Michigan State University Department of Entomology presentations
2017 Entomological Society of America meeting, Nov. 5-8, 2017, Denver, CO

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**Team 2: Michigan State University (faculty advisor - Jim Smith), Topic 2**

Courtney Larson (larso126@msu.edu), Nicholas Babcock (babco116@msu.edu), Lidia Komondy (lkomondy@msu.edu) and Joseph Receveur (josephreceveur@gmail.com), Michigan State University, East Lansing, MI

**Adams, Christopher G.**

Sterile insect release for suppression of codling moth (*Cydia pomonella*) in Michigan apple orchards. **Christopher Adams** (adamsch@msu.edu) and Larry Gut, Michigan State University, East Lansing, MI

Nasonov-based dispensers for pollinator attraction in blueberry, apple and cherry. **Julie Williamson** (adamsju6@gmail.com), Christopher G. Adams, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

**Albert, Jacquelyn L.**

Field-level fungicide exposure to honey bees (*Apis mellifera*) during orchard bloom in Michigan. **Jacquelyn Albert** (albertj9@msu.edu) and Julianna Wilson, Michigan State University, East Lansing, MI

**Babcock, Nicholas**

Team 2: Michigan State University (faculty advisor - Jim Smith), Topic 2

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**Bandason, Elizabeth**

Molecular basis of pyrethroid repellency. Peng Xu¹, Qiang Wang¹, Feng Liu¹, Elizabeth Bandason¹, Yoshiko Nomura¹, Shaoying Wu¹, Yuzhe Du¹, Leticia Smith², Jeff Scott², Kamlesh R. Chauhan³ and **Ke Dong** (dongk@cns.msu.edu)¹,¹Michigan State University, East Lansing, MI, ²Cornell University, Ithaca, NY, ³USDA - ARS, Beltsville, MD
**Benbow, M. Eric**

Building capacity for NGS data analysis in sub-Saharan Africa to improve public health research

Joseph Receveur (josephreceveur@gmail.com)\(^1\), Luc Djogbenou\(^2\) and M. Eric Benbow\(^1\),
\(^1\)Michigan State University, East Lansing, MI, \(^2\)Université d’Abomey-Calavi, Ouidah, Benin

Calliphoridae microbiome dynamics during decomposition

Jennifer Pechal

(pechalje@msu.edu), Courtney Weatherbee and M. Eric Benbow, Michigan State University, East Lansing, MI

Shedding light on emerald ash borer (Agrilus planipennis) indirect effects on aquatic ecosystem function

Courtney Larson (larso126@msu.edu), Patrick Engelken, Jennifer Pechal, Deborah G. McCullough and M. Eric Benbow, Michigan State University, East Lansing, MI

The ecological importance of resource subsidies on insect-microbe interactions in aquatic ecosystems: The dispersal of novel microbes and their genomes in insect communities

M. Eric Benbow (benbow@msu.edu)\(^1\), Jennifer Pechal\(^1\), Courtney Larson\(^1\), Patrick Engelken\(^1\), Deborah G. McCullough\(^1\), Ryan McEwan\(^2\) and Kevin Custer\(^2\), \(^1\)Michigan State University, East Lansing, MI, \(^2\)University of Dayton, Dayton, OH

Insects and microbes drive VOC emission from decomposing carrion resources

Jonathan A. Cammack (jcammack_07@tamu.edu)\(^1\), Jennifer Pechal\(^2\), Stephen Sweet\(^1\), Tawni Crippen\(^3\), Anthony Knap\(^1\), M. Eric Benbow\(^2\) and Jeffery K. Tomberlin\(^1\), \(^1\)Texas A&M University, College Station, TX, \(^2\)Michigan State University, East Lansing, MI, \(^3\)USDA - ARS, College Station, TX

Effects of emerald ash borer on riparian forest structure

Patrick Engelken (engelke2@msu.edu), Deborah G. McCullough, Courtney Larson and M. Eric Benbow, Michigan State University, East Lansing, MI

The characterization of louse fly microbiomes on migrating raptors: Implications for avian pathogen dispersal

Kayli Thomas (klthoma3@millersville.edu)\(^1\), Rebecca McCabe\(^2\), Joseph Receveur\(^3\), M. Eric Benbow\(^3\), Jennifer Pechal\(^3\) and John R. Wallace\(^1\), \(^1\)Millersville University of Pennsylvania, Millersville, PA, \(^2\)Acopian Center for Conservation Learning at Hawk Mountain Sanctuary, Orwigsburg, PA, \(^3\)Michigan State University, East Lansing, MI

**An Introduction to the Aquatic Insects of North America: A new edition**

Richard Merritt\(^1\), M. Eric Benbow (benbow@msu.edu)\(^1\), Martin B. Berg\(^2\) and Kenneth Cummins\(^1\), \(^1\)Michigan State University, East Lansing, MI, \(^2\)Loyola University, Chicago, IL
Bennett, Ashley B.

Do community gardens increase the abundance and richness of beneficial insects in surrounding green spaces? Ashley Bennett (abb@nmsu.edu), Araceli Lopez-Binder and Wesley Noe, New Mexico State University, Los Lunas, NM

Blaauw, Brett

Multi-state evaluation of polyculture trap crop for managing brown marmorated and native stink bugs in organic peppers Clarissa Mathews (cmathews@shepherd.edu)1,2, Brett Blaauw3, Galen Dively4, James Kotcon5, Jennifer Moore6, Emily Ogburn7, Douglas G. Pfeiffer8, Taliaferro Trope8, Jim Walgenbach7, Celeste Welty9, Gladis Zinati10 and Anne Nielsen11, 1Redbud Farm, LLC, Inwood, WV, 2Institute of Environmental and Physical Sciences, Shepherdstown, WV, 3Michigan State University, East Lansing, MI, 4University of Maryland, College Park, MD, 5West Virginia University, Morgantown, WV, 6University of Tennessee, Knoxville, TN, 7North Carolina State University, Mills River, NC, 8Virginia Polytechnic Institute and State University, Blacksburg, VA, 9The Ohio State University, Columbus, OH, 10Rodale Institute, Kutztown, PA, 11Rutgers, The State University of New Jersey, Bridgeton, NJ

Bolt, Marguerite

Influence of variety and management on chemically mediated hemp-pest interactions John J. Couture (couture@purdue.edu)1, Marguerite Bolt2, Gordon McNickle1 and Janna Beckerman1, 1Purdue University, West Lafayette, IN, 2Michigan State University, East Lansing, MI

Influence of genetics and management on hemp-arthropod interactions Marguerite Bolt (margyabolt@gmail.com)1, Janna Beckerman2 and John J. Couture2, 1Michigan State University, East Lansing, MI, 2Purdue University, West Lafayette, IN

Botch, Paul S.

