



Newsletter of the Michigan Entomological Society

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66th Annual MES Meeting

June 6, 2020, ONLINE!

For the first time in the history of the Michigan Entomological Society the annual meeting was conducted in an online format, utilizing the services of Zoom Video Communications, Inc. Members and speakers were able to participate in the meeting without leaving their homes or offices, incurring no costs for travel, lodging, meals or registration. The MES incurred no meeting expenses, thanks to our treasurer Angie Pytel allowing us to utilize her paid Zoom plan.

President-Elect Duke Elsner presided over the meeting from his home office in Traverse City. The session included eight speakers and the annual MES business meeting. Close to 30 participants participated by Zoom. The meeting was recorded and once some editing is done, it is hoped that it can be made available for members to view.

Abstracts from the 66th Annual Meeting of the Michigan Entomological Society

Where have all the Pine Shoot Beetles gone, long time passing? The 1992 PSB federal quarantine is coming to an end

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The pine shoot beetle (PSB), *Tomicus piniperda* (L) (Coleoptera, Curculionidae, Scolytinae), a Eurasian bark beetle species, was the first exotic forest insect that I studied. This began in 1992, when a Christmas tree grower near Cleveland, Ohio, brought some unknown beetles that were infesting his pine trees to Dr. David Nielsen at The Ohio State University, who subsequently sent them to Dr. Stephen Wood at Brigham Young University, a world authority on bark and ambrosia beetles. Dr. Wood's reply letter of 16 July 1992 made a huge impact on USDA APHIS and state plant health regulators around the country, especially this sentence: "This species is the notorious *Tomicus piniperda*, the second most destructive bark beetle in Europe and the most destructive in pine."

USDA APHIS was notified of this discovery on 22 July 1992 and by the next day APHIS had established a 'New Pest Advisory Group' to evaluate its potential pest status and soon thereafter started training sessions in Ohio on how to identify and survey for PSB. This response paid



Tomicus piniperda adult by Udo Schmidt

off and within a month, PSB was found in five nearby states (listed in order of discovery): IN, PA, MI, NY, and IL. The infested states imposed internal quarantines on themselves, and then in September and October 1992, other US states (FL, GA, KS, LA, NC, OR, WV) started imposing quarantines on the infested states, given that millions of Christmas trees would soon be shipped out of the infested states. These state-level regulations varied widely, which prompted APHIS to impose a federal quarantine in November 1992 that provided a uniform set of rules for the entire country.

At first, the PSB federal quarantine covered pine products such as logs and lumber with bark, nursery stock, and Christmas trees. Pine stumps and bark/chips were added in 1993, and pine Christmas wreaths and garlands were added in 1995. The rules to move these pine products to areas outside the quarantine zone varied from product to product, but generally required some level of inspection and treatment. The economic impacts on many pine industries were huge. Initially, logs had to be debarked or fumigated prior to movement and Christmas trees had to pass a zero-tolerance inspection. Finding just one PSB adult stopped the shipment of all pine trees from a field.

Over the next few years many modifications were made to the quarantine. For the logging industry, an open season for log movement was allowed in summer (July - October). And for the pine Christmas tree and nursery industries, a

“Compliance Management Program” was developed (primarily through research conducted at Michigan State University and Purdue University) that established a series of Best Management Practices (BMPs) for growers to follow and thereby gave growers more confidence that if they followed the BMPs they would be able to ship their trees outside the quarantine zone.

PSB completes one generation per year. It overwinters at the base of pine trees in the outer bark, and flies in search of breeding sites in late winter or early spring when temperatures start to exceed just 10-12°C. PSB is monogamous, constructing an egg gallery at the bark-sapwood interface that follows the grain of the wood. The new generation of adults emerges in late May or early June but instead of having a second generation, they fly to the crowns of pine trees and feed inside current-year and 1-year-old shoots until autumn by making short tunnels that average about an inch long. A single adult can make 4-6 tunnels during the summer. Sometimes adults make multiple tunnels in the same shoot, and sometimes they select new shoots for each tunnel. So why was there such concern? Because infested shoots usually die, and when shoot-feeding is severe on forest trees, tree growth is reduced, and such trees can be infested and killed by breeding PSB or other insects in future years (which has happened in Europe).

