, A (DBM)
8123 *Virbia ferruginosa* (Walker, 1854): 8, late June- early August, C-G (KEJ, RPD, DRB)
8127 *Parasemia plantaginis* (L., 1758): 1, late June, A (RPD)
8136 *Spilosoma dubia* (Walker, 1855): 1, late June, C (KEJ)
8323.1 *Idia concisa* of authors, not (Walker, 1860): 1, late June, C (KEJ)
8362 *Phalaenostola metonalis* (Walker, 1859): 1, mid July, E (RPD)
8397 *Palthis angulalis* (Hübner, 1796): 2, June, C (KEJ)
8445 *Bomolocha abalienalis* (Walker, 1859): 1, late June, A (DBM)
8490 *Pangrapta decoralis* (Hübner, 1818): 1, late June, C (DRB)
8636 *Drasteria adumbrata* (Behr, 1870): 1, late June, B (KEJ)
8694 *Zale aeruginosa* (Guenée, 1852): 1, late May, C (KEJ)
8703 *Zale duplicata* (Bethune, 1865): 1, late June, C (KEJ)
8717 *Zale horrida* Hübner, 1819: 1, late June, C (KEJ)
8727 *Parallelia bistriaris* Hübner, 1818: 1, mid June, C (KEJ)
8776 *Catocala badia coelebs* Grote, 1874: 2, early August, C-F (KEJ)
8846 *Catocala sordida* Grote, 1877: 2, early August, C (KEJ)
8904 *Chrysanympha formosa* (Grote, 1865): 2, early August, C (KEJ)
8909 *Autographa rubidus* Ottolengui, 1902: 4, late May-June, A-C-G (KEJ)
8913 *Autographa pseudogamma* (Grote, 1875): 1, late June, F (KEJ)
8925 *Syngrapha altera* (Ottolengui, 1902): 1, early August, C (KEJ)
8927 *Syngrapha epigaea* (Grote, 1875): 1, early August, C (KEJ)
8945 *Syngrapha montana* (Packard, 1869): 1, mid June, G (KEJ)
8946 *Syngrapha microgamma nearctica* Ferguson, 1955: 1, mid June, G (KEJ)
8970 *Baileya ophthalmica* (Guenée, 1852): 1, early June, A (KEJ)
9053 *Pseudeustrotia carneola* (Guenée, 1852): 1, mid June, C (KEJ)
9059 *Capis curvata* Grote, 1882: 4, mid July-early August, E-F (RPD)
9211 *Acronicta tritona* (Hübner, 1818): 1, late May, C (KEJ)
9224 *Acronicta quadrata* Grote, 1874: 1, early June, A (KEJ)
9257 *Acronicta impleta* Walker, 1856: 1, mid June, C (KEJ)
9341 *Apamea vultuosa* (Grote, 1875): 1, late June, C (KEJ, DRB)
9647 *Proxenus miranda* (Grote, 1873): 3, June, A-C-G (KEJ)
9681.1 *Elaphria alapallida* Pogue & Sullivan, 2003: 2, mid to late June, A-C (KEJ)
9875 *Xylena thoracica* (Putnam-Cramer, 1886): 1, late May, G (KEJ)
9888 *Lithophane innominata* (J.B. Smith, 1893): 2, mid September-early June, A (DBM, KEJ)
9889 *Lithophane petulca* Grote, 1874: 2, mid September-late May, A (DBM, KEJ)
9902 *Lithophane baileyi* Grote, 1877: 1, early September, G (KEJ)
9925.1 *Lithophane adipel* (Benjamin, 1936): 1, mid September, A (KEJ); *possible new state record, from 2011; collected in Lake and Lake of the Woods counties later that year
9935 *Eupsilia tristigmata* (Grote, 1877): 1, late September-May, A (DBM)
9939 *Eupsilia devia* (Grote, 1875): 1, mid October, A (DBM)
9980 *Xylotype arcadia* Barnes & Benjamin, 1922: 2, August-early September, F-G (KEJ)
9998 *Brachylomia algens* (Grote, 1878): 1, early August, G (KEJ)
9999 *Brachylomia discinigra* (Walker, 1856): 1, early August, G (KEJ)
10055 *Sympistis dentata* (Grote, 1875): 2, early August, C-G (KEJ)
10066.1 *Sympistis dinalda* (Smith, 1908): 1, early August, C (KEJ)
10194 *Cucullia intermedia* (Speyer, 1870): 1, mid June, A (DBM)
10197 *Cucullia florea* (Guenée, 1852): 1, late June, C (DRB)