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Competition and host-specificity among Trissolcus wasps for egg masses of native and invasive stink bugs Krista De Cooke (nicho452@msu.edu), Ernest Delfosse and Paul Botch, Michigan State University, East Lansing, MI

Effects of host-species on the biotic potential of the Asian parasitoid wasp, Trissolcus japonicus Emmaline Gates (gatesemmm@msu.edu), Paul Botch and Ernest Delfosse, Michigan State University, East Lansing, MI
Effects of pentatomid egg age on host acceptance, development and longevity of offspring for *Trissolcus japonicus* Paul Botch (botchpau@msu.edu) and Ernest Delfosse, Michigan State University, East Lansing, MI

Does placement of sentinel eggs on plant species affect success in attracting parasitoids? Ernest Delfosse (delfosse@cns.msu.edu) and Paul Botch, Michigan State University, East Lansing, MI

**Brokaw, Julia**

Emergence trapping for crop pollinators: Can we determine high quality nesting habitat for ground-nesting bees on Michigan blueberry farms? Julia Brokaw (julia.n.brokaw@gmail.com)¹, Emily May², Shiala Naranjo³, Rufus Isaacs⁴ and Jason Gibbs⁴,⁵ ¹University of Minnesota, St. Paul, MN, ²The Xerces Society for Invertebrate Conservation, Portland, OR, ³University of Central Florida, Orlando, FL, ⁴Michigan State University, East Lansing, MI, ⁵University of Manitoba, Winnipeg, MB, Canada

**Buchanan, Amanda Lynn**

Habitat management for conservation biocontrol of a stem mining fly Amanda Buchanan (alynn@msu.edu), Adam Ingrao and Zsofia Szendrei, Michigan State University, East Lansing, MI

**Bush, Guy**

A 28S rRNA D2-D3 expansion variant useful in molecular identification of the apple maggot, *Rhagoletis pomonella* and the snowberry fly, *R. zephyria* James Smith (jimsmith@msu.edu)¹, Daniel Hulbert¹, Mike Klaus² and Guy Bush³, ¹Michigan State University, East Lansing, MI, ²Washington State Department of Agriculture, Yakima, WA, ³Michigan State University, Fish Creek, WI

**Chung, Henry**

Genetics of cuticular hydrocarbon evolution in *Drosophila* Henry Chung (hwchung@msu.edu), Michigan State University, East Lansing, MI

Cis-regulatory evolution in the elongase bond underlies a pheromonal difference between *Drosophila* species Jian Pu (pujian@msu.edu)¹, Jessa Justen², Joanne Yew³ and Henry Chung¹, ¹Michigan State University, East Lansing, MI, ²University of Wisconsin, Madison, WI, ³University of Hawai‘i, Honolulu, HI
**Cognato, Anthony**

Ancient wanderlust leads to diversification of endemic Hawaiian *Xyleborus* species (Coleoptera: Curculionidae: Scolytinae) **Anthony Cognato** (cognato@msu.edu), Bjarte Jordal² and Daniel Rubinoff³, ¹Michigan State University, East Lansing, MI, ²University of Bergen, Bergen, Norway, ³University of Hawai‘i, Honolulu, HI

**Developing an identification tool for Southeast Asian xyleborine ambrosia beetles (Coleoptera: Curculionidae: Scolytinae) **Sarah Smith (Smith462@msu.edu), Roger A. Beaver², Jiri Hulcr³, Rachel Osborn⁴, Sudhir Singh⁵ and Anthony Cognato¹, ¹Michigan State University, East Lansing, MI, ²Chiangmai, Thailand, ³University of Florida, Gainesville, FL, ⁴Michigan State University, Okemos, MI, ⁵Forest Research Institute, Dehradun, India

**Multiple DNA loci for identification of southeast Asian ambrosia beetles (Coleoptera: Curculionidae: Scolytinae: Xyleborini) **Gina Sari (sarigina@msu.edu), Sarah Smith¹, You Li², Thai Pham³, Wisut Sittichaya⁴, Hisashi Kajimura⁵, Sudhir Singh⁶, Jiri Hulcr² and Anthony Cognato¹, ¹Michigan State University, East Lansing, MI, ²University of Florida, Gainesville, FL, ³Vietnam National Museum of Nature, Hanoi, Vietnam, ⁴Prince of Songkla University, Hat Yai, Thailand, ⁵Nagoya University, Nagoya, Japan, ⁶Forest Research Institute, Dehradun, India

**Phylogenetic reconstruction of North American Xyleborini species **Lidia Komondy (lkomondy@msu.edu) and Anthony Cognato, Michigan State University, East Lansing, MI

**Cole, Ellen**

Molecular diagnostics and phylogenetics of aster yellows phytoplasma (AYp) in leafhoppers **Zsofia Szendrei** (szendrei@msu.edu), Katherine Demeuse, Ari Grode, Ellen Cole and Carolyn Malmstrom, Michigan State University, East Lansing, MI

**Crum, James**

Mason bee construction: Patterns of soil composition across species, nest tubes, and partitions **Mario Pinilla-Gallego** (simonpinilla@yahoo.com), James Crum and Rufus Isaacs, Michigan State University, East Lansing, MI

**Cummins, Kenneth W.**

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De Cooke, Krista N.

Competition and host-specificity among *Trissolcus* wasps for egg masses of native and invasive stink bugs Krista De Cooke (nicho452@msu.edu), Ernest Delfosse and Paul Botch, Michigan State University, East Lansing, MI

Delfosse, Ernest S.