When PSB was discovered in 1992, it was anticipated that PSB outbreaks would soon happen in the US and be widespread. So, what has happened? County-level surveys were conducted in many states, and the number of infested states grew year by year, with about 20 states quarantined by 2016, mostly in the Midwest and Northeast. Spread has been very slow during the past decade. Although high PSB populations were found in some Christmas tree fields and nurseries in the 1990s, PSB levels have dramatically fallen in recent years, especially since growers started following the Compliance Management Program BMPs. In natural and planted pine forests in the US, PSB has never become a major pest and no PSB outbreaks have ever been reported, perhaps in part due to harvesting practices in North



PSB adult in its feeding tunnel in a pine twig

America that utilize most pine slash from logging sites.

As a result of PSB not becoming a major pest in the United States, APHIS considered “deregulation” of PSB a few times over the past two decades. However, such efforts were often met with strong concerns from US states in the West and South (which are the major pine growing regions of the country), and deregulation never happened. But in September 2019, APHIS again announced in the US Federal Register a “proposed rule” to deregulate PSB (= rescind the quarantine). So, after nearly 28 years, will the PSB federal quarantine come to an end? The answer is Yes, and on 30 September 2020, APHIS announced that their final rule to deregulate will be published on 1 October 2020 and become effective on 2 November 2020 (USDA APHIS 2020).

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Southern pine beetle expansion into Connecticut

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Southern Pine Beetle (SPB), *Dendroctonus frontalis* Zimmermann, attacks mostly weak or dying pine trees but when outbreak populations occur healthy trees can succumb. The Southeastern U.S. is the historically native range of SPB where the most severe outbreaks occurred during 1999-2003 when over one million acres of pines were impacted causing over one billion dollars damage. SPB has been expanding its range along the Northeastern coast and was detected on Long Island New York in 2014 and Connecticut, Rhode Island and Massachusetts in 2015. Initial detections were statewide, but very few infested trees have been reported since then.



This project presented results of a monitoring program established to investigate the extent of the population in CT. Trap surveys in 2015, 2016, and 2017 detected SPB in several towns in Connecticut; with the majority of the beetles located in the southern CT (a single beetle was collected in northwest CT in 2016). Trapping in 2018 and 2019 was concentrated in four locations in southern CT (Wallingford, Niantic, Groton, and Griswold) using three pairs of 2 traps (Lindgren funnel traps and three-sided panel traps with Pestick™) each baited with a standard SPB lure. Beetle numbers have increased in two of the sites (Groton and Griswold) while remaining relatively stable in the other two.

We are evaluating the samples again to identify and quantify predatory Clerid beetle numbers and estimate the SPB/Clerid ratio given it may provide insight on the population status. We continued trapping through 2020 field season to determine if the beetle numbers continue to rise and plan to do so again in 2021.

If a tree falls in the forest, do caddisflies notice?



David C. Houghton

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In the absence of historical data for comparison, it is difficult to ascertain the specific environmental drivers of aquatic insect assemblages and feeding ecology. Utilizing the simple counts of benthic specimens found in most studies can lead to misleading results due to sampling difficulties, lack of taxonomic resolution, and the tacit assumption that all specimens are ecologically equal.

This study quantified the most important variables affecting adult caddisfly (Trichoptera) assemblages and feeding ecology in the northcentral United States, an area ranging from designated wilderness to intense agriculture. Over 600 streams of varying size and condition were sampled throughout a 1.2 million km² study area. The relative ability of 53 predictor variables to predict caddisfly assemblages and functional

feeding group (FFG) ash-free dry mass was assessed. The percentage of intact habitat, particularly at the whole-watershed scale, was most effective at predicting all metrics. The biomass of all FFGs except filtering collectors, as well as that of 85% of individual species decreased as intact habitat decreased. Assemblages of least disturbed streams, conversely, were primarily affected by latitude, temperature, and stream width, and generally followed predicted patterns of river continuity. While natural variables are important predictors of caddisfly assemblages in generally undisturbed streams, habitat loss overwhelms differences in such variables throughout the northcentral US.