10265 *Sideridis rosea* (Harvey, 1874): 1, mid June, A (DBM)
10268 *Sideridis maryx* (Guenée, 1852): 1, late June, C (KEJ)
10277.1 *Polia propodea* McCabe, 1980: 2, late June, C-G (KEJ, DRB)
10290 *Orthodes obscura* (Smith, 1888): 2, late May-June, A-C (DBM, KEJ)
10294 *Melanchra pulverulenta* (Smith, 1888): 1, late May, G (KEJ)
10296 *Lacanobia nevadae* (Grote, 1876): 2, late June, C-G (KEJ, DRB)
10301 *Spiramater lutra* (Guenée, 1852): 2, late May-June, C-G (KEJ)
10312 *Papestra cristifera* (Walker, 1858): 2, late May-June, C-G (KEJ); *apparent new state record
10332 *Coranarta luteola* (Grote & Robinson, 1865): 4, June, G (KEJ)
10339.4 *Lasionycta taigata* Lafontaine, 1988: 2, late June, G (KEJ); *recently discovered in northern Great Lakes states, locally common in black spruce bog forests in Cook County
10372 *Lacinipolia anguina* (Grote, 1881): 3, late May-June, C-G (KEJ)
10431 *Dargida diffusa* (Walker, 1856): 2, early June, C (DBM, KEJ)
10449 *Leucania insueta* Guenée, 1852: 3, June, C-F (KEJ, DRB)
10501 *Crocigrapha normani* (Grote, 1874): 1, late May-early June, A-C (DBM)
10530 *Anhimella contrahens* (Walker, 1860): 1, July, A (DBM)
10532 *Homorthodes furfurata* (Grote, 1875): 1, early August, C (KEJ)
10578 *Pseudorthodes vecors* (Guenée, 1852): 1, early July, A-C (DBM)
10644 *Feltia mollis* (Walker, 1857): 2, late July-early August, C (DBM, KEJ)
10660 *Agrotis obliqua* (Smith, 1903): 1, early June, C (KEJ)
10702 *Euxoa divergens* (Walker, 1857): 1, early July, A (DBM)
10756 *Euxoa campestris* (Grote, 1875): 1, mid July, A-C (DBM)
10919 *Diarsia jucunda* (Walker, 1857): 3, late July-early August, A-C-D (DBM, KEJ)
10924 *Actebia fennica* (Tauscher, 1806): 1, late September, D (DBM)
10942.1 *Xestia dolosa* Franclemont, 1980: 2, early August, D-F (KEJ)
10959.1 *Xestia mixta* (Walker, 1856): 2, early August, C-G (KEJ); recently discovered in northern Great Lakes states; Cook County supports the only known upland population
10962 *Xestia perquiritata* (Morrison, 1874): 1, early August, G (KEJ); apparent new state record
10969 *Xestia dilucida* (Morrison, 1875): 1, early August, G (KEJ)
10993.1 *Hemipachnobia monochromatea* (Morrison, 1874): 3, mid-late June, G (KEJ)
10997 *Cerastis fishii* (Grote, 1878): 2, late May-mid June, G (KEJ)
11003 *Chersotis juncta* (Grote, 1878): 1, early August, C (KEJ)
11006 *Protolampra brunneicollis* (Grote, 1865): 1, early August, C (KEJ)
11164 *Schinia florida* (Guenée, 1852): 1, early July (JS); larvae reared on (Oenothera biennis) in late August

FUTURE ADDITIONS

Despite documenting 130 new additions many more lepidopteran species undoubtedly await discovery in Cook County, MN. Vast areas have yet to be explored, and many habitats are weakly sampled. We look forward to any future additions or corrections. The following is a partial list of species of which we are especially interested in seeing records.