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Metapopulations: From bacteria to elephants Ernest Delfosse (delfosse@cns.msu.edu), Michigan State University, East Lansing, MI

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Does placement of sentinel eggs on plant species affect success in attracting parasitoids? Ernest Delfosse (delfosse@cns.msu.edu) and Paul Botch, Michigan State University, East Lansing, MI

Demeuse, Katherine

Understanding *Aedes japonicus japonicus* distribution in container habitats Katherine Demeuse (demeusek@msu.edu) and Michael Kaufman, Michigan State University, East Lansing, MI

Molecular diagnostics and phylogenetics of aster yellows phytoplasma (AYp) in leafhoppers Zsofia Szendrei (szendrei@msu.edu), Katherine Demeuse, Ari Grode, Ellen Cole and Carolyn Malmstrom, Michigan State University, East Lansing, MI

Dong, Ke

Induction phenology and response to semiochemicals of winter morph spotted wing *Drosophila* Heather Leach (leachhea@msu.edu), Danielle Kirkpatrick, Jaclyn Stone, Peng Xu, Ke Dong, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI
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**Du, Yuzhe**

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**Engelken, Patrick J.**

Shedding light on emerald ash borer (*Agrilus planipennis*) indirect effects on aquatic ecosystem function **Courtney Larson** (larso126@msu.edu), Patrick Engelken, Jennifer Pechal, Deborah G. McCullough and M. Eric Benbow, Michigan State University, East Lansing, MI

The ecological importance of resource subsidies on insect-microbe interactions in aquatic ecosystems: The dispersal of novel microbes and their genomes in insect communities **M. Eric Benbow** (benbow@msu.edu)¹, Jennifer Pechal¹, Courtney Larson¹, Patrick Engelken¹, Deborah G. McCullough¹, Ryan McEwan² and Kevin Custer², ¹Michigan State University, East Lansing, MI, ²University of Dayton, Dayton, OH

Effects of emerald ash borer on riparian forest structure **Patrick Engelken** (engelke2@msu.edu), Deborah G. McCullough, Courtney Larson and M. Eric Benbow, Michigan State University, East Lansing, MI

**Fanning, Philip**

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Severe induction of a native secondary pest by an invasive primary pest: The role of natural enemies **Philip Fanning** (fanning9@msu.edu), Benjamin Johnson, Steven Van Timmeren and Rufus Isaacs, Michigan State University, East Lansing, MI

**Galley, Sarah**

The impact of strip tillage and cover crops on pests and beneficials in organic squash **Sarah Galley** (galleysa@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI
Gates, Emmaline M.

Effects of host-species on the biotic potential of the Asian parasitoid wasp, *Trissolcus japonicus*
Emmaline Gates (gatesemm@msu.edu), Paul Botch and Ernest Delfosse, Michigan State University, East Lansing, MI

Grieshop, Matt J.

Multistate comparison of attractants, and the impact of background volatiles on trapping *Drosophila suzukii* (Diptera: Drosophilidae) in raspberry and blueberry Benjamin Jaffe (bjaffe2@wisc.edu)¹, Harit K. Bal², Joshua Grant³, Matt Grieshop⁴, Jana Lee⁵, Oscar Liburd⁶, Eric McDougal⁷, Cesar Rodriguez⁸, Elena Rhodes⁹, Ashfaq Sial¹⁰, Aijun Zhang¹¹ and Christelle Guédot¹², ¹University of Wisconsin, Madison, WI, ²Association of Indian Entomologists in North America, East Lansing, MI, ³University of Georgia, Athens, GA, ⁴Michigan State University, East Lansing, MI, ⁵USDA - ARS, Corvallis, OR, ⁶University of Florida, Gainesville, FL, ⁷Rutgers, The State University of New Jersey, Chatsworth, NJ, ⁸USDA - ARS, Beltsville, MD

Field-scale exploration of invertebrate communities with metagenomic approaches: Detritivores in apple orchards Jason Matlock (matlockj@msu.edu) and Matt Grieshop, Michigan State University, East Lansing, MI

Development and implementation of systems-based organic management strategies for spotted wing drosophila: An OREI project update Ashfaq Sial¹, Rufus Isaacs (isaacsr@msu.edu)², Matt Grieshop³, Christelle Guédot⁴, Kelly Hamby⁵, Vaughn Walton⁶, Mary Rogers⁷ and Hannah Burrack⁸, ¹University of Georgia, Athens, GA, ²Michigan State University, East Lansing, MI, ³University of Wisconsin, Madison, WI, ⁴University of Maryland, College Park, MD, ⁵Oregon State University, Corvallis, OR, ⁶University of Minnesota, St. Paul, MN, ⁷North Carolina State University, Raleigh, NC

Evaluation of food-based attractants for spotted wing drosophila, *Drosophila suzukii* Juan Huang (huangju@msu.edu), Larry Gut and Matt Grieshop, Michigan State University, East Lansing, MI

On- and off-season habitat evaluation for *Drosophila suzukii* (Diptera: Drosophilidae) Harit K. Bal (bal@msu.edu)¹, Clarence Green², Christelle Guédot³, Lindsay Iglesias⁴, Oscar Liburd⁵, Ashfaq Sial² and Matt Grieshop¹, ¹Michigan State University, East Lansing, MI, ²University of Georgia, Athens, GA, ³University of Wisconsin, Madison, WI, ⁴University of Florida, Gainesville, FL

Spray coverage of a solid set canopy delivery system in grapes, raspberries, and blueberries Matt Grieshop (grieshop@msu.edu), Paul Owen-Smith and Jacob Malsch, Michigan State University, East Lansing, MI
Grode, Ari S.