Insect photography: before and after the camera

F. William Ravlin, Professor & Chairperson
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The purpose of this presentation was to help insect photographers increase the quality of their final images and to create increased awareness of post-processing (i.e., after the image has been captured in a camera) methods that are a standard part of today's photographic workflow.



Bill in Gorongosa Mozambique

High quality images begin by using good camera techniques with an emphasis on focus, light, composition, and color as images are being captured with a camera. Just as film-based photography relies on dark room processes, digital photography relies on computer-based post-processing methods. In both cases, post-processing is essential to render high quality final images and in many if not most cases, to increase the quality of the final images. High-level film or digital photography is designed to include post-processing recognizing that post-processing can't turn low quality images into good ones. It can however, make good images better and great images even greater.

During this presentation, digital post-processing methods were demonstrated using previously captured images of arthropods and Adobe Lightroom software.

Plenary Presentation



Statewide bumble bee survey and updates on the Poweshiek skipperling and the Mitchell's satyr butterfly

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Michigan is home to remnant populations of multiple at-risk pollinator species including the

federally endangered Poweshiek skipperling (*Oarisma Poweshiek*) and Mitchel's satyr butterfly (*Neonympha mitchellii mitchellii*), and numerous species of bumble bees. Michigan Natural Features Inventory (MNFI) actively monitors populations of these insects to provide the population level data needed to inform ongoing conservation efforts in the region. In this presentation, I provided an update on the current population status of Poweshiek skipperling, Mitchel's satyr butterfly, and multiple species of bumble bees found in Michigan.

For bumble bees, data from museum searches and a statewide survey effort between 2017 and 2019 were used to determine the current distribution and conservation status (s-rank) for each bumble bee species in the state. Conservation of at-risk pollinator species in Michigan requires long-term monitoring programs that can assess temporal changes in populations and distributions.

Firefly (Coleoptera: Lampyridae) diversity of Hispaniola and a new subfamily from Mexico

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The firefly fauna of the West Indies is largely understudied, and currently 186 species in 18



genera are known from the region. For this diversity study of the fireflies of Hispaniola 2439 specimens from 12 collections were identified to species based on morphological characters using the currently available taxonomic keys. Sixty-nine species were known from the island, but we found 64 undescribed species during our study bringing the total to 133. Chao1 species richness calculations based on the amounts of singletons in the sample estimated 176 species for the island, showing that many species still have not been discovered.

Additional research discovered a new subfamily of fireflies from Mexico. All known specimens were misidentified and found in net-winged beetle (Coleoptera: Lycidae) holdings. Their unique morphology with characteristics of lycids, phengodids, and fireflies warranted further investigation of their placement within the superfamily Elateroidea. Three genetic markers were obtained and added to an existing molecular data set, and Maximum Likelihood and Bayesian Inference analyses performed. Our analyses rendered nearly identical tree topologies, with the new genus recovered as an independent lineage as sister to *Pollaclasis bifaria* + *Cyphonocerus ruficollis*+Luciolinae, with a PP of .96 and UFBoot respectively of .91 for the ML analysis with the entire clade sister to *Pterotus obscuripennis*.

The most feared spider in the U.S. is in Michigan... but you may have to pay people to see them!