3958 *Erynnis lucilius* (Scudder & Burgess, 1870): documented from adjacent Lake Co. (KEJ)
3962 *Pyrgus centaureae freija* (B. Warren, 1924): documented from adjacent Lake Co. (Ron Huber, pers. comm.)
4058 *Poanes massasoit* (Scudder, 1863)
4064 *Poanes viator* (W. H. Edwards, 1865)
4072 *Euphyes dion* (W. H. Edwards, 1879)
4159 *Papilio polyxenes asterius* (Stoll, 1782)
4166 *Papilio machaon hudsonianus* A. Clark, 1932; not yet documented in MN
4193 *Pontia protodice* (Boisduval & Le Conte, 1830): documented from adjacent Lake Co. (KEJ)
4249 *Feniseca tarquinius* (Fabricius, 1793): documented from numerous sites in adjacent Lake and St. Louis counties (KEJ and Jim Phillips, pers. comm.)
4256 *Lycaena hyllus* (Cramer, 1775): documented from St. Louis County (KEJ)
4262 *Lycaena helloides* (Boisduval, 1852)
4275 *Satyrium titus* (Fabricius, 1793)
4278 *Satyrium acadica* (W. H. Edwards, 1862)
4326 *Callophrys henrici* (Grote & Robinson, 1867)
4447 *Euptoieta claudia* (Cramer, 1775)
4523 *Limenitis archippus* (Cramer, 1775): documented from adjacent Lake Co. (KEJ)
4568.3 *Lethe eurydice* (Linnaeus, 1763)
4578 *Megisto cymela* (Cramer, 1777)
6257 *Leucobrephos brephoides* (Walker, 1857)
6653 *Lycia rachelae* (Hulst, 1896): not yet documented in northern Great Lakes
6898 *Cingilia catenaria* (Drury, 1773)
7877 *Proserpinus flavofasciata* (Walker, 1856): should be sought within the large burn areas near Sea Gull Lake (where fireweed has become quite abundant)
8120 *Virbia lamae* (Freeman, 1941): documented from northern St. Louis County (KEJ)
9899.1 *Lithophane thujae* Webster & Thomas, 2000: not yet documented in MN
9913 *Lithophane georgii* Grote, 1875: documented from adjacent Lake Co. (KEJ)
10302 *Trichordestra rugosa* (Morrison, 1875)
10311 *Papestra biren* (Goeze, 1781)
10315 *Lasionycta secedens* (Walker, [1858]): should be sought in lingonberry peatlands; thus far only known from St. Louis to Lake of the Woods County in MN (KEJ)
10337.3 *Lasionycta anthracina* Crabo & Lafontaine, 2009: not yet recorded from MN; possible in select peatland types
10493 *Orthosia segregata* (Smith, 1893)
10958 *Xestia fabulosa* (Ferguson, 1965): not yet documented from MN; would be a fabulous find
11081 *Heliothis borealis* (Hampson, 1903): thus far only recorded from northwestern MN (KEJ)

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References

MacLean, David B. 2006. Preliminary inventory of Lepidoptera from Cook County, Minnesota: Hesperioidea, Papilionoidea, Drepanoidea, Geometroidea, Bombycoidea, Sphingoidea and Noctuoidea. Great Lakes Entomologist 39: 123-140.

Macy, R.W. and H.H. Shepard. 1941. Butterflies. University of Minnesota Press, Minneapolis. 247 p.

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Requesting First State Arthropod Reports

ITS TIME AGAIN TO SET THE RECORD STRAIGHT! Have you recovered an arthropod species not before recorded from your state? Perhaps you've recovered one a few years ago which has not yet been reported in print. Publishing new state records significantly adds to our understanding of species ranges as well as their expansion.

Submit your record(s) for our next newsletter (spring 2012). If you're not sure of the identity of your specimens, it's a great reason to attend our next Breaking Diapause, **Saturday, 17 March 2012**. See the announcement on this page. The more information you have regarding your recovery the better. Include as many of the following points that you have: species, common name (if there is one), family; date, location of recovery, method of recovery, identifier, photograph, habitat, and current specimen(s) location. Of course, you will be credited for all your information!

Send your information to Ron Priest at: priest@msu.edu or 243 Nat. Sci. Bldg., M.S.U., East Lansing, MI 48824-1115. If you have questions, then do contact me by Email, phone: 517-353-3891, or U.S. mail. I look forward to hearing from you, learning what's new, and seeing your records in print. Cheers. *Ron Priest*

MES Officers Needed. As is the case every year, we need a few people to step forward and nominate themselves or others for two positions: President Elect, and Member at Large. Please consider serving MES. We'll send out election ballots in spring 2012.

MES Dues Notice: The MES Governing Board expanded the eligibility for student membership to include undergraduate and graduate students, beginning in 2012**.**

Breaking Diapause Saturday, 17 March 2012

Breaking Diapause is the annual MES spring entomology meeting. It is an informal, social gathering for members and those interested in becoming members. Breaking Diapause will be held from **9:30 AM till mid-afternoon** in **Room 352** of the **Natural Science Building** (Nat Sci) at **Michigan State University**. In addition to socializing with a variety of professional and amateurs there will be plenty to do. The insect museum at Nat Sci will be open so bring along your unidentified insects. Folks will be available to show you around the collection if you're unfamiliar and assist you with any unknowns you have. Bring along your entomological duplicates you'd like to trade, sell, or just give away. You might also bring along specimens, images, and displays to show, As usual we'll also have a variety of finger foods. Note! We will meet on the 3rd floor, not the 2nd due to renovations. See you then! *Ron Priest*