Molecular diagnostics and phylogenetics of aster yellows phytoplasma (AYp) in leafhoppers
Zsofia Szendrei (szendrei@msu.edu), Katherine Demeuse, Ari Grode, Ellen Cole and Carolyn Malmstrom, Michigan State University, East Lansing, MI

Gut, Larry

Induction phenology and response to semiochemicals of winter morph spotted wing Drosophila
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Behavioral responses of Drosophila suzukii winter and summer morphs to visual and olfactory cues
Danielle Kirkpatrick (kirkpa42@msu.edu), Heather Leach, Rufus Isaacs and Larry Gut, Michigan State University, East Lansing, MI

Testing novel attractants for Drosophila suzukii
Cesar Rodriguez-Saona (crodriguez@rce.rutgers.edu), Johnnattan Hernández-Cumplido, Hannah Burrell, Frank Drummond, Larry Gut, Rufus Isaacs, Gregory Loeb, Anne Nielsen, Zainulabeuddin Syed, Kyoo Park, Vaughn Walton and Aijun Zhang, Rutgers, The State University of New Jersey, New Brunswick, NJ, North Carolina State University, Raleigh, NC, University of Maine, Orono, ME, Michigan State University, East Lansing, MI, Cornell University, Geneva, NY, Rutgers, The State University of New Jersey, Bridgeton, NJ, University of Notre Dame, Notre Dame, IN, Oregon State University, Corvallis, OR, USDA - ARS, Beltsville, MD

Sustainable spotted wing drosophila management in US fruit crops: Year 2 update
Hannah Burrack (hannah_burrack@ncsu.edu), Joanna Chiu, Kent Daane, Miguel Gomez, Larry Gut, Rufus Isaacs, Gregory Loeb, Cesar Rodriguez-Saona, Ashfaq Sial, Vaughn Walton and Frank Zalom, North Carolina State University, Raleigh, NC, University of California, Davis, CA, University of California, Parlier, CA, Cornell University, Ithaca, NY, Michigan State University, East Lansing, MI, Cornell University, Geneva, NY, Rutgers, The State University of New Jersey, New Brunswick, NJ, University of Georgia, Athens, GA, Oregon State University, Corvallis, OR

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Evaluation of food-based attractants for spotted wing drosophila, *Drosophila suzukii* Juan

Huang (huangju@msu.edu), Larry Gut and Matt Grieshop, Michigan State University, East Lansing, MI

Hermann, Sara L.

The ecology of fear: Understanding how the threat of predation impacts insect prey

Sara Hermann (slh@msu.edu) and Douglas A. Landis, Michigan State University, East Lansing, MI

Huang, Juan

Evaluation of food-based attractants for spotted wing drosophila, *Drosophila suzukii* Juan

Huang (huangju@msu.edu), Larry Gut and Matt Grieshop, Michigan State University, East Lansing, MI

Huang, Zachary Y.

Parasite manipulating hosts: *Nosema ceranae* infected honey bee workers are more easily accepted by non-nestmates

Zachary Y. Huang (bees@msu.edu) and Yujie Li, Michigan State University, East Lansing, MI

Palynological analysis of pollen collected by honey bees (*Apis mellifera*) in developed areas in four regions of the United States

Pierre Lau (plau0168@tamu.edu)¹, Juliana Rangel¹, Vaughn Bryant¹, Ana Cabrera², Daniel Schmehl², Joseph Sullivan³, Zachary Y. Huang⁴ and James Ellis⁵, ¹Texas A&M University, College Station, TX, ²Bayer CropScience, Research Triangle Park, NC, ³Ardea Consulting, Woodland, CA, ⁴Michigan State University, East Lansing, MI, ⁵University of Florida, Gainesville, FL

Hulbert, Daniel Lloyd

A 28S rRNA D2-D3 expansion variant useful in molecular identification of the apple maggot, *Rhagoletis pomonella* and the snowberry fly, *R. zephyria*

James Smith (jimsmith@msu.edu)¹, Daniel Hulbert¹, Mike Klaus² and Guy Bush³, ¹Michigan State University, East Lansing, MI, ²Washington State Department of Agriculture, Yakima, WA, ³Michigan State University, Fish Creek, WI

A new species of *Rhagoletis* (Diptera: Tephritidae) in the *tabellaria* species group: Morphology, molecular phylogenetics, and host-plant use

Daniel Hulbert (hulbertd@msu.edu)¹, Morgan Jackson² and James Smith¹, ¹Michigan State University, East Lansing, MI, ²University of Guelph, Guelph, ON, Canada
Ingrao, Adam Joseph

Habitat management for conservation biocontrol of a stem mining fly Amanda Buchanan (alynn@msu.edu), Adam Ingrao and Zsofia Szendrei, Michigan State University, East Lansing, MI

Natural enemy attraction to herbivore induced asparagus volatiles Adam Ingrao (ingraoad@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

Isaacs, Rufus

Mason bee construction: Patterns of soil composition across species, nest tubes, and partitions Mario Pinilla-Gallego (simonpinilla@yahoo.com), James Crum and Rufus Isaacs, Michigan State University, East Lansing, MI

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Behavioral responses of Drosophila suzukii winter and summer morphs to visual and olfactory cues Danielle Kirkpatrick (kirkpa42@msu.edu), Heather Leach, Rufus Isaacs and Larry Gut, Michigan State University, East Lansing, MI

Lessons learned from establishing wildflower plantings for wild bee conservation near perennial fruit crops in Michigan Julianna Wilson (jkwilson@msu.edu)1, Rufus Isaacs1, Thomas Wood1 and Jason Gibbs2, 1Michigan State University, East Lansing, MI, 2University of Manitoba, Winnipeg, MB, Canada

Plant selection to support pollinators and natural enemies in Michigan farm landscapes and beyond Logan Rove (roweloga@msu.edu), Dan Gibson, Rufus Isaacs and Douglas A. Landis, Michigan State University, East Lansing, MI
Flower power: Habitat management to support crop pollination and pest management Brett Blaauw (bblaauw@uga.edu)¹, Rufus Isaacs² and Anne Nielsen², ¹University of Georgia, Athens, GA, ²Michigan State University, East Lansing, MI

Testing novel attractants for Drosophila suzukii Cesar Rodriguez-Saona (crodriguez@rce.rutgers.edu)¹, Johnattan Hernández-Cumplido¹, Hannah Burrack², Frank Drummond³, Larry Gut⁴, Rufus Isaacs⁴, Gregory Loeb⁵, Anne Nielsen⁶, Zainulabeuddin Syed⁷, Kyoo Park⁸, Vaughn Walton⁸ and Aijun Zhang⁹, ¹Rutgers, The State University of New Jersey, New Brunswick, NJ, ²North Carolina State University, Raleigh, NC, ³University of Maine, Orono, ME, ⁴Michigan State University, East Lansing, MI, ⁵Cornell University, Geneva, NY, ⁶Rutgers, The State University of New Jersey, Bridgeton, NJ, ⁷University of Notre Dame, Notre Dame, IN, ⁸Oregon State University, Corvallis, OR, ⁹USDA - ARS, Beltsville, MD