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Brown recluse spiders (*Loxosceles reclusa*) are commonly reported in Michigan, medical doctors diagnose their bites, and the supposed graphic results of their envenomations make



it into local news stories. However, the spiders themselves are rarely seen and despite decades of being recognized as medically important arachnids, their geographic range hasn't expanded to include Michigan. A handful of credible reports have identified recluse populations in the State. However, all findings to date cluster in SE Michigan, where human population is the densest, likely indicating that spider populations can be inadvertently brought into a home and establish an infestation. To get a better understanding of how commonly this occurs, in 2018 Rose Pest Solutions offered a \$300 cash prize and free treatment for any Michigan homeowner who had a verified brown recluse population. Respondents were first asked to submit images of the spiders they found to Rose's entomologists. Respondent's homes with images that appeared to show brown recluse spiders were then inspected in person and insect sticky traps were deployed to verify the presence of recluses.

This resulted in five homes, in four SE Michigan counties, with verified brown recluse infestations, including a new county record in Monroe. 105 total images were submitted, the bulk of which depicted other common urban spider species (primarily *Pisaurina*, *Dolomedes*, *Agelenopsis*, *Tegenaria*, and various Lycosidae). Of the five infestations, three of them appear to have been infesting an existing home prior to purchase, one resulted from the residents moving the spiders in infested belongings from their previous home in Oklahoma, and one infestation resulted from undetermined causes. Rose traditionally verifies less than one brown recluse infestation in Michigan per year; clearly paying homeowners increases reporting and detection!

Asian Longhorned Beetle: A 2020 Update

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The Asian longhorned beetle [ALB, *Anoplophora glabripennis* (Motschulsky)], a native of China and Korea, was first discovered in North America in 1996 in New York City and elsewhere on Long Island (Haack et al. 1996, 1997). Additional ALB infestations were next discovered in Chicago in 1998, New Jersey in 2002, near Toronto in 2003 and 2013, in two areas of Massachusetts in 2008 and 2010, Ohio in 2011, and now in South Carolina in 2020 (Poland et al. 1998, Haack et al. 2010, Eyre and Haack 2017, USDA APHIS 2020a).

In each case, aggressive action was taken to eradicate the pest, first by cutting all infested trees and later by also cutting nearby high-risk host trees that could be infested but did not yet show signs of infestation. In some cases, systemic insecticides were used instead of cutting to treat high-risk host trees that were near infested trees. Successful eradication is usually declared after 4-5 years of active surveys without finding any ALB or ALB-infested trees. To date, eradication of ALB has been declared in Illinois (2008); Islip, NY (2011); Manhattan and Staten Island, NY (2013); New Jersey (2013); Toronto (2013, 1st infestation), Boston, MA (2014); Brooklyn and Queens, NY (2019), and again in Toronto (2020, 2nd infestation) (USDA APHIS 2020b, EPPO 2020).

Hundreds of millions of dollars have been spent in these eradication efforts, however, this is considered well worth the cost because ALB can infest and kill healthy hardwood trees in several genera, especially *Acer*, *Aesculus*, *Betula*, *Platanus*, *Populus*, *Salix*, *Sorbus*, and *Ulmus* (Haack et al. 2010, Eyre and Haack 2017).

ALB infestations have been found in several European countries as well (Austria, Finland, France, Germany, Italy, Montenegro, Netherlands, and the United Kingdom), and eradication has already been completed or is

ongoing in all cases (Eyre and Haack 2017, EPPO 2020). In addition, ALB was collected in the same area of Lebanon for two consecutive years (2015-16) (Moussa and Cocquemot 2017), but its current status has not been reported recently (EPPO 2020).