Severe induction of a native secondary pest by an invasive primary pest: The role of natural enemies Philip Fanning (fanning9@msu.edu), Benjamin Johnson, Steven Van Timmeren and Rufus Isaacs, Michigan State University, East Lansing, MI

The salt test method: an efficient tool to monitor for spotted wing drosophila infestation in fruit Lauren Diepenbrock (laurendiepenbrock@gmail.com)¹, Steven Van Timmeren², Matt Bertone¹, Hannah Burrack¹ and Rufus Isaacs², ¹North Carolina State University, Raleigh, NC, ²Michigan State University, East Lansing, MI

A semi-field bioassay protocol for assessing the effectiveness of field-aged insecticides against spotted-wing drosophila Steven Van Timmeren (vantimm2@msu.edu) and Rufus Isaacs, Michigan State University, East Lansing, MI

Sustainable spotted wing drosophila management in US fruit crops: Year 2 update Hannah Burrack (hannah_burrack@ncsu.edu)¹, Joanna Chiù², Kent Daane³, Miguel Gomez⁴, Larry Gut⁵, Rufus Isaacs⁵, Gregory Loeb⁶, Cesar Rodriguez-Saona⁷, Ashfaq Sial⁸, Vaughn Walton⁹ and Frank Zalom¹², ¹North Carolina State University, Raleigh, NC, ²University of California, Davis, CA, ³University of California, Parlier, CA, ⁴Cornell University, Ithaca, NY, ⁵Michigan State University, East Lansing, MI, ⁶Cornell University, Geneva, NY, ⁷Rutgers, The State University of New Jersey, New Brunswick, NJ, ⁸University of Georgia, Athens, GA, ⁹Oregon State University, Corvallis, OR

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Linking landscapes to honey bee (*Apis mellifera*) health in southern Michigan
Gabriela Quinlan (quinlang@msu.edu), Meghan Milbrath, Rufus Isaacs and Clint Otto, Michigan State University, East Lansing, MI, U.S. Geological Survey, Jamestown, ND

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Severe induction of a native secondary pest by an invasive primary pest: The role of natural enemies Philip Fanning (fanning9@msu.edu), Benjamin Johnson, Steven Van Timmeren and Rufus Isaacs, Michigan State University, East Lansing, MI

*Jubenville, Jeremy J.*

Root aphids in the greenhouse: Observations and recommendations Jeremy Jubenville (jeremy.jubenville@gmail.com), West Michigan IPM, Kalamazoo, MI

*Kaufman, Michael*

Understanding *Aedes japonicus japonicus* distribution in container habitats Katherine Demeuse (demeusek@msu.edu) and Michael Kaufman, Michigan State University, East Lansing, MI

*Kirkpatrick, Danielle M.*

Induction phenology and response to semiochemicals of winter morph spotted wing Drosophila Heather Leach (leachhea@msu.edu), Danielle Kirkpatrick, Jaclyn Stone, Peng Xu, Ke Dong, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

Behavioral responses of *Drosophila suzukii* winter and summer morphs to visual and olfactory cues Danielle Kirkpatrick (kirkpa42@msu.edu), Heather Leach, Rufus Isaacs and Larry Gut, Michigan State University, East Lansing, MI

*Komondy, Lidia*

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Phylogenetic reconstruction of North American Xyleborini species Lidia Komondy (lkomondy@msu.edu) and Anthony Cognato, Michigan State University, East Lansing, MI
**Labbate, Louise A.**

*Evaluation of galls caused by Asian chestnut gall wasp on chestnut cultivars in commercial orchards in Michigan* Louise Labbate (daquilal@msu.edu) and Deborah McCullough, Michigan State University, East Lansing, MI

**Landis, Douglas A.**

*The ecology of fear: Understanding how the threat of predation impacts insect prey* Sara Hermann (slh@msu.edu) and Douglas A. Landis, Michigan State University, East Lansing, MI

**P-IE Section Symposium: Igniting Next Generation Science on Habitat and Landscape Management to Enhance Pest Suppression and Pollination**

*Plant selection to support pollinators and natural enemies in Michigan farm landscapes and beyond* Logan Rowe (roweloga@msu.edu), Dan Gibson, Rufus Isaacs and Douglas A. Landis, Michigan State University, East Lansing, MI

*Ant suppression reduces biological control potential in grasslands* Bill Wills (willsbd@gmail.com)¹, Tania Kim², Claudio Gratton² and Douglas A. Landis¹, ¹Michigan State University, East Lansing, MI, ²University of Wisconsin, Madison, WI

**Larson, Courtney E.**

**346 Member Symposium: Aquatic Entomology: Innovative Strategies in Research, Education, and Outreach**

*Team 2: Michigan State University (faculty advisor - Jim Smith), Topic 2* Courtney Larson (larso126@msu.edu), Nicholas Babcock (babco116@msu.edu), Lidia Komondy (lkomondy@msu.edu) and Joseph Receveur (josephreceveur@gmail.com), Michigan State University, East Lansing, MI

*Shedding light on emerald ash borer (Agrilus planipennis) indirect effects on aquatic ecosystem function* Courtney Larson (larso126@msu.edu), Patrick Engelken, Jennifer Pechal, Deborah G. McCullough and M. Eric Benbow, Michigan State University, East Lansing, MI

*The ecological importance of resource subsidies on insect-microbe interactions in aquatic ecosystems: The dispersal of novel microbes and their genomes in insect communities* M. Eric Benbow (benbow@msu.edu)¹, Jennifer Pechal¹, Courtney Larson¹, Patrick Engelken¹, Deborah G. McCullough¹, Ryan McEwan² and Kevin Custer², ¹Michigan State University, East Lansing, MI, ²University of Dayton, Dayton, OH
Aphid community structure influenced by environmental variation over large spatial and temporal scales Courtney Larson (larso126@msu.edu), Michigan State University, East Lansing, MI

Effects of emerald ash borer on riparian forest structure Patrick Engelken (engelke2@msu.edu), Deborah G. McCullough, Courtney Larson and M. Eric Benbow, Michigan State University, East Lansing, MI

Leach, Heather

Induction phenology and response to semiochemicals of winter morph spotted wing Drosophila Heather Leach (leachhea@msu.edu), Danielle Kirkpatrick, Jaclyn Stone, Peng Xu, Ke Dong, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

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Li, Yujie

Parasite manipulating hosts: Nosema ceranae infected honey bee workers are more easily accepted by non-nestmates Zachary Y. Huang (bees@msu.edu) and Yujie Li, Michigan State University, East Lansing, MI

Liu, Feng

Molecular basis of pyrethroid repellency Peng Xu¹, Qiang Wang¹, Feng Liu¹, Elizabeth Bandason¹, Yoshiko Nomura¹, Shaoying Wu¹, Yuzhe Du¹, Leticia Smith², Jeff Scott², Kamlesh R. Chauhan³ and Ke Dong (dongk@cns.msu.edu)¹, ¹Michigan State University, East Lansing, MI, ²Cornell University, Ithaca, NY, ³USDA - ARS, Beltsville, MD

Lund, Margaret

Use of a cue hierarchy for host plant selection in Pieris rapae (Lepidoptera: Pieridae) oviposition Margaret Lund (lundmar6@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

Malmstrom, Carolyn

Molecular diagnostics and phylogenetics of aster yellows phytoplasma (AYp) in leafhoppers Zsofia Szendrei (szendrei@msu.edu), Katherine Demeuse, Ari Grode, Ellen Cole and Carolyn Malmstrom, Michigan State University, East Lansing, MI
**Malsch, Jacob**

Spray coverage of a solid set canopy delivery system in grapes, raspberries, and blueberries Matt Grieshop (grieshop@msu.edu), Paul Owen-Smith and Jacob Malsch, Michigan State University, East Lansing, MI

**Maredia, Karim M.**

Integrated pest management in central Asia Karim Maredia (kmaredia@msu.edu), Michigan State University, East Lansing, MI

**Matlock, Jason M.**

Field-scale exploration of invertebrate communities with metagenomic approaches: Detritivores in apple orchards Jason Matlock (matlockj@msu.edu) and Matt Grieshop, Michigan State University, East Lansing, MI

**McCullough, Deborah G.**

Shedding light on emerald ash borer (Agrilus planipennis) indirect effects on aquatic ecosystem function Courtney Larson (larso126@msu.edu), Patrick Engelken, Jennifer Pechal, Deborah G. McCullough and M. Eric Benbow, Michigan State University, East Lansing, MI

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Evaluation of three products to protect American beech tree from beech scale (Cryptoccus fagisuga Lind.) and beech bark disease James Wieferich (wiefer10@msu.edu) and Deborah G. McCullough, Michigan State University, East Lansing, MI

Evaluation of galls caused by Asian chestnut gall wasp on chestnut cultivars in commercial orchards in Michigan Louise Labbate (daquilal@msu.edu) and Deborah McCullough, Michigan State University, East Lansing, MI

Effects of paclobutrazol on systemic neonicotinoid insecticides applied to four Fraxinus species over three years Andrew Tluczek¹, Deborah McCullough (mccullo6@msu.edu)¹, Sara Tanis¹,
Six-year evaluation of systemic insecticides applied at one-, two-, and three-year intervals for emerald ash borer control Deborah McCullough (mccullo6@msu.edu)¹, Therese Poland², Andrew Tluczek¹, James Wieferich¹, Andrea Anulewicz³ and Nathan Siegert⁴, ¹Michigan State University, East Lansing, MI, ²USDA - Forest Service, Lansing, MI, ³USDA - APHIS, Brighton, MI, ⁴USDA - Forest Service, Durham, NH

Merritt, Richard

An Introduction to the Aquatic Insects of North America: A new edition Richard Merritt¹, M. Eric Benbow (benbow@msu.edu)¹, Martin B. Berg² and Kenneth Cummins¹, ¹Michigan State University, East Lansing, MI, ²Loyola University, Chicago, IL

Milbrath, Meghan O.

Linking landscapes to honey bee (Apis mellifera) health in southern Michigan Gabriela Quinlan (quinlang@msu.edu)¹, Meghan Milbrath¹, Rufus Isaacs¹ and Clint Otto², ¹Michigan State University, East Lansing, MI, ²U.S. Geological Survey, Jamestown, ND

Mota-Sanchez, David

Field evolved resistance of arthropods to pesticides: An analysis of resistance adaptation from 1914 to 2017 David Mota-Sanchez (motasanc@msu.edu) and John Wise, Michigan State University, East Lansing, MI

Myers, Andrew Thomas

Effects of habitat on monarch butterfly (Danaus plexippus) oviposition and egg and larvae survival Andrew Myers (myersan7@msu.edu), Michigan State University, East Lansing, MI

Nielsen, Anne

Flower power: Habitat management to support crop pollination and pest management Brett Blaauw (bblaauw@uga.edu)¹, Rufus Isaacs² and Anne Nielsen², ¹University of Georgia, Athens, GA, ²Michigan State University, East Lansing, MI

Nomura, Yoshiko

Field evolved resistance of arthropods to pesticides: An analysis of resistance adaptation from 1914 to 2017 David Mota-Sanchez (motasanc@msu.edu) and John Wise, Michigan State University, East Lansing, MI
Osborn, Rachel

Developing an identification tool for Southeast Asian xyleborine ambrosia beetles (Coleoptera: Curculionidae: Scolytinae) Sarah Smith (Smith462@msu.edu), Roger A. Beaver, Jiří Hulcr, Rachel Osborn, Sudhir Singh and Anthony Cognato, Michigan State University, East Lansing, MI, Chiangmai, Thailand, University of Florida, Gainesville, FL, Michigan State University, Okemos, MI, Forest Research Institute, Dehradun, India

Owen-Smith, Paul

Spray coverage of a solid set canopy delivery system in grapes, raspberries, and blueberries Matt Grieshop (grieshop@msu.edu), Paul Owen-Smith and Jacob Malsch, Michigan State University, East Lansing, MI

Pechal, Jennifer L.