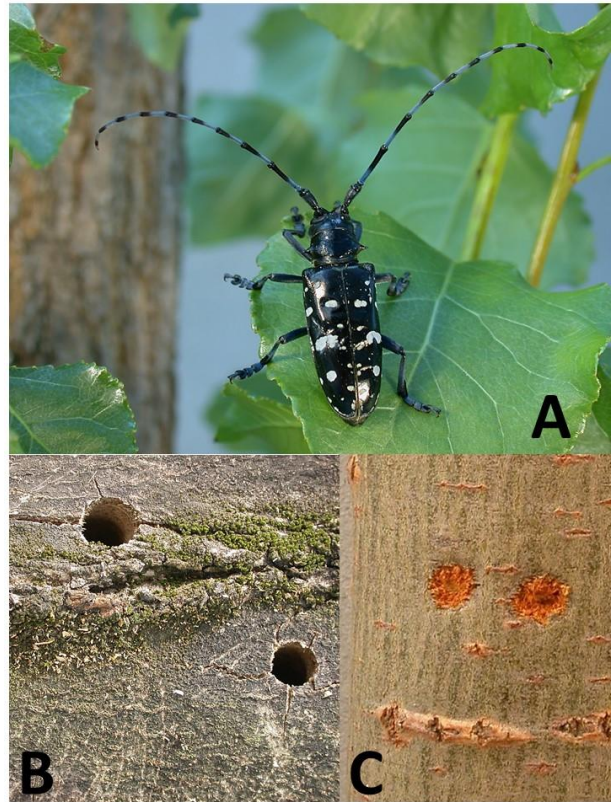
In the United States, ALB eradication efforts are ongoing in New York (in parts of Long Island, especially near Amityville), Massachusetts (near Worcester), and Ohio (near Cincinnati). As of 31 July 2020, about 7,200 ALB-infested trees have been removed in all of New York, 24,200 infested trees in Massachusetts (Worcester area), and 20,500 infested trees in Ohio (USDA APHIS 2020b). Tens of thousands of additional high-risk host trees have also been removed near each infestation.

The situation in South Carolina is still developing. Briefly, on 29 May 2020, a homeowner in Hollywood, SC (near Charleston), found a dead adult beetle on their property that they thought (luckily) looked like ALB. The homeowner contacted staff at Clemson University, who tentatively identified the beetle as ALB. It was later confirmed as ALB by APHIS on 4 June 2020. Later, on 11 June, two ALB-infested trees were found close to where the original ALB adult had been collected in Hollywood, SC (USDA APHIS 2020a). Active surveys are now occurring near Hollywood and as of 28 August 2020 a total of 1,950 infested trees had been detected. In the months ahead, we should have a better understanding of the size of this infestation and how difficult it will be to eradicate.

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A = ALB adult male; B = ALB exit holes (about the size of a dime); C = ALB oviposition pits. Adult females chew pits in the outer bark, insert their ovipositor in the center, and usually lay a single egg under the bark. Photos courtesy of Franck Hérard (USDA, Agricultural Research Service).

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MES 2020 Election Results

Governing Board Members at Large:
Crystal Dailey
Brian Scholtens

President Elect:
Mark VanderWerp

Please submit articles, items or suggested topics for the next MES Newsletter

Publication tentatively scheduled for December 2020.

Send materials to Duke Elsner at elsner@msu.edu or Crystal Dailey at smilingrainbow00@yahoo.com

Blueberry stem gall wasp: the fascinating biology and challenging management of an induced native pest

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In recent years the prevalence of the native pest, blueberry stem gall wasp (*Hemadas nubilipennis*), has increased dramatically in Michigan blueberry fields. This has been challenging to control due to the period of activity overlapping with bloom when bee protection is a priority. We have explored its biology and management through studying a combination of phenology, biological control, chemical control, and host plant resistance. We have developed an understanding of the degree day accumulations needed for emergence in the spring, and posted this at the MSU Enviroweather site. Our investigations of the gall-inhabiting community from various farms suggest that the natural enemy population has been decimated by treatments applied for spotted wing Drosophila control. Evaluation of new foliar and systemic insecticides revealed high potential for the systemic insecticide spirotetramat, which can be applied after bloom and still reduce gall wasp infestation, thereby minimizing risk to managed bees. Finally, there is strong genetic basis to the susceptibility of blueberries to this pest, and our research is identifying the existing resistant cultivars and the mechanisms underlying their resistance to ensure future breeding efforts can ensure resistance to blueberry stem gall wasp.