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Calliphoridae microbiome dynamics during decomposition Jennifer Pechal (pechalje@msu.edu), Courtney Weatherbee and M. Eric Benbow, Michigan State University, East Lansing, MI

Shedding light on emerald ash borer (Agrilus planipennis) indirect effects on aquatic ecosystem function Courtney Larson (larso126@msu.edu), Patrick Engelken, Jennifer Pechal, Deborah G. McCullough and M. Eric Benbow, Michigan State University, East Lansing, MI

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Insects and microbes drive VOC emission from decomposing carrion resources Jonathan A. Cammack (jcammack_07@tamu.edu), Jennifer Pechal, Stephen Sweet, Tawni Crippen, Anthony Knap, M. Eric Benbow and Jeffery K. Tomberlin, Texas A&M University, College Station, TX, Michigan State University, East Lansing, MI, USDA - ARS, College Station, TX

The characterization of louse fly microbiomes on migrating raptors: Implications for avian pathogen dispersal Kayli Thomas (klthoma3@millersville.edu), Rebecca McCabe, Joseph Receveur, M. Eric Benbow, Jennifer Pechal and John R. Wallace, Millersville University of Pennsylvania, Millersville, PA, Acopian Center for Conservation Learning at Hawk Mountain Sanctuary, Orwigsburg, PA, Michigan State University, East Lansing, MI
Pinilla-Gallego, Mario Simon

Mason bee construction: Patterns of soil composition across species, nest tubes, and partitions
Mario Pinilla-Gallego (simonpinilla@yahoo.com), James Crum and Rufus Isaacs, Michigan State University, East Lansing, MI

Pu, Jian

Cis-regulatory evolution in the elongase bond underlies a pheromonal difference between Drosophila species Jian Pu (pujian@msu.edu)\textsuperscript{1}, Jessa Justen\textsuperscript{2}, Joanne Yew\textsuperscript{3} and Henry Chung\textsuperscript{1}, \textsuperscript{1}Michigan State University, East Lansing, MI, \textsuperscript{2}University of Wisconsin, Madison, WI, \textsuperscript{3}University of Hawai'i, Honolulu, HI

Quinlan, Gabriela

Linking landscapes to honey bee (Apis mellifera) health in southern Michigan Gabriela Quinlan (quinlang@msu.edu)\textsuperscript{1}, Meghan Milbrath\textsuperscript{1}, Rufus Isaacs\textsuperscript{1} and Clint Otto\textsuperscript{2}, \textsuperscript{1}Michigan State University, East Lansing, MI, \textsuperscript{2}U.S. Geological Survey, Jamestown, ND

Receveur, Joseph P.

Building capacity for NGS data analysis in sub-Saharan Africa to improve public health research Joseph Receveur (josephreceveur@gmail.com)\textsuperscript{1}, Luc Djogbenou\textsuperscript{2} and M. Eric Benbow\textsuperscript{1}, \textsuperscript{1}Michigan State University, East Lansing, MI, \textsuperscript{2}Université d'Abomey-Calavi, Ouidah, Benin

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Rowe, Logan

Plant selection to support pollinators and natural enemies in Michigan farm landscapes and beyond Logan Rowe (roweloga@msu.edu), Dan Gibson, Rufus Isaacs and Douglas A. Landis, Michigan State University, East Lansing, MI
Sari, Gina

Multiple DNA loci for identification of southeast Asian ambrosia beetles (Coleoptera: Curculionidae: Scolytinae: Xyleborini) Gina Sari (sarigina@msu.edu), Sarah Smith, You Li, Thai Pham, Wisut Sittichaya, Hisashi Kajimura, Sudhir Singh, Jiri Hulcr and Anthony Cognato, 1Michigan State University, East Lansing, MI, 2University of Florida, Gainesville, FL, 3Vietnam National Museum of Nature, Hanoi, Vietnam, 4Prince of Songkla University, Hat Yai, Thailand, 5Nagoya University, Nagoya, Japan, 6Forest Research Institute, Dehradun, India

Smith, James J.

A 28S rRNA D2-D3 expansion variant useful in molecular identification of the apple maggot, Rhagoletis pomonella and the snowberry fly, R. zephyria James Smith (jimsmith@msu.edu), Daniel Hulbert, Mike Klaus and Guy Bush, 1Michigan State University, East Lansing, MI, 2Washington State Department of Agriculture, Yakima, WA, 3Michigan State University, Fish Creek, WI

From host race to species: Genome-wide divergence parallels ecological variation within and across species in the Rhagoletis pomonella complex (Diptera: Tephritidae) Meredith Doellman (mdoellma@nd.edu), Thomas Powell, Katherine Inskeep, Scott Egan, Gregory Ragland, Peter Meyers, Glen Hood, James Smith, Stewart Berlocher and Jeffrey Feder, 1University of Notre Dame, Notre Dame, IN, 2State University of New York, Binghamton, NY, 3Rice University, Houston, TX, 4University of Colorado, Denver, CO, 5Michigan State University, East Lansing, MI, 6University of Illinois, Champaign, IL

A new species of Rhagoletis (Diptera: Tephritidae) in the tabellaria species group: Morphology, molecular phylogenetics, and host-plant use Daniel Hulbert (hulbertd@msu.edu), Morgan Jackson and James Smith, 1Michigan State University, East Lansing, MI, 2University of Guelph, Guelph, ON, Canada

Investigation of genetic diversity in mtDNA (COI-COII) region of Ceratitis capitata Wiedmann (Diptera: Tephritidae) in the eastern Mediterranean region of Turkey Adnan Tusun and Serdar Satar (hserhat@cu.edu.tr), 1Çukurova University, Adana, Turkey, 2Michigan State University, East Lansing, MI, 3Çukurova University, Adana, Turkey

Smith, Sarah

Developing an identification tool for Southeast Asian xyleborine ambrosia beetles (Coleoptera: Curculionidae: Scolytinae) Sarah Smith (Smith462@msu.edu), Roger A. Beaver, Jiri Hulcr, Rachel Osborn, Sudhir Singh and Anthony Cognato, 1Michigan State University, East Lansing, MI, 2Chiangmai, Thailand, 3University of Florida, Gainesville, FL, 4Michigan State University, Okemos, MI, 5Forest Research Institute, Dehradun, India
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Smitley, David

Long-term suppression of Japanese beetle by Ovavesicula popilliae, a microsporidean pathogen David Smitley (smitley@msu.edu), Michigan State University, East Lansing, MI

Management options for greenhouse pests that protect pollinators Cristi L. Palmer (palmer@aesop.rutgers.edu)¹, James A. Bethke², Juang-Horang Chong³, Daniel Gilrein⁴ and David R. Smitley⁵, ¹Rutgers, The State University of New Jersey, New Brunswick, NJ, ²University of California Cooperative Extension, San Diego, CA, ³Clemson University, Clemson, SC, ⁴Long Island Horticultural Research and Extension Center, Riverhead, NY, ⁵Michigan State University, East Lansing, MI

Stone, Jaclyn

Induction phenology and response to semiochemicals of winter morph spotted wing Drosophila Heather Leach (leachhea@msu.edu), Danielle Kirkpatrick, Jaclyn Stone, Peng Xu, Ke Dong, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

Szendrei, Zsofia

Navigating trade-offs between pest management and pollinator conservation in cucurbits Thomas Wood (woodtho4@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

Use of a cue hierarchy for host plant selection in Pieris rapae (Lepidoptera: Pieridae) oviposition Margaret Lund (lundmar6@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

Perspectives on the role of habitat management in sustainable agriculture Zsofia Szendrei (szendrei@msu.edu), Michigan State University, East Lansing, MI

Habitat management for conservation biocontrol of a stem mining fly Amanda Buchanan (alynn@msu.edu), Adam Ingrao and Zsofia Szendrei, Michigan State University, East Lansing, MI
Molecular diagnostics and phylogenetics of aster yellows phytoplasma (AYp) in leafhoppers
Zsofia Szendrei (szendrei@msu.edu), Katherine Demeuse, Ari Grode, Ellen Cole and Carolyn Malmstrom, Michigan State University, East Lansing, MI

Natural enemy attraction to herbivore induced asparagus volatiles
Adam Ingrao (ingraoad@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

The impact of strip tillage and cover crops on pests and beneficials in organic squash
Sarah Galley (galleysa@msu.edu) and Zsofia Szendrei, Michigan State University, East Lansing, MI

Tanis, Sara

Effects of paclobutrazol on systemic neonicotinoid insecticides applied to four Fraxinus species over three years
Andrew Tluczek¹, Deborah McCullough (mccullo6@msu.edu)¹, Sara Tanis¹, James Wieferich¹ and Phillip A. Lewis², ¹Michigan State University, East Lansing, MI, ²USDA - APHIS, Buzzards Bay, MA

Tluczek, Andrew R.

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Six-year evaluation of systemic insecticides applied at one-, two-, and three-year intervals for emerald ash borer control
Deborah McCullough (mccullo6@msu.edu)¹, Therese Poland², Andrew Tluczek¹, James Wieferich¹, Andrea Anulewicz³ and Nathan Siegert⁴, ¹Michigan State University, East Lansing, MI, ²USDA - Forest Service, Lansing, MI, ³USDA - APHIS, Brighton, MI, ⁴USDA - Forest Service, Durham, NH

Van Timmeren, Steven

Severe induction of a native secondary pest by an invasive primary pest: The role of natural enemies
Philip Fanning (fanning9@msu.edu), Benjamin Johnson, Steven Van Timmeren and Rufus Isaacs, Michigan State University, East Lansing, MI

The salt test method: an efficient tool to monitor for spotted wing drosophila infestation in fruit
Lauren Diepenbrock (laurendiepenbrock@gmail.com)¹, Steven Van Timmeren², Matt Bertone¹, Hannah Burack¹ and Rufus Isaacs², ¹North Carolina State University, Raleigh, NC, ²Michigan State University, East Lansing, MI
A semi-field bioassay protocol for assessing the effectiveness of field-aged insecticides against spotted-wing drosophila Steven Van Timmeren (vantimm2@msu.edu) and Rufus Isaacs, Michigan State University, East Lansing, MI

Wang, Qiang

Molecular basis of pyrethroid repellency Peng Xu¹, Qiang Wang¹, Feng Liu¹, Elizabeth Bandason¹, Yoshiko Nomura¹, Shaoying Wu¹, Yuzhe Du¹, Leticia Smith², Jeff Scott², Kamlesh R. Chauhan³ and Ke Dong (dongk@cns.msu.edu)¹, ¹Michigan State University, East Lansing, MI, ²Cornell University, Ithaca, NY, ³USDA - ARS, Beltsville, MD

Weatherbee, Courtney R.

Calliphoridae microbiome dynamics during decomposition Jennifer Pechal (pechalje@msu.edu), Courtney Weatherbee and M. Eric Benbow, Michigan State University, East Lansing, MI

Weber, Marjorie

The macroevolution of mite defense: Tiny bodyguards on the tree of life Marjorie Weber (marjorie.gail@gmail.com), Michigan State University, East Lansing, MI

Wetzel, William C.

Heat waves, indirect defenses, and the dynamics of tri-trophic interactions William Wetzel (william.wetzel@gmail.com), Michigan State University, East Lansing, MI

Wieferich, James B.

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Williamson, Julie A.

Nasonov-based dispensers for pollinator attraction in blueberry, apple and cherry Julie Williamson (adamsju6@gmail.com), Christopher G. Adams, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

Wilson, Julianna K.

Lessons learned from establishing wildflower plantings for wild bee conservation near perennial fruit crops in Michigan Julianna Wilson (jkwilson@msu.edu)¹, Rufus Isaacs¹, Thomas Wood¹ and Jason Gibbs², ¹Michigan State University, East Lansing, MI, ²University of Manitoba, Winnipeg, MB, Canada

Field-level fungicide exposure to honey bees (Apis mellifera) during orchard bloom in Michigan Jacquelyn Albert (albertj9@msu.edu) and Julianna Wilson, Michigan State University, East Lansing, MI

Wise, John C.

Field evolved resistance of arthropods to pesticides: An analysis of resistance adaptation from 1914 to 2017 David Mota-Sanchez (motasanc@msu.edu) and John Wise, Michigan State University, East Lansing, MI

Wood, Thomas J.

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Wu, Shaoying

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Xu, Peng

Induction phenology and response to semiochemicals of winter morph spotted wing Drosophila

Heather Leach (leachhea@msu.edu), Danielle Kirkpatrick, Jaclyn Stone, Peng Xu, Ke Dong, Larry Gut and Rufus Isaacs, Michigan State University, East Lansing, MI

